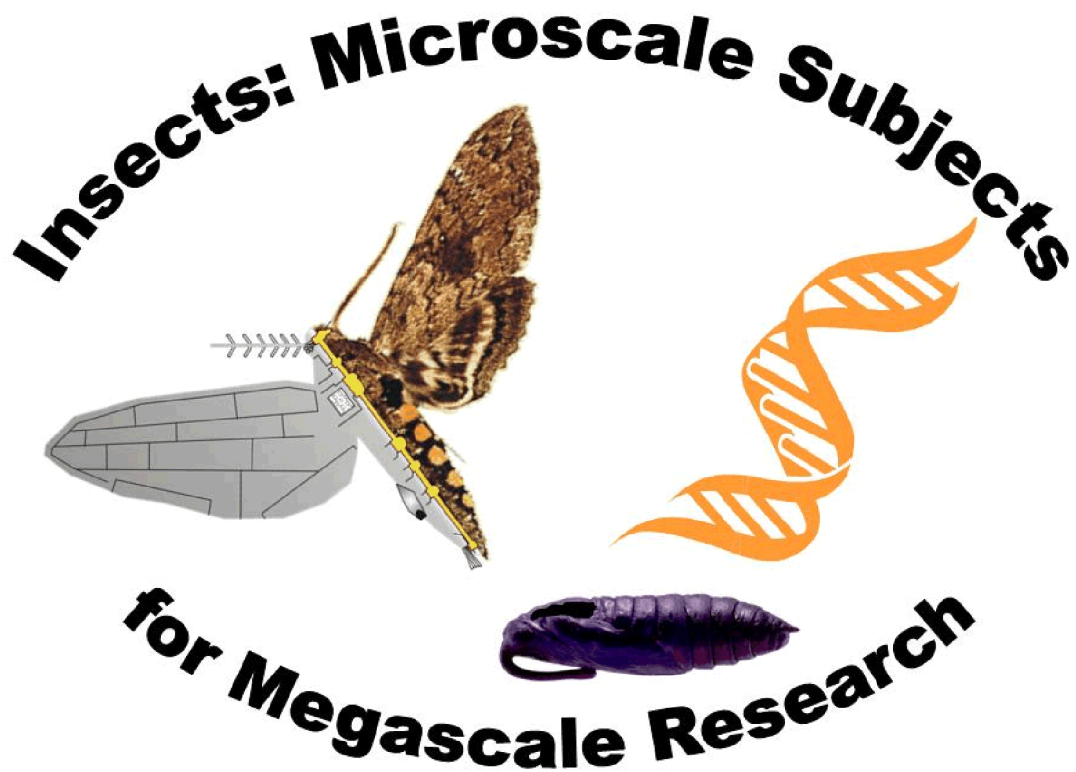
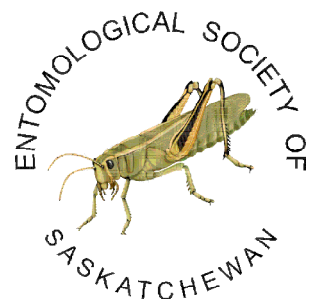


Entomological Society of Canada/
Entomological Society of Saskatchewan



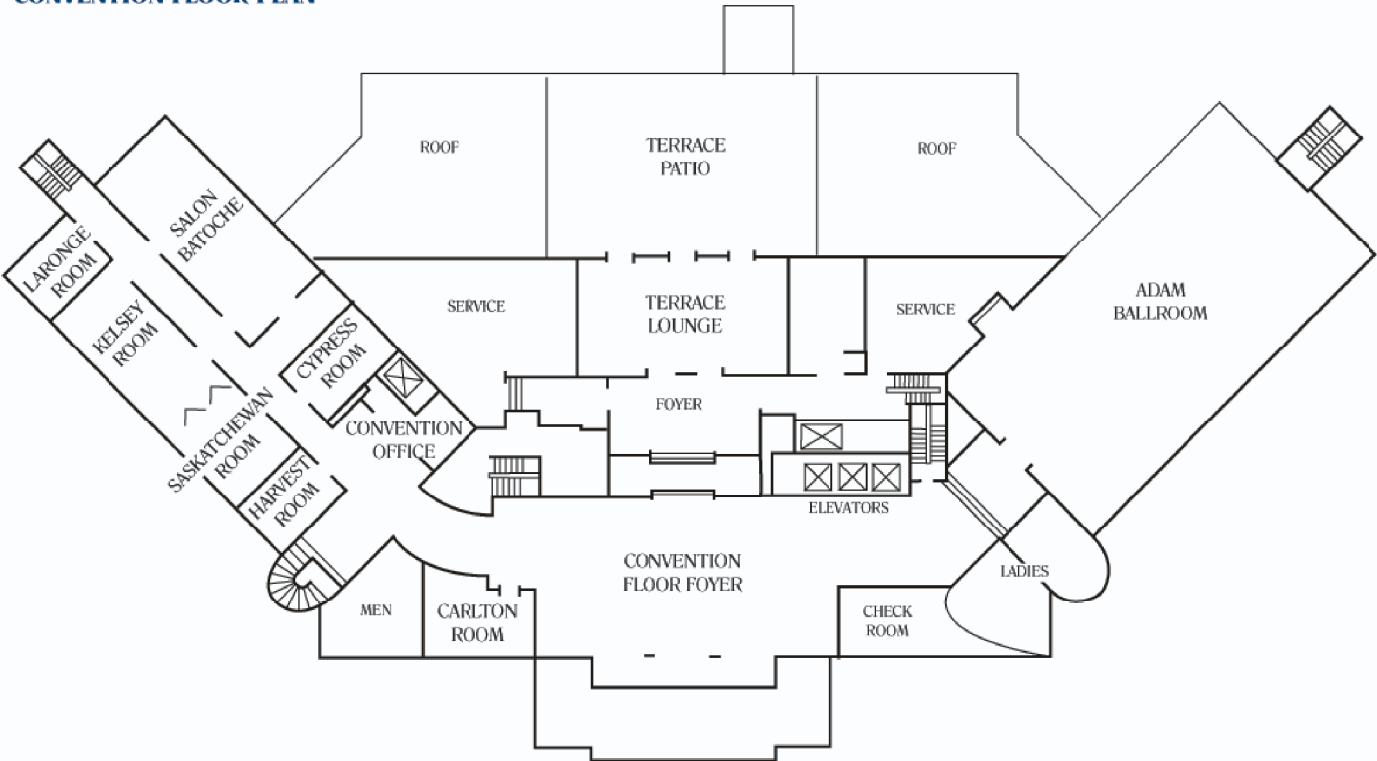
Delta Bessborough Hotel
Saskatoon SK

29 Sept. - 3 Oct. 2007



Delta Bessborough

CONVENTION FLOOR PLAN



MEZZANINE FLOOR

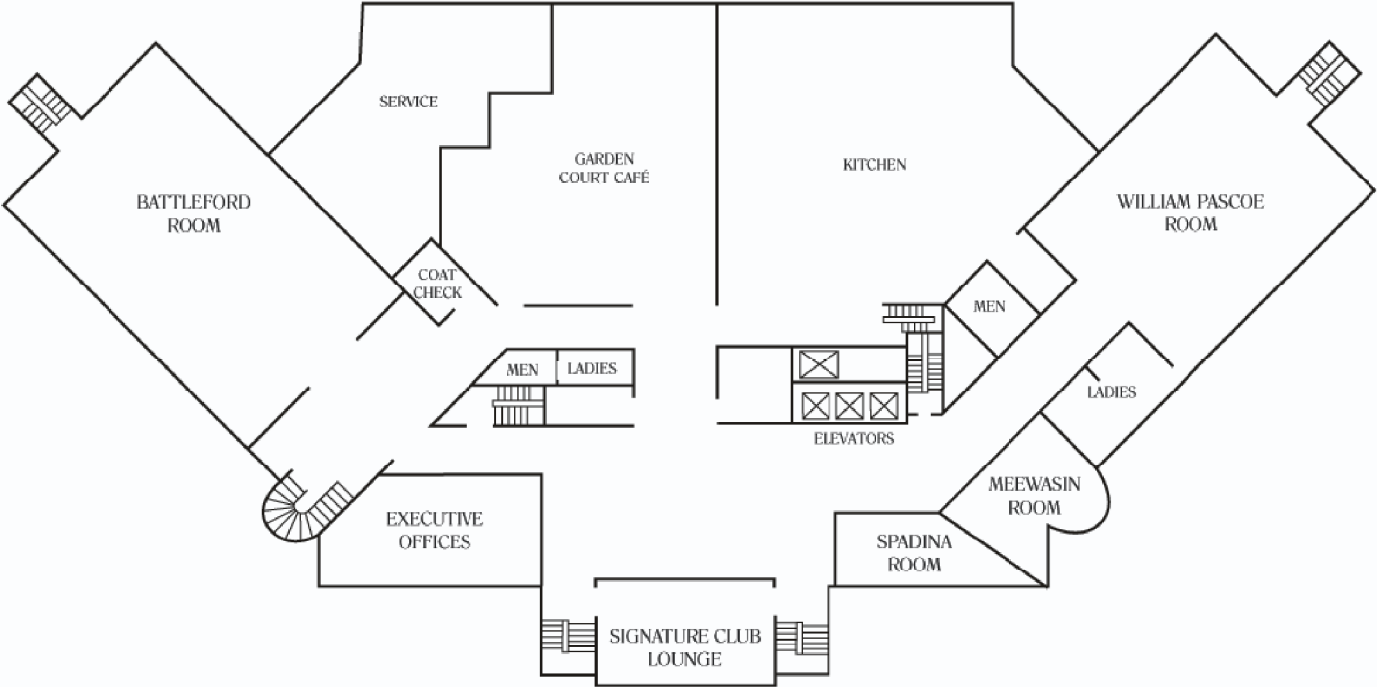


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Society Officers - 2007

Entomological Society of Canada

President/Président

Peggy Dixon

Secretary/Secrétaire

Rick West

First Vice-president/Premier vice-président

Terry Shore

Treasurer/Trésorier

Patrice Bouchard

Second Vice-president/Deuxième vice-président

Paul Fields

Past President/ Président sortant

Dan Quiring

Scientific Editors/Editeurs scientifique

Robb Bennett (**The Canadian Entomologist**)

Kevin Floate (**Bulletin**)

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President

Julie Soroka

Secretary

Larry Grenkow

Vice-president

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Treasurer

Dwayne Hegedus

Past President

Art Davis

Regional Director to E.S.C.

Chrystel Olivier

2007 Joint Annual Meeting Organising Committee

General Chairperson

Dwayne Hegedus

Scientific Program

Martin Erlandson

Cedric Gillott

Treasurer/Registration

Lorraine Braun

Fundraising

Lorraine Braun

Phil Curry

Art Davis

Cedric Gillott

Dwayne Hegedus

Julie Soroka

Local Arrangements/Accommodations

Wayne Goerzen

Keith Moore

Registration

Lorraine Braun

Julie Soroka

Audio-visual/Displays

Doug Baldwin

Banquet/Receptions

Margie Gruber

Keith Moore

Owen Olfert

Tour

Margie Gruber

Transportation

Art Davis

Awards

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Larry Grenkow

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Margie Gruber

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Printing

Cedric Gillott

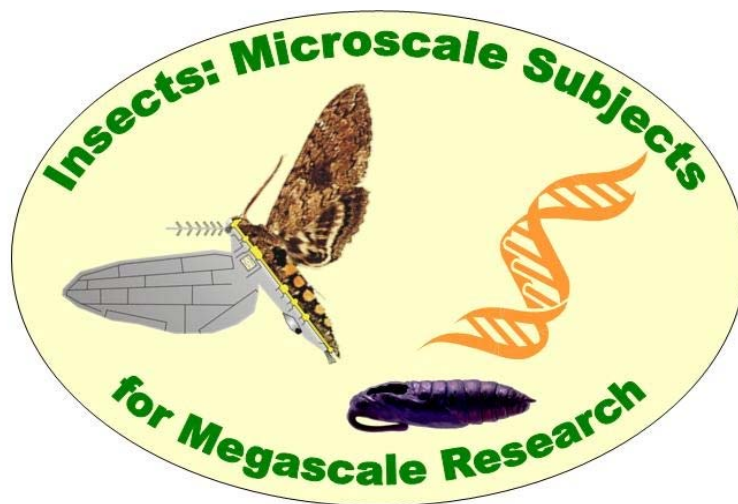
Deidre Wasyliv (layout)

INSECTS: MICROSCALE SUBJECTS FOR MEGASCALE RESEARCH

The starring roles of insects as models in the establishment of biological principles, especially in genetics and ecology, their central position in energy flow from primary producers to upper-level consumers in ecosystems, and as both friend and foe in integrated pest-management schemes are well known. Entomological research is now being taken in new and exciting directions with the advent of molecular biology, nanotechnology and biologically-inspired artificial systems. Whole genome sequences are now available for several insects of commercial and agriculture importance, powerful light sources allow one to probe matter at the atomic level and advanced sensors and imaging systems are helping to elucidate the emerging principles of insect biomechanics and neurophysiology. These technologies serve to advance the state of traditional entomological studies such as physiology, taxonomy and the development of safe strategies for improved pest management, while generating a wealth of information for non-traditional activities. Indeed, ambitious programs are in place to develop highly maneuverable robotic systems and micro air vehicles that emulate the non-steady state aerodynamics of flapping insect wings; to design and fabricate artificial sensors that attain the sensitivity and dynamic range of insect sensory systems; and to impart the host with the ability to disrupt aspects of insect physiology by targeting specific molecules or proteins with antibodies. Clearly, an intimate knowledge of insect biology is requisite for success in these ventures.

The aim of JAM2007 is to introduce researchers from multi-disciplinary areas to both the new and established entomological tools and concepts, ultimately leading to a plethora of exciting research opportunities in the foreseeable future.

JAM2007 LOGO



The logo reflects the development of new avenues of entomological research as represented by the hybrid moth and DNA strand "emerging" from the pupal case. The strand of DNA symbolizes progress in molecular approaches to basic and applied studies using insects. The hybrid moth denotes recent attempts to model insect behaviour and physiology to create biologically-inspired artificial systems.

General Information

Visual Aids

Power Point is the only system available for presentations. Speakers must bring their file on a compact disc or memory stick for downloading to the room of their presentation at least 30 minutes before the session is due to start; that is, not later than 08:00 for morning sessions and not later than 13:00 for afternoon sessions.

No 'rehearsal room' is available.

Posters

Posters (1.2 m high x 1.0 m wide) should be set up in the William Pascoe Room between 12:00 and 13:30 on Sunday, September 30, 2007. Each poster has been assigned a number (see Program or Alphabetical List of Abstracts) and should be set up in the space allocated.

Pins or Velcro will be provided dependent on the type of board.

Poster presenters should be in attendance at their poster from 16:15 to 17:45 on Sunday, September 30, 2007.

Posters may be taken down at the presenter's discretion, but not before 23:00 on Sunday, 30 September, 2007.

Poster boards will be moved to the Convention Floor Foyer on the morning of Monday, October 1, 2007.

SUMMARY OF MEETING SCHEDULE

Saturday, 29 September

08:30 – 17:30	Entomological Society of Canada Governing Board meeting	<i>Salon Batoche</i>
14:30 – 17:00	Synchrotron Tour (Buses depart from Delta Bessborough)	<i>Canadian Light Source</i>
16:00 – 20:00	Registration	<i>Spadina</i>

Sunday, 30 September

08:00 – 17:00	Registration	<i>Spadina</i>
08:30 – 10:00	Opening Ceremonies, ESC Awards, Gold Medal Address	<i>Battleford Room</i>
10:30 – 12:00	Plenary Session: Insects: Microscale Subjects for Megascale Research	<i>Battleford Room</i>
12:00 – 13:30	Poster set-up	<i>William Pascoe Room</i>
13:30 – 16:15	President's Prize Papers Session A (Semiochemicals) Session B (Ecology)	<i>Terrace Lounge Salon Batoche</i>
16:15 – 17:45	Poster Session (President's Prize Entries and Contributed) (presenters in attendance)	<i>William Pascoe Room</i>
19:30 – 20:30	Student Social	<i>William Pascoe Room</i>
20:30 – 23:00	General Mixer	<i>William Pascoe Room</i>

Monday, 1 October

08:30 – 12:00	President's Prize Papers Session C (Biology) Session D (Pests and Their Management)	<i>Salon Batoche Terrace Lounge</i>
13:00 – 13:15	Buses depart for Wanuskewin	<i>Venue TBA</i>

17:00 – 17:30	Heritage Lecture: Drifting and Diagonal Swimming in the Ag Canada Flow: A Personal Account of Weed Biocontrol in Canada	<i>Wanuskewin</i>
17:30	Buses return from Wanuskewin	
17:45 – 18:30	ESC Annual General Meeting	<i>Wanuskewin</i>
18:30	Buses return from Wanuskewin	
19:30 – 20:30	ESC Governing Board Meeting	<i>Vice-regal Suite</i>
20:30 - ?	President's Reception (by invitation)	<i>Vice-regal Suite</i>

Tuesday, 2 October

08:30 – 12:00	Symposium I (Dependence, Deception and Death: Insect-Microbe Interactions)	<i>Adam Ballroom</i>
08:30 – 12:00	Contributed Paper Session I (Ecology)	<i>Terrace Lounge</i>
13:30 – 17:00	Graduate Student Symposium (Microscale Models Mirror Metacommunity Dynamics)	<i>Adam Ballroom</i>
13:30 – 17:00	Contributed Paper Session II (Arthropod Biology)	<i>Terrace Lounge</i>
18:00 – 19:00	Cocktails	<i>Battleford Room</i>
19:00 – 23:00	Banquet and Award Presentations	<i>Battleford Room</i>

Wednesday, 3 October

08:30 – 12:00	Symposium II (Tiny Brains, Big Ideas: Insects as Model Systems)	<i>Adam Ballroom</i>
08:30 – 12:00	Contributed Paper Session III (Pest Management)	<i>Terrace Lounge</i>

Satellite activities

Friday, 28 September

Time TBA AAFC, Bio-Control Working Group *AAFC, SRC*

Monday, 1 October

19:00 – 21:00 Canadian Forum for Biological Control *Terrace Lounge*

Tuesday, 2 October

12:00 – 13:30 *The Canadian Entomologist* Editorial Board
Luncheon Meeting *Salon Batoche*

PROGRAM

Saturday, 29 September

08:30 – 17:30	Entomological Society of Canada Governing Board meeting	<i>Salon Batoche</i>
14:30 – 17:00	Synchrotron Tour (Buses depart from Delta Bessborough)	<i>Canadian Light Source</i>
16:00 – 20:00	Registration	<i>Spadina</i>

Sunday, 30 September

08:00 – 17:00	Registration	<i>Spadina</i>
08:30 – 10:00	Opening Ceremonies	<i>Battleford Room</i>
	▶ Introduction and Welcome	
	● Dwayne Hegedus , Chair, Organizing Committee	
	● Peggy Dixon , President, ESC	
	● Julie Soroka , President, ESS	
	▶ ESC Awards Presentation	
	● Peggy Dixon	
	▶ C. Gordon Hewitt Award Recipient	
	● Maya Evenden	
	▶ Gold Medal Recipient	
	● Cedric Gillott	
	▶ Gold Medal Address: Forty-odd years of Entomological Serendipity	
10:00 – 10:30	Refreshment Break	
10:30 – 12:00	Plenary Session: Insects: Microscale Subjects for Megascale Research	<i>Battleford Room</i>
10:30 – 11:10	Casting New Light on Familiar Insects. Helen Nichol	
11:10 – 11:50	How Do Insects and Insect Inspired Robots	

Deal with Barriers?
Roy E. Ritzmann

11:50 – 12:00 Discussion

12:00 – 13:30 Poster set-up

*William Pascoe
Room*

12:00 – 13:30 LUNCH

Sunday, 30 September

**13:30 – 16:15 President's Prize Papers (Session A):
Semiochemicals**

Terrace Lounge

13:30 – 13:45 Contact and Airborne Aggregation Pheromones of the Common Bed Bug, *Cimex lectularius* Linnaeus (Hemiptera: Cimicidae).
Eric Siljander, Dan Penman, Harold Harlan, Regine Gries, Gerhard Gries

13:45 – 14:00 Aggregation Pheromone of the European Earwig, *Forficula auricularia* (Dermaptera: Forficulidae).
Gagandeep Hehar, Regine Gries, Grigori Khaskin, Gerhard Gries

14:00 – 14:15 Pheromonal Communication in Common Silverfish, *Lepisma saccharina*, Giant Silverfish, *Ctenolepisma longicaudata*, and Firebrat, *Thermobia domestica* (All Thysanura: Lepismatidae).
Nathan Woodbury, Gerhard Gries

14:15 – 14:30 Does Larval Aggregation Pheromone of Codling Moth, *Cydia pomonella*, Induce Attraction or Arrestment of Receivers?
Zaid Jumean, Charlene Wood, Gerhard Gries

14:30 – 14:45 Evidence for Specimen-specific Mate Marking Pheromone in the Parasitoid Wasp *Ooencyrtus kuvanae* (Hymenoptera: Encyrtidae).
Kelly M. Ablard, Paul W. Schaefer, Gerhard Gries

- 14:45 – 15:00 Juvenile Hormone Mediates Pheromone Response in a Long-lived Moth, *Caloptilia fraxinella* (Gracillaridae: Lepidoptera).
Joelle K. Lemmen, Maya L. Evenden
- 15:00 – 15:30 Refreshment Break
- 15:30 – 15:45 Development of a Semiochemical-based Monitoring System for Diamondback Moth *Plutella xylostella* (L.) (Lepidoptera – Plutellidae) on Canola.
Christine E. Miluch, Lloyd M. Dossall, Maya L. Evenden
- 15:45 – 16:00 Attractiveness of Girdled Paper Birch (*Betula papyrifera*) to the Bronze Birch Borer *Agrilus anxius* (Coleoptera: Buprestidae).
Connie K. Chan, Joseph D. Shorthouse, D. Barry Lyons
- 13:30 – 16:15 President’s Prize Papers (Session B): Ecology** *Salon Batoche*
- 13:30 – 13:45 Effects of Harvesting on Spider Assemblages in the Canopy of Aspen (*Populus tremuloides*) and White Spruce (*Picea galuca*) Stands in the Boreal Forest.
Jaime Pinzon, John Spence
- 13:45 – 14:00 Does Species Sorting Occur in Spider Colonization of Old Field Saplings?
Carol Frost, Chris Buddle
- 14:00 – 14:15 Spatial Distribution of Oribatid Mite (Acari: Oribatida) Assemblages in a Southern Quebec Forest.
Zachary A. Sylvain, Christopher M. Buddle
- 14:15 – 14:30 Distribution of Native and Invading Tree-hole and Container-breeding Mosquitoes (Diptera: Culicidae) in Ontario.
Roger Kroeker, F. F. Hunter
- 14:30 – 14:45 Pollination Effectiveness of Insect Visitors to *Lythrum salicaria* L. (Purple Loosestrife) in Saskatchewan.

Wade D. Caswell, Arthur R. Davis

- 14:45 – 15:00 Novel Use of Ash Leaflets Rolled by the Ash Leaf Coneroller, *Caloptilia fraxinella* (Lepidoptera: Gracillariidae), by the Cottony Ash Psyllid, *Psilopsis discrepans* (Homoptera: Psyllidae).
Tyler J. Wist
- 15:00 – 15:30 Refreshment Break
- 15:30 – 15:45 Understanding the Life History of Adelgids (Hemiptera: Adelgidae).
Babita Bains, Ward Strong, John McLean
- 15:45 – 16:00 Life History and Population Dynamics of Ambermarked Birch Leafminer (*Profenusa thomsoni* Konow) an Alien Species Infesting Urban Birch (*Betula*) Forests in Alaska.
Chris J K MacQuarrie, David W Langor, John R Spence
- 16:00 – 16:15 Synchrotron Studies on Selenium in Insects: Environmental Implications.
Ruwandi Andrahennadi, Ingrid J. Pickering
- 16:15 – 17:45 Poster Session (President’s Prize Entries [*] and Contributed) (presenters in attendance)** *William Pascoe Room*
- *1. A Novel UV-Stress Tolerance System for the Entomopathogenic Fungus, *Beauveria bassiana*.
Kelly Aasen, George Khachatourians
2. What Happens when the Larva Doesn’t Die? – Potential Sublethal Impact of CpGV.
J. E. Cossentine, L.B.M. Jensen
- *3. Genetic Characterization and Comparison of Two MadiNPV Pick Plaque Isolates.
William R Reid, Melissa Strom, Martin Erlandson
4. Phylogenetic Analysis of *Wolbachia* Strains Found in *Plutella xylostella* (L.) (Lepidoptera: Yponomeutidae) and its Parasitoid *Diadegma*

insulare.

Philip D. Batista, B. Andrew Keddie, Harriet L. Harris

5. *Wolbachia* in the Fruit Fly – An Invasion Success Story.

Markus Riegler, Joris Witsenburg, **Kevin Floate**, Ryuichi Yamada, Jeremy Brownlie, Scott L. O'Neill

6. Novel products for Control of American Serpentine Leafminer *Liriomyza trifolii* in Greenhouse Floriculture.

Lisa Conroy, Cynthia Scott-Dupree, **Bruce Broadbent**, Graeme Murphy, Ron Harris, Justin Glatt

7. Effects of Seeding Date and Canola Species on Flea Beetle Damage in Alberta.

Héctor Cárcamo, Jennifer Otani, Lloyd Dodsall, Robert Blackshaw, George Clayton, Neil Harker, Kelly Turkington, John O'Donovan

8. Egg Parasitoids of Lygus Bugs in Southern Alberta.

Héctor Cárcamo, John Huber, Tracy Larson, Rob Bouchier

9. Can Insect Release Size Predict the Outcomes of Weed Biocontrol?

Rosemarie De Clerck-Floate

10. Identification of Climbing Cutworm (Lepidoptera: Noctuidae) Damaging Buds of Grapevines in the Southern Okanagan Valley, BC.

D. Thomas Lowery, James T. Troubridge, Gary J.R. Judd

*11. The Effect of Color on Oviposition Rate of Wheat Midge, *Sitodiplosis mosellana* (Diptera: Cecidomyiidae).

A. Hosseini Gharalari, M.A.H. Smith, S. Fox

12. Drilling into the Past: Effect of Long-term Leafminer Defoliation on Growth of Birch Trees 10 Years after the End of an Infestation.
Colin Bergeron, Chris JK MacQuarrie

*13. Field Evaluation of Trapping Methods for Insects on Soybean (*Glycine max* L.) and Dry Bean (*Phaseolus vulgaris* L.) in Puerto Rico.
Diego Viteri, Irma Cabrera, Amanda Hodges, Consuelo Estévez de Jensen, Byron Vega

14. Laboratory and Field Testing of a Pheromone- and Permethrin-based Attracticide against the Ash Leaf Cone Roller, *Caloptilia fraxinella* (Lepidoptera: Gracillariidae).
Maya L. Evenden, Regine Gries, Gerhard Gries

15. Distribution of *Rhagoletis mendax* (Diptera: Tephritidae) within New Brunswick, Canada, Based on Adult Trap Captures and Lowbush Blueberry, *Vaccinium angustifolium*, Fruit Infestation.
Sonia O. Gaul, Evans Estabrooks, Charles Vincent, Kenna MacKenzie

16. Prefeeding Behaviors and Feeding Preference of the Crucifer Flea Beetle, *Phyllotreta cruciferae* on Transgenic *Brassica napus*.
Jennifer M. Holowachuk, Margie Gruber, Julie Soroka

17. Non-Target Impact of Imidacloprid on Spider Abundance on Eastern Hemlock, *Tsuga canadensis*.
Abdul Hakeem, Jerome F. Grant, Paris L. Lambdin, Frank Hale and Rusty Rhea

18. Biodiversity Right under Your Nose: The First Survey of Nasal Mites (Arachnida: Acari) from Birds in Canada.
Wayne Knee, **Heather Proctor**, Terry Galloway

*19. The Effects of Variation in the Hive Environment on the Survival of the Honey Bee

Parasite, *Varroa destructor*.
Paul Kozak, Robert Currie

20. Damage to *Varroa destructor*, an
Ectoparasitic Mite of Honey Bees, Inflicted by
Ants (Hymenoptera: Formicidae).
Arthur R. Davis, Darya Bikey, Anirudh
Mirakhur

*21. Pollination Ecology of *Lilium
philadelphicum* L., Saskatchewan's Floral
Emblem.
Jessica Stolar, Arthur R. Davis

22. Seasonal Shifts in Ground Beetle
Diversity and Abundance in Raspberry
Plantations as Affected by Reflective
Groundcovers.
Tina Rousselle, Jean-Pierre Privé, Anita
Leblanc, **Gaétan Moreau**

*23. Diversity and Habitat Use of
Beetles (Coleoptera) in a Managed
Dairy Pasture in Nova Scotia, Canada.
Clayton W. D'Orsay

24. Preliminary Molecular Phylogeny of the
Pylalidae, with Special Focus on the Subfamily
Phycitinae.
Amanda D Roe, Brian Scholtens, **Thomas
Simonsen**, Susan Weller

*25. A Biodiversity Study of Muscid and
Fanniid flies (Diptera: Muscoidea) of Churchill
(MB).
Anaïs Renaud, Rob Roughley, Jade Savage

26. Beetle Ectoparasites of American Beavers:
Distribution and Biology.
Stewart B. Peck

27. Diet of *Skwala parallela* (Plecoptera:
Perlodidae) and *Zapada cinctipes* (Plecoptera:
Nemouridae) in a Prairie Headwater Stream.
Iain D. Phillips

19:30 – 20:30 Student Social *William Pascoe Room*

20:30 – 23:00 General Mixer *William Pascoe Room*

Monday, 1 October

**08:30 – 12:00 President's Prize Papers (Session C):
Arthropod Biology** *Salon Batoche*

08:30 – 08:45 Infrared Radiation from Cones: Foraging Cue for Western Conifer Seed Bugs (*Leptoglossus occidentalis*, Hemiptera: Coreidae) to Locate Feeding Sites.
Hannah Bottomley, Stephen Takács, Isak Andreller, Robb Bennett, Ward Strong, Gerhard Gries

08:45 – 09:00 Attraction of Indian meal moth (*Plodia interpunctella*) to Specific Wavelengths of Light.
Thomas Cowan, Gerhard Gries

09:00 – 09:15 Responses to Multimodal Sensory Cues in the Moth, *Manduca sexta*.
R. Verspui, J.R. Gray

09:15 – 09:30 Sensory Coding in an Identified Motion-sensitive Visual Neuron of *Locusta migratoria*.
Glyn A. McMillan, Jack Gray

09:30 – 09:45 Female German Cockroaches, *Blattella germanica* L. (Dictyoptera: Blattellidae), Join Conspecific Groups Based on Auditory Cues.
Rosanna Wijenberg, Melissa Cook, Stephen Takács, Gerhard Gries

09:45 – 10:00 Bioacoustic Communication in Lymantriid Moths: Sound as a Short-range Orientation Signal.
Eloise Rowland, Paul W. Schaefer, Stephen Takács, Gerhard Gries

10:00 – 10:30 Refreshment Break

- 10:30 – 10:45 Curiouser and Curiouser: The Sternum V Gland in Agathiphagidae.
Marie Djernæs, Niels Peder Kristensen
- 10:45 – 11:00 Messy Molecules and Morphology...also Known as the Systematics of the *Choristoneura fumiferana* Species Complex (Lepidoptera: Tortricidae).
Lisa M. Lumley, Felix A.H. Sperling
- 11:00 – 11:15 *Anopheles perplexens* and the *An. quadrimaculatus* Complex (Diptera: Culicidae): New Records for Canada?
Aynsley Thielman, F. F. Hunter
- 11:15 – 11:30 Characterization of Three New Insect Intestinal Mucins From Lepidopteran Peritrophic Matrix (PM) and Interaction of MacoNPV Enhancer with the PM Protein, McIIM1.
Umut Toprak, Martin Erlandson, Cedric Gillott, Dwayne D. Hegedus
- 11:30 – 11:45 Bacterial Symbionts on House Fly, *Musca domestica* (Diptera: Muscidae), Eggs Mediate Conspecific Oviposition, Inhibit Fungal Growth, and Supplement Larval Nutrition.
Kevin Lam, Kelsie Thu, Margo Moore, Gerhard Gries
- 11:45 – 12:00 Consequences of Larval Competition on Mating Strategies of Female Bruchids (Coleoptera: Bruchidae).
Daynika Schade, Steven Vamosi
- 08:30 – 12:00 President's Prize Papers (Session D): Pests and Their Management** *Terrace Lounge*
- 08:30 – 08:45 Assessing Grooming Behavior as a Defense against Varroa Mite (*Varroa destructor* A. & T) in Different Honey Bee (*Apis mellifera* L.) Stocks in Manitoba.
R. Bahreini, R.W Currie
- 08:45 – 09:00 Smoke from Burning Rice Husks Controls Stored-product Insects.
Wolly Wijayarathne

- 09:00 – 09:15 The Effects of the Trehalase Inhibitor, Validoxylamine A, on *Aedes aegypti* (Diptera: Culicidae).
Carolina I. Perez Orella, Carl A. Lowenberger
- 09:15 – 09:30 The Effects of Bacterial and Jasmonic Acid Treatments on Insects of Canola.
Kate Bergen, W.G. Dilantha Fernando, Neil J. Holliday
- 09:30 – 09:45 Effect of Time of Tree Removal on Potential of *Hylurgopinus rufipes* (Eichhoff) to Transmit Dutch Elm Disease Pathogens from Newly-diagnosed American Elm Trees in Manitoba.
S. Oghiakhe, N. J. Holliday
- 09:45 – 10:00 Field and Laboratory Studies on the Use of Lysozyme to Control Chalkbrood in Honey Bees.
Amanda Van Haga, Andrew B. Keddie, Stephen F. Pernal
- 10:00 – 10:30 Refreshment Break
- 10:30 – 10:45 Biochemical Analysis of the Isoforms of Proteinase from the Conidia of *Beauveria bassiana* and *Metarhizium anisopliae*.
Sohail S. Qazi, George G. Khachatourians
- 10:45 – 11:00 Prevalence of *Rickettsia* spp. and *Francisella* spp. in *Dermacentor* (Acari: Ixodidae) from the Canadian Prairies.
Shaun J. Dergousoff, Andrew J.A. Gajadhar, Neil B. Chilton
- 11:00 – 11:15 Refuges in Reverse: The Spread of *Bt* Resistance to Unselected Populations of Cabbage Looper, *Trichoplusia ni*.
Michelle T. Franklin, **Judith H. Myers**
- 11:15 – 11:30 The Influence of Visual and Olfactory Cues on Host Selection by the Cabbage Seedpod Weevil.
James A. Tansey, Lloyd M. Dosdall, B. Andrew Keddie

11:30 – 11:45	Field Efficacy Trials of a Candidate Biological Control Agent for Leek Moth. Wade Jenner , Ulrich Kuhlmann, Naomi Cappuccino, Peter G. Mason	
11:45 – 12:00	Tritrophic Interactions: Effects of Host Plant Nutritional Quality on the Performance of the Herbivore <i>Plutella xylostella</i> and its Parasitoid <i>Diadegma insulare</i> . Rana M. Sarfraz , Lloyd M. Dossall, Andrew B. Keddie	
12:00 – 13:15	LUNCH	
13:00 – 13:15	Buses depart for Wanuskewin	<i>Venue TBA</i>
17:00 – 17:30	Heritage Lecture: Drifting and Diagonal Swimming in the Ag Canada Flow: A Personal Account of Weed Biocontrol in Canada. Peter Harris	<i>Wanuskewin</i>
17:30	Buses return from Wanuskewin	
17:45 – 18:30	ESC Annual General Meeting	<i>Wanuskewin</i>
18:30	Buses return from Wanuskewin	
19:30 – 20:30	ESC Governing Board Meeting	<i>Vice-regal Suite</i>
20:30 - ?	President's Reception (by invitation)	<i>Vice-regal Suite</i>

Tuesday, 2 October

08:30 – 12:00	Symposium I: Dependence, Deception and Death: Insect-Microbe Interactions	<i>Adam Ballroom</i>
08:30 – 08:40	Introduction. Martin Erlandson	
08:40 – 09:25	Ants, Agriculture and Antibiotics: Ancient Coevolution in a Quadripartite Symbiosis. Cameron R. Currie	
09:25 – 10:00	Behavioral changes in fungal-infected insects Ann E. Hajek	

- 10:00 – 10:30 Refreshment Break
- 10:30 – 11:00 Polydnviruses: Their Association with Parasitic Wasps and Their Role in the Subjugation of Lepidopteran Hosts.
Michel Cusson
- 11:00 – 11:30 *Wolbachia* - Impacts on Insect Reproduction and Physiology.
Kevin Floate
- 11:30 – 11:55 Interactions between Phytoplasmas and Their Insect Vectors
Christel Olivier, Lorne Stobbs, Tom Lowery
- 08:30 – 12:00 Contributed Papers (Session I): Ecology** *Terrace Lounge*
- 08:30 – 08:45 Expansion of *Pterostichus melanarius* Ill. (Coleoptera:Carabidae) in the Edmonton Area over 17 Years.
Dustin J. Hartley, John R. Spence
- 08:45 – 09:00 Assessment of Disturbance of Urban Riparian Habitat Using Ground Beetle (Coleoptera: Carabidae) Surveys.
Robert McGregor
- 09:00 – 09:15 Introduction to the Impact of Earthworms on the Ground Beetles of the Eastern Deciduous Forest Leaf Litter.
Henri Goulet
- 09:15 – 09:30 The Effects of Patch Harvesting and Ground Scarification on Rove Beetles (Coleoptera, Staphylinidae) in Yellow Birch Dominated Forests of South-eastern Quebec.
Jan Klimaszewski, David W. Langor, H.E. James Hammond
- 09:30 – 09:45 Teasing out the Effects of Host Plant Quality and Predator Foraging Strategies on Leaf beetle Survival in Bioenergy Crops.
Gaétan Moreau, Christer Björkman
- 09:45 – 10:00 Modelling Mountain Pine Beetle Pathways to the Boreal Forest.

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

- 10:00 – 10:30 Refreshment Break
- 10:30 – 10:45 Using Coupled Plant-Herbivore Models to Explain, and Perhaps Predict, the Success of Weed Biocontrol Programs.
Brian H. Van Hezewijk, Robert S. Bouchier
- 10:45 – 11:00 Responses of the Cabbage Seedpod Weevil, *Ceutorhynchus obstrictus* (Marsham), to Host Plant Quality.
Lloyd M. Dossall, Ross McKenzie
- 11:00 – 11:15 An Interspersed Refuge Strategy to Preserve Wheat Midge Resistance in Wheat.
Marjorie A.H. Smith, Robert J. Lamb
- 11:15 – 11:30 The Forgotten Sex: Impact of Male Mosquitoes on Population Dynamics in *Anopheles gambiae*.
Bernard D Roitberg, Woodbridge A Foster
- 12:00 – 13:30 LUNCH
- 13:30 – 17:00 Graduate Student Symposium: Microscale Models Mirror Metacommunity Dynamics** *Adam Ballroom*
- 13:30 – 13:35 Introduction.
Chris Buddle
- 13:35 – 14:10 Multi-scale Research on Oribatid Mites in Eastern Managed Boreal Forest.
Andrea D. Déchêne, Christopher M. Buddle
- 14:10 – 14:45 The Importance of Host Specificity and Host Synchronization for Classical Biological Control of Cabbage Maggot in Prairie Canola.
Lars D. Andreassen, Ulrich Kuhlmann, Peter G. Mason, Neil J. Holliday
- 14:45 – 15:15 Refreshment Break
- 15:15 – 15:50 Who Goes First and Why: Pioneering and Joining in the Mountain Pine Beetle (*Dendroctonus ponderosae*).
Tanya Latty, Mary Reid

- 15:50 – 16:25 Sampling Flour Beetles in Flour Mills.
Karen Hawkin, Paul Fields, Dean Stanbridge
- 16:25 – 17:00 Patch Size and Colonisation Patterns: An Experimental Analysis of the Species-Area Relationship Using Artificial Canopy Habitats.
Zoë Lindo
- 13:30 – 17:00 Contributed Papers (Session II): Arthropod Biology/Phylogeny** *Terrace Lounge*
- 13:30 – 13:45 Effect of Nematode Parasites on Mate Choice and Fitness in the Mushroom-feeding Fly, *Drosophila falleni*.
Steve Perlman, Christina Ball
- 13:45 – 14:00 Highest Frequency Pure-tone Call Produced by an Insect.
Fernando Montealegre-Z., Glenn K. Morris, Andrew C. Mason
- 14:00 – 14:15 The Bizarre Male of *Spalangia dozieri* Burks (Hymenoptera: Chalcidoidea, Pteromalidae, Spalangiinae) — A Case of Male Phoresy?
Gary A.P. Gibson, Carolina Reigada
- 14:15 – 14:30 The European Invasion of the Red Clover Casebearer, *Coleophora deauratella* (Lepidoptera: Coleophoridae) in the Peace River Region Continues.
Jennifer Otani
- 14:30 – 14:45 The Banded Elm Bark Beetle, *Scolytus schevyrewi* (Curculionidae: Scolytinae): A New Exotic Pest Species in Western Canada.
Greg R. Pohl, Bruce D. Gill, Jeannette Wheeler, James W. Jones
- 14:45 – 15:00 Effect of Pheromone Chirality and Release Rate on Attraction of *Tetropium fuscum* (F.) (Coleoptera: Cerambycidae).
Jon Sweeney, Peter Silk, Jerzy Gutowski, Junping Wu, Jessica Price
- 15:00 – 15:30 Refreshment Break

- 15:30 – 15:45 Midgut Proteases of Larval *Mamestra configurata* (Bertha Armyworm): Gene Characterization and Analysis of Protease Adaption on Artificial and Plant Diets.
Martin Erlandson, Douglas Baldwin, Dwayne D. Hegedus
- 15:45 – 16:00 Characterization of the *Mamestra configurata* (bertha armyworm) *Serpin 1* Gene and Its Coordinate Regulation during Molting.
Dwayne D. Hegedus, Douglas Baldwin, Mahmood Chamankhah, Martin Erlandson
- 16:00 – 16:15 Towards a Phylogeny of the Cactus-feeding Genera in Phycitinae (Pyralidae). *Step 1: Morphology*.
Thomas J. Simonsen
- 13:30 – 16:15 Differentiation of Three Species of *Dermacentor* (Acari: Ixodidae) by PCR-based Approaches.
Neil B. Chilton, Shaun J. Dergousoff
- 16:15 – 16:30 Oribatid Mites (Ceratozetoidea) of North America Challenge Biogeographical Gradients of Diversity: Why Beringia Matters.
Valerie Behan-Pelletier, Heinz Schatz
- 18:00 – 19:00 Cocktails** *Battleford Room*
- 19:00 – 23:00 Banquet and Award Presentations** *Battleford Room*
- Wednesday, 3 October**
- 08:30 – 12:00 Symposium II: Tiny Brains, Big Ideas: Insects as Model Systems** *Adam Ballroom*
- 08:30 – 08:40 Introduction.
Jack Gray
- 08:40 – 09:20 Learning, and Learning not to Learn, in the Honey Bee.
Brian H. Smith
- 09:20 – 10:00 Flight Control and Controlling Flight: Sensory Integration and Motor Control in *Drosophila*.

- Mark Frye**, Brian Duistermars, Yan Zhu
- 10:00 – 10:30 Refreshment Break
- 10:30 – 11:10 Through the Mind of a Locust (and Moth):
Sensory Coding for Behaviour.
Jack Gray
- 11:10 – 11:50 Navigating Complexity with a Simple Sensory
System.
Andrew C Mason
- 11:50 – 12:00 Discussion.
- 08:30 – 12:00 Contributed Papers (Session III): Pest Management** *Terrace Lounge*
- 08:30 – 08:45 Hitchhikers on Temperate Fruits: Potential
Threats to Canadian Agriculture.
Marie-Pierre Mignault
- 08:45 – 09:00 Effect of Rearing Strategy and Handling on the
Quality of Mass-Reared Codling Moths *Cydia
pomonella* (Lepidoptera: Tortricidae).
Mustapha F.A. Jallow, Gary J. R. Judd
- 09:00 – 09:15 Mountain Pine Beetle Invasion of Boreal
Forests – A Prognosis.
David W. Langor, Adrienne Rice, Daryl
Williams, Colin Myrholm
- 09:15 – 09:30 Trophic Interaction between Three Species of
Aphid (Homoptera: Aphididae) and Spring
Wheat: Implications for Pest Management.
Samual M. Migui, **Robert J. Lamb**
- 09:30 – 09:45 Preliminary Results on the Effect of Some Plant
Oils on the Control of Desert Locust,
Schistocerca gregaria (Forskål) (Orthoptera:
Acrididae).
Nawal A. Al-Fuhid, **Abdulaziz M. Al-Ajlan**
- 09:45 – 10:00 Trials with Ecotrol, an Essential Oil Insecticide,
for Management of Root Weevils in
Strawberry.
Kenna MacKenzie, Beata Lees

- 10:00 – 10:20 Refreshment Break
- 10:20 – 10:35 Red Clover Seed Insect Pests - What You See Isn't Necessarily What You've Got.
Juliana Soroka, Clayton Myhre, Larry Grenkow, Ross Weiss
- 10:35 – 10:50 Influence of Parasitoid Species on Dropping Behavior in the Foxglove Aphid, *Aulacorthum solani* (Homoptera: Aphididae).
Susanna Acheampong, Dave R. Gillespie, Don Quiring
- 10:50 – 11:05 Effects of Plant Quality on Performance of an Omnivore in Biological Control.
Dave Gillespie, Bernie Roitberg
- 11:05 – 11:20 Determination of Optimal Concentration of Combined Inoculum '*Beauveria bassiana* + *Clonostachys rosea*' as Vectored *Bombus impatiens* for Control of Insect Pest and Disease in Greenhouse Tomato and Pepper.
J. P. Kapongo, L. Shipp, P. Kevan, J.C. Sutton, B. Broadbent
- 11:20 – 11:35 Synchrony and Periodicity of Western Tent Caterpillar Populations: Looking for Mechanisms.
Judith H. Myers, J.S. Cory
- 11:35 – 11:50 Temporal and Spatial Variation in Disease Resistance in Cyclic Populations of Tent Caterpillars.
Jenny S. Cory, Judith H. Myers
- 11:50 – 12:05 Phytoplasma Diseases in Grapevines of Ontario and British Columbia.
Christel Olivier, Won-Sik Kim, Brian Galka, Lori Bittner, Tom Lowery, Lorne Stobbs

Satellite Activities

Friday, 28 September

Time TBA AAFC, Bio-Control Working Group *AAFC, SRC*

Monday, 1 October

19:00 – 21:00 Canadian Forum for Biological Control *Terrace Lounge*

Tuesday, 2 October

12:00 – 13:30 *The Canadian Entomologist* Editorial Board Luncheon Meeting *Salon Batoche*

ESC NORMAN CRIDDLE AWARD RECIPIENT 2007

ANNA L. LEIGHTON

The Entomological Society of Canada Norman Criddle Award recognizes the contribution of an outstanding non-professional entomologist to the furtherance of entomology in Canada. The award may be given for outstanding work in teaching or research, community projects, publicity, popular writing, preparation of slide sets or films or any other activity that enhances the image of entomology. The recipient is selected by the affiliate society that hosts the annual meeting of the Entomological Society of Canada.

This year the Criddle Award goes to Anna L. Leighton of Saskatoon

Anna Leighton is an ethnobotanist by training and profession. She received her B.Sc. (Hons.) from the University of Saskatchewan in 1977 and her M.Sc. (also from the University of Saskatchewan) in 1982, for a thesis titled '*Ethnobotany of the Nihithawak: The Saskatchewan Woods Cree of the "th" dialect*'. She has extensive experience in, and has made numerous contributions to, Saskatchewan botanical research projects. For example, she was a field botanist for the Saskatchewan Research Council, the Peter Ballentyne First Nation, and a range of government organizations and private companies. She was a research associate with the Flora of Saskatchewan Project, and is a plant taxonomist with several environmental consultants. She has a long-standing interest in, and is an acknowledged expert on, the prairie lily, Saskatchewan's floral emblem. In 2005, with co-author Bonnie J. Lawrence, she published '*Prairie Phoenix, The Red Lily, Lilium philadelphicum, in Saskatchewan*' (Nature Saskatchewan, Regina).

Her interest in insects has flourished relatively recently. In association with the late Bernie Gollop, the Norman Criddle Award winner in 1999, Anna compiled the Saskatchewan Butterflies report from 1998-2003, co-ordinating and collating annual butterfly survey data provided by the Province's keen amateur lepidopterists. The primary purpose of these surveys is to advance our understanding of the current distribution and occurrence of butterflies in Saskatchewan. However, some of this information is included in the annual 4th July survey undertaken by the North American Butterfly Association which is interested in fluctuations in levels of all butterfly species. Anna has become recognized as an expert on Saskatchewan butterflies, along with Ron Hooper and John Kozial, also past Criddle Award winners.

Anna's broad knowledge of all aspects of natural history has led her to assume the mantle, along with her husband Ted, of co-editor of the Blue Jay, the quarterly periodical of the Saskatchewan Natural History Society. Under their editorship, the journal has seen a significant increase in the number of insect-related articles. With an engaging and informal style, Anna herself authored several of these articles, including "Milkweed: the Monarch's prairie host" 1998 *Blue Jay* 56(1):46-54, and "Buzzing ball baffles botanist" 2000 *Blue Jay* 58(2):104-105.

As an active member of the Saskatoon Nature Society, Anna is regularly called upon to give talks on these insects to the general public and, from May to September each year, leads biweekly hikes in search of butterflies, a role she assumed following Bernie Gollop's untimely death in 2000. She has been an assistant in the S.O.S. Elms tree inventory program, and she was the co-ordinator of an educational program on Dutch Elm disease (Saskatoon Beetle and Elm Project) for Grade 6 students in numerous Saskatoon schools.

As a passionate spokesperson for all living creatures, including insects, Anna Leighton is the quintessential amateur entomologist, and is well deserving of the Norman Criddle Award for 2007.

ABSTRACTS
(listed alphabetically by first author's surname)

Kelly Aasen, George Khachatourians

Microbial Biotechnology/ Molecular Microbiology Laboratories, Graduate Program in Applied Microbiology, University of Saskatchewan, 51 Campus Drive, Saskatoon, SK Canada, S7N 5A8

A Novel UV-Stress Tolerance System for the Entomopathogenic Fungus, *Beauveria bassiana*

The entomopathogenic fungus, *Beauveria bassiana* can control many agri-forestry pest insects, though solar UV radiation can impact on it. Orthodox DNA damage repair, first reported by our lab, mitigates this. We have discovered a second novel tolerance mechanism, which is mediated by stress sensing extracellular protein(s) and aids in UV and other environmental stress tolerance. We will report data obtained from a combination of microbial and molecular approaches.

Poster #1 (President's Prize)

Kelly M. Ablard¹, Paul W. Schaefer², Gerhard Gries¹

¹Department of Biological Sciences, Simon Fraser University, 8888 University Drive, Burnaby, BC Canada, V5A 1S6; ²United States Department of Agriculture, Agricultural Research Service: North Atlantic Area, Beneficial Insects Introduction Research, 501 S. Chapel Street, Newark, Delaware, 19713-3814

Evidence for Specimen-specific Mate Marking Pheromone in the Parasitoid Wasp *Ooencyrtus kuvanae* (Hymenoptera: Encyrtidae)

Male and female *O. kuvanae* eclose in large numbers from their gypsy moth host eggs. Reportedly, they engage in pre- and post-mating rituals during which they deposit mate-marking pheromones on their prospective and post-copulatory mates. We show experimental data suggesting that each male recognizes his own pheromone and discriminates against those of other males. This phenomenon might be adaptive should a pair be interrupted prior to or during copulation.

President's Prize Paper (Session A; Sunday 14:30)

Susanna Acheampong, Dave R. Gillespie, Don Quiring

Agriculture and Agri-Food Canada, Pacific Agri-Food Research Centre, Agassiz, P. O. Box 1000, Agassiz, BC, Canada V0M 1A0

Influence of Parasitoid Species on Dropping Behavior in the Foxglove Aphid, *Aulacorthum solani* (Homoptera: Aphididae)

The foxglove aphid (FGA), a serious pest of commercial greenhouse pepper production exhibits dropping behavior when attacked by parasitoids. We investigated the effect of different parasitoid species on dropping behavior of the FGA, whether dropping behavior in FGA was age or density dependent, and the impact of dropping behavior on the population dynamics of FGA. We also report host location by FGA after dropping.

Contributed Paper (Session III; Wednesday 10:35)

Nawal A. Al-Fuhid¹, Abdulaziz M. Al-Ajlan²

Preliminary Results on the Effect of Some Plant Oils on the Control of Desert Locust, *Schistocerca gregaria* (Forskål) (Orthoptera: Acrididae)

Desert Locust, *Schistocerca gregaria*, is one of the most important insect pests in Saudi Arabia and cultivated crops and the range lands are heavily infested. The main objective of this study is to determine the effect of some plant oils on the control of desert locust to replace insecticides use to minimize crop damage. The study highlighted the needs for further investigations for planning future desert locust control programs.

Contributed Paper (Session III; Wednesday 09:30)

Ruwandi Andrahennadi, Ingrid J. Pickering

Department of Geological Sciences, University of Saskatchewan, 114 Science Place, Saskatoon, SK Canada, S7N 5E2

Synchrotron Studies on Selenium in Insects: Environmental Implications

Insects play a critical role in bioaccumulation and dispersal of selenium in contaminated areas. Biotransformation of selenium by insects into different chemical forms will influence how toxic or benign selenium is to insects and to their predators. In an effort to understand the selenium toxicity, we have used synchrotron generated X-rays to probe the chemical form and location of selenium within insects. Mechanisms of selenium elimination will also be presented.

President's Prize Paper (Session B; Sunday 16:00)

Lars D. Andreassen^{1,2}, Ulrich Kuhlmann², Peter G. Mason³, Neil J. Holliday¹

¹University of Manitoba Department of Entomology, 214 Animal Science Entomology Building, Winnipeg, MB Canada, R3T 2N2;

²CABI Europe – Switzerland, 1 Rue des Grillons, 2800 Delemont, Switzerland; ³Agriculture and Agri-Food Canada, Eastern Cereal and Oilseed Research Centre, 960 Carling Avenue, Ottawa, ON Canada K1A 0C6

The Importance of Host Specificity and Host Synchronization for Classical Biological Control of Cabbage Maggot in Prairie Canola

Canola crops in western Canada are fed upon by larvae of the cabbage maggot, *Delia radicum* (L.) (Diptera: Anthomyiidae). Surveys across the prairies demonstrated that the area and severity of damage by *D. radicum* increased over the past 25 years. Since *D. radicum* is native to Europe it may be possible to complement existing pest management strategies with the introduction of European natural enemies.

Aleochara bipustulata L. (Coleoptera: Staphylinidae) has the greatest potential, adults feed on immature cabbage maggots, and larvae are parasitic on cabbage maggot puparia.

The fundamental host range of *A. bipustulata* was studied in the laboratory. Recently proposed international standards were used to select and test 18 non-target species. Species with unusual puparium structure, relatively large puparia, or a relatively short pupal stage were not suitable hosts. All beneficial Diptera species tested are unlikely to be attacked if *A. bipustulata* is introduced to Canada.

To help identify an *A. bipustulata* population with a seasonal cycle well-suited to the cabbage maggot on the prairies, the post-diapause thermal accumulation requirements of prairie *D. radicum* were compared with a population from Ontario and with *A. bilineata*, a natural enemy already found in Canada. Nonlinear models describing the relationship between temperature and rate of post-diapause development revealed that *D. radicum* from across the prairies develop more slowly than the Ontario population, and that *A. bilineata* develops too slowly to be an effective predator of *D. radicum* eggs in canola. This suggests that particular Eurasian *A. bipustulata* populations may be better suited than others for introduction, and that

considerable potential exists to reduce *D. radicum* populations with a predator active earlier in the season. Field studies in Europe indicate that *A. bipustulata* overwinters as an adult, and therefore likely is capable of spring predation.

Graduate Student Symposium (Tuesday 14:10)

R. Bahreini, R.W Currie

Dept. of Entomology, University of Manitoba, Winnipeg, Manitoba, Canada, R3T 2N2

Assessing Grooming Behavior as a Defense against Varroa Mite (*Varroa destructor* A. & T) in Different Honey Bee (*Apis mellifera* L.) Stocks in Manitoba

To measure the intensity and effectiveness of grooming responses of worker of honey bee artificially infested with varroa mites, the bioassay tests were carried out at the University of Manitoba on selected (from Manitoba queen breeders) and unselected colonies. The data showed that selected colonies (34.55%) compare to unselected (23.53%) ones had higher populations of mites removed. Bee mortality in selected colonies (16.2%) was slightly higher than in unselected stocks (11.3%).

President's Prize Paper (Session D; Monday 08:30)

Babita Bains¹, Ward Strong², John McLean¹

¹Forest Sciences, University of British Columbia, 2424 Main Mall, Vancouver, BC, Canada, V6T 1Z4; ²Ministry of Forests, Kalamalka Research Station, 3401 Reservoir Road, Vernon, BC, Canada, V1B 2C7

Understanding the Life History of Adelgids (Hemiptera: Adelgidae)

Adelgids (Hemiptera: Adelgidae) feed on conifers and induce galls on the shoots of spruce trees. Adelgids were manipulated on expanding buds of spruce branches to determine which life stages induced galling. Galled branches were photographed and measured to link morphological characteristics to adelgid species and abundance. Understanding the role of adelgid life stages in gall induction and characterizing gall morphology can be useful tools in seed orchard management.

President's Prize Paper (Session B; Sunday 15:30)

Philip D. Batista¹, B. Andrew Keddie¹, Harriet L. Harris^{1,2}

¹Department of Biological Sciences, University of Alberta, Edmonton, AB Canada, T6G 2E1; ²Department of Biology and Environmental Sciences, Concordia University College of Alberta, Edmonton AB, T5B 4E4

Phylogenetic Analysis of *Wolbachia* Strains Found in *Plutella xylostella* (L.)(Lepidoptera:Yponomeutidae) and its Parasitoid *Diadegma insulare*

The parasitoid *Diadegma insulare* (Cresson) (Hymenoptera:Ichneumonidae) has been successfully used as a natural control agent in North America to reduce *Plutella xylostella* (L.)(Lepidoptera:Yponomeutidae) populations. The presence of the intracellular bacteria *Wolbachia pipientis* in both of these hosts is documented but the effect of infection is not known. The phylogenetic analysis of *Wolbachia* in both host species was performed in order to better understand the role of *Wolbachia* in this insect-parasitoid system.

Poster #4 (Contributed)

Valerie Behan-Pelletier¹, Heinz Schatz²

¹Agriculture and Agri-Food Canada, Ottawa, ON, Canada K1A 0C6; ²Institute of Zoology, University of Innsbruck, Innsbruck, Austria

Oribatid Mites (Ceratozetoidea) of North America Challenge Biogeographical Gradients of Diversity: Why Beringia Matters

We address to what extent historical and ecological biogeography have influenced present distribution of species of Ceratozetoidea (Acari: Oribatida) in North America. The trend of increase in number of species with decreasing latitude was not supported irrespective of longitude. Almost 60% of species are Nearctic, dominated by species with Carolinian-Austroriparian and Beringian distributions. In contrast with the biogeography of other Oribatida that of Ceratozetoidea is strongly influenced by Beringia.

Contributed Paper (Session II; Tuesday 16:30)

Kate Bergen¹, W.G. Dilantha Fernando², Neil J. Holliday¹

¹Department of Entomology, University of Manitoba, Winnipeg, MB, Canada R3T 2N2; ²Department of Plant Science, University of Manitoba, Winnipeg, MB, Canada R3T 2N2

The Effects of Bacterial and Jasmonic Acid Treatments on Insects of Canola

Some strains of rhizosphere bacteria control some fungal diseases in canola through multiple mechanisms including induced systemic resistance. We evaluated the potential for this induced resistance to affect insect herbivory by measuring *Plutella xylostella* and *Lipaphis erysimi* responses to canola treated with the bacteria or with jasmonic acid, the signalling molecule for induced systemic resistance. *Plutella xylostella* oviposition was increased, and larval feeding and growth reduced on jasmonic acid-treated plants.

President's Prize Paper (Session D; Monday 09:15)

Colin Bergeron, Chris JK MacQuarrie

Department of Renewable Resources, University of Alberta, 442 Earth Sciences Building, Edmonton, AB, T6G 2E3

Drilling into the Past: Effect of Long-term Leafminer Defoliation on Growth of Birch Trees 10 Years after the End of an Infestation

In Edmonton, Alberta, a severe infestation of ambermarked birch leaf miner (*Profenusa thomsoni*) that began in the 1960's ended in the mid 1990's when it was controlled by a native parasitoid. We are developing a tree ring chronology from urban paper birch (*Betula papyrifera*) to determine if leafminer defoliation had an important impact on tree vigor. We expect the average ring width to be smaller during the infestation years.

Poster #12 (Contributed)

Hannah Bottomley¹, Stephen Takács¹, Iisak Andreller¹, Robb Bennett², Ward Strong³, Gerhard Gries¹

¹Department of Biological Sciences, Simon Fraser University, 8888 University Drive, Burnaby, British Columbia, Canada V5A1S6; ²British Columbia Ministry of Forests and Range, 7380 Puckle Road, Saanichton, BC, Canada V8M 1W4; ³British Columbia Ministry of Forests and Range, Kalamalka Forestry Center, 3401 Reservoir Road, Vernon, BC, Canada V1B 2C7

Infrared Radiation from Cones: Foraging Cue for Western Conifer Seed Bugs (*Leptoglossus occidentalis*, Hemiptera: Coreidae) to Locate Feeding Sites

Infrared (IR) radiation is a heretofore unknown foraging cue for herbivores. Here we show that IR emission from conifer cones illuminates cones like candles on a Christmas tree and that Western Conifer Seed Bugs are attracted to IR radiation both in laboratory and field experiments. Our results demonstrate a novel foraging cue that may be broadly used by conifer seed herbivores to locate cones.

President's Prize Paper (Session C; Monday 08:30)

Héctor Cárcamo¹, Jennifer Otani², Lloyd Dossall³, Robert Blackshaw¹, George Clayton¹, Neil Harker⁴, Kelly Turkington⁴, John O'Donovan⁴

Agriculture and Agri-Food Canada, ¹Lethbridge Research Centre, Lethbridge, AB Canada, T1J 4B1; ²Beaverlodge Research Farm, Beaverlodge, AB Canada, ⁴Lacombe Research Centre, Lacombe AB Canada, ³Department of Agriculture, Food and Nutritional Science, University of Alberta, Edmonton, AB Canada T6G 2P5

Effects of Seeding Date and Canola Species on Flea Beetle Damage in Alberta

We conducted field studies from 2001-2004 at Lethbridge, Lacombe and Beaverlodge, Alberta, to assess the impact of seeding date (Fall, April and May), and canola species (*Brassica rapa*, *B. napus*) on flea beetle damage to seedlings. In Lethbridge, *Brassica napus* seedlings planted in May had higher damage than those planted early. At the central and northern sites *B. rapa* planted earlier had greater damage than those planted in May.

Poster #7 (Contributed)

Héctor Cárcamo¹, John Huber², Tracy Larson¹, Rob Bouchier¹

¹Agriculture and Agri-Food Canada, Lethbridge Research Centre, Lethbridge, AB Canada, T1J 4B1; ²Canadian Forest Service, Natural Resources Canada, 960 Carling Avenue, Ottawa, ON Canada

Egg Parasitoids of Lygus Bugs in Southern Alberta

From 2005-2006, we used sentinel *Lygus* eggs and surveyed host plants to identify potential parasitoids and rates of attack. *Anaphes iole*, *Telenomus sp.* and *Polynema sp.* were identified as putative parasitoids. Most parasitoids emerged from eggs from lamb's-quarter, followed by mustard, flixweed and alfalfa. Parasitism rate, estimated from total nymphal emergence, was less than 5% suggesting that egg parasitoids do not cause significant mortality of lygus bugs.

Poster #8 (Contributed)

Wade D. Caswell, Arthur R. Davis

Department of Biology, University of Saskatchewan, 112 Science Place, Saskatoon, SK Canada, S7N 5E2

Pollination Effectiveness of Insect Visitors to *Lythrum salicaria* L. (Purple Loosestrife) in Saskatchewan

Lythrum salicaria is an invasive species of Canadian wetlands, most recently in Saskatchewan. Being tristylous, its breeding system demands outcrossing. Researchers from Europe and elsewhere in Canada have reported that common floral visitors include bumble, honey, and leafcutter bees, plus certain Lepidoptera and Diptera. By allowing single insect visits to previously-unvisited (virgin) flowers in the field, this study was devoted to the quantitative evaluation of flower visitors as pollinators of purple loosestrife.

President's Prize Paper (Session B; Sunday 14:30)

Connie K. Chan¹, Joseph D. Shorthouse¹, D. Barry Lyons²

¹Department of Biology, Laurentian University, 935 Ramsey Lake Road, Sudbury, ON Canada, P3E 2C6; ²Canadian Forest Service, Great Lakes Forestry Centre, Sault Ste. Marie, ON Canada, P6A 2E5

Attractiveness of Girdled Paper Birch (*Betula papyrifera*) to the Bronze Birch Borer *Agrilus anxius* (Coleoptera: Buprestidae)

Bronze birch borer larvae cause the premature death of stressed birch trees. To study the attractiveness of stressed birch to the borer, 55 healthy trees were xylem-girdled with an axe prior to adult emergence. Sticky band traps were placed on both girdled trees and 55 non-girdled trees to monitor adult activity. Girdled trees were 10 times more attractive than control trees and attracted twice as many females.

President's Prize Paper (Session A; Sunday 15:45)

Neil B. Chilton, Shaun J. Dergousoff

Department of Biology, University of Saskatchewan, Saskatoon, SK, S7N 5E2

Differentiation of Three Species of *Dermacentor* (Acari: Ixodidae) by PCR-based Approaches

Ticks cause disease and transmit pathogens to vertebrates. Understanding the epidemiology and ecology of tick-borne diseases requires the accurate identification of ticks to the species level. PCR-based approaches were used to differentiate three species of *Dermacentor* that occur in Canada. This provided the opportunity to examine the distributions of *D. variabilis* and *D. andersoni* in Saskatchewan and determine if hybridization is occurring in areas where these two species coexist.

Contributed Paper (Session II; Tuesday 16:15)

Lisa Conroy¹, Cynthia Scott-Dupree¹, **Bruce Broadbent**², Graeme Murphy³, Ron Harris¹, Justin Glatt¹

¹Dept. Environmental Biology, University of Guelph, Guelph, ON, N1G 2W1; ²Southern Crop Protection and Food Research Centre, AAFC, 1391 Sandford St., London, ON, N5V 4T3; ³OMAFRA, Vineland Station, PO Box 7000, ON, L0R 2E0

Novel products for Control of American Serpentine Leafminer *Liriomyza trifolii* in Greenhouse Floriculture

The American serpentine leafminer (ASL), *Liriomyza trifolii* (Burgess) (Diptera: Agromyzidae), is a serious pest of chrysanthemum and gerbera daisy in greenhouse floriculture. Growers in Ontario have recently reported decreased ASL control using registered insecticides. Research suggests that this strain of ASL accidentally imported from the United States on contaminated propagation material is resistant to both Avid[®] and Citation[®]. In light of this insecticide resistance, it is important to develop an effective multifaceted IPM program to control this greenhouse pest. Previous research has suggested that plant anti-desiccants can repel ASL, decreasing both feeding and oviposition. This study investigates the efficacy of two products, Wilt-Pruf[®] and VaporGard[®], as repellants against ASL on chrysanthemum. When given a choice between treated and non treated chrysanthemums, ASL consistently chose non treated chrysanthemums for feeding and oviposition.

Poster #6 (Contributed)

Jenny S. Cory^{1,2}, Judith H. Myers³

¹Laboratory for Molecular Ecology, Great Lakes Forestry Centre, Sault Ste. Marie, ON, P6A 2E5; ²Algoma University College, Sault Ste. Marie, ON, P6A 2G4; ³Depts. of Zoology and Agroecology, University of British Columbia, 6270 University Blvd., Vancouver, B.C., V6T 1Z4

Temporal and Spatial Variation in Disease Resistance in Cyclic Populations of Tent Caterpillars

The western tent caterpillar, *Malacosoma pluviale*, has regular population cycles characterised by high levels of mortality from a nucleopolyhedrovirus (NPV) in peak and declining populations. We examined the variation in larval resistance to NPV in spatially distinct populations of tent caterpillars over several years. *M. pluviale* families showed a large variation in disease resistance. There was some evidence that exposure to an NPV epizootic resulted in increased disease resistance.

Contributed Paper (Session III; Wednesday 11:35)

J. E. Cossentine, L.B.M. Jensen

Agriculture and Agri-Food Canada, Pacific Agri-Food Research Centre, Summerland, BC, Canada, V0H 1Z6

What Happens when the Larva Doesn't Die? – Potential Sublethal Impact of CpGV

The *Cydia pomonella* granulovirus is an effective orchard insecticide due to its high virulence at low concentrations versus neonate codling moth. However, not all targeted larvae consume sufficient concentrations of the virus to cause their early instar mortality. Codling moth developmental parameters were measured for larvae consuming the virus at low levels to improve our knowledge of the post-neonatal impact of CpGV on the ecology of the species.

Poster #2 (Contributed)

Thomas Cowan, Gerhard Gries

Department of Biological Sciences, Simon Fraser University, 8888 University Dr., Burnaby, BC V5A 1S6

Attraction of Indian meal moth (*Plodia interpunctella*) to specific wavelengths of light

Foraging gravid females of the Indian meal moth are well known to respond to semiochemicals from potential oviposition sites. Here we report results of laboratory experiments with light emitting diodes that virgin and gravid females as well as males are strongly attracted to specific wavelengths of light. Light emitting diode traps have potential to become a tactic within integrated Indian meal moth control programs.

President's Prize Paper (Session C; Monday 08:45)

Cameron R. Currie

Department of Bacteriology, University of Wisconsin-Madison, Madison, WI USA, 53706

Ants, Agriculture and Antibiotics: Ancient Coevolution in a Quadripartite Symbiosis

Fungus-growing ants, including the well known leaf-cutters, are symbiotically associated with a complex community of parasitic and mutualistic microbes. The ants cultivate fungi that serve as their main food source. The ants' fungus gardens are frequently infected by a group of potentially devastating microfungus parasites in the genus *Escovopsis*. A fourth symbiont in the symbiosis, filamentous bacteria, occurs on the

cuticle of the ants and produce antibiotics that inhibit the growth of *Escovopsis*. This symbiosis is shaped by ancient coevolution between the farming ants, their fungal cultivar, the garden parasite, and antibiotic-producing bacteria.

Symposium I (Tuesday 08:40)

Michel Cusson

Natural Resources Canada, Canadian Forest Service, Laurentian Forestry Centre, Quebec City, QC, G1V 4C7, Canada

Polydnaviruses: Their Association with Parasitic Wasps and Their Role in the Subjugation of Lepidopteran Hosts

Some endoparasitic wasps inject a polydnavirus (PDV) into their lepidopteran hosts during oviposition. Although PDVs are in symbiosis with their asymptomatic wasp carriers, they induce immune dysfunctions and developmental disturbances in parasitized caterpillars, to the benefit of the immature wasp. PDVs differ from conventional viruses in several ways, including: (i) the integration of a copy of their genome within the chromosomal DNA of the wasp carrier, (ii) a replication process involving excision and packaging of the integrated form of the genome (confined to the wasp ovary) and (iii) the absence, in the packaged genome, of genes encoding structural proteins and enzymes involved in virus replication. Thus, PDV virions harbour only genes whose expression causes the aforementioned pathologies in caterpillars. Recent genomics studies have indicated that most PDV genes are of wasp origin; some of the encoded proteins display modifications that may be instrumental in the disruption of targeted molecular pathways.

Symposium I (Tuesday 10:30)

Arthur R. Davis, Darya Bikey, Anirudh Mirakhr

Department of Biology, University of Saskatchewan, 112 Science Place, Saskatoon, SK Canada, S7N 5E2

Damage to *Varroa destructor*, an Ectoparasitic Mite of Honey Bees, Inflicted by Ants (Hymenoptera: Formicidae)

Laboratory trials were conducted to examine mortality and damage to *Varroa destructor* inflicted by three local ant species (*Formica fusca* group, *Lasius neoniger*, *Tapinoma sessile*). Petri dishes containing ten adult female mites confined with five adult worker ants of a single taxon were held in darkness and checked regularly. Damage to the legs and idiosoma of mites was quantified using scanning-electron microscopy. Mite legs were amputated most frequently by *F. fusca*.

Poster #20 (Contributed)

Andrea D. Déchéne, Christopher M. Buddle

McGill University, Department of Natural Resource Sciences, Ste. Anne de Bellevue, QC, H9X 3V9

Multi-scale Research on Oribatid Mites in Eastern Managed Boreal Forest

Partial-cut harvesting retains some components of natural forest structure such as deadwood and may have less impact than clearcutting on forest floor fauna. Oribatid mites represent much of the biodiversity in forest litter and soil and are essential to decomposition and nutrient cycling processes. We tested how partial-cut harvesting affects oribatid mite assemblages and explored the influence of decomposing logs on the spatial distribution of oribatids on the forest floor at the SAFE (sylviculture et aménagement forestiers écosystémique) research station in the Abitibi region in NW Quebec. In June 2006, litter and soil were

sampled in the mixed-wood boreal forest at SAFE where in 1998-9 the following treatments were applied and replicated three times: clear-cut harvest, 1/3 partial-cut harvest, 2/3 partial-cut harvest, prescribed burn (after harvest) and uncut control. As well, twelve logs were classified as decayed or buried and sampled at three distances each: directly on top of the log (ON), directly beside the log (ADJACENT) and at least one meter away from the log and other fallen wood (AWAY). Each log sample consisted of an upper or “litter” layer and a lower or “soil” layer. One additional sample of “inner wood” was also taken from the decayed logs. Results show that harvesting treatment has little significant effect on oribatid abundance, richness and composition, although diversity and composition in prescribed burn is distinct. Initial results of log samples show higher abundance and diversity in litter habitat directly on deadwood, although there is no significant difference in family level composition among distance classes. These results suggest that oribatid mites may be more resilient to large scale physical disturbance than previously thought; however, more research is necessary to explore the influence of microhabitat on oribatid assemblages.

Graduate Student Symposium (Tuesday 13:35)

Rosemarie De Clerck-Floate

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

Can Insect Release Size Predict the Outcomes of Weed Biocontrol?

A root weevil, *Mogulones cruciger*, introduced into Canada to control houndstongue (*Cynoglossum officinale*), was used to test whether release size could predict agent establishment and efficacy. Weevils were released in numbers of 0-400 in a field experiment, and houndstongue and weevil populations were monitored over 2 years. Relative to control sites, establishment and impact were reliably and rapidly achieved regardless of release size. Predictability is possible, but requires further study.

Poster #9 (Contributed)

Shaun J. Dergousoff, Andrew J.A. Gajadhar, Neil B. Chilton

Department of Biology, University of Saskatchewan, Saskatoon, SK, S7N 5E2

Prevalence of *Rickettsia* spp. and *Francisella* spp. in *Dermacentor* (Acari: Ixodidae) from the Canadian Prairies

Dermacentor andersoni and *D. variabilis* are two tick species that are common on the Canadian Prairies and are hosts to a variety of microorganisms, some of which are pathogens. We compared the prevalence different species of *Rickettsia* and *Francisella* in allopatric and sympatric populations of *D. andersoni* and *D. variabilis* with PCR-based techniques. Our findings have important epidemiological implications and raise questions about the ecology of tick-borne microorganisms.

President's Prize Paper (Session D; Monday 10:45)

Marie Djernæs¹, Niels Peder Kristensen²

¹Department of Biological Sciences, University of Alberta, Edmonton, AB, Canada, T6G 2E9; ²Zoological Museum, Natural History Museum of Denmark, Universitetsparken 15, 2100 Copenhagen East, Denmark

Curiouser and Curiouser: The Sternum V Gland in Agathiphagidae

The sternum V gland is present in basal Lepidoptera and most Trichoptera. The gland typically consists of a sac-like reservoir surrounded by glandular tissue with an opening on sternum V; generally present in both

sexes or in females only. *Agathiphaga* possess several unique, intriguing specialisations: Coiled tube-like gland, zeppelin-shaped reservoir, sphincter around gland duct, and accessory sac inside opening. I present a morphological description of the gland, including 3-D reconstructions.

President's Prize Paper (Session C; Monday 10:30)

Clayton W. D'Orsay^{1,2}

¹Department of Biology, University of Prince Edward Island, 550 University Ave., Charlottetown, PEI, C1A 4P3;

²Department of Biology, Cape Breton University, Box 5300, 1250 Grand Lake Rd., Sydney, NS, B1P 6L2

Diversity and Habitat Use of Beetles (Coleoptera) in a Managed Dairy Pasture in Nova Scotia, Canada

Dairy cow grazing intensity can affect pasture biodiversity and sustainability. How grazing affects biodiversity was explored looking at the beetle (Coleoptera) families Carabidae, Staphylinidae and Curculionidae in a managed pasture in Bible Hill, Nova Scotia. Species richness and abundance of these families varied across grazing treatments and were related to environmental variables, such as soil moisture and temperature, plant species diversity and density.

Poster #23 (President's Prize)

Lloyd M. Dossall¹, Ross McKenzie²

¹Department of Agricultural, Food and Nutritional Science, 4-16B Agriculture-Forestry Centre, University of Alberta, Edmonton, AB, Canada T6G 2P5; ²Alberta Agriculture and Food, Agriculture Centre, 100 – 5401 – 1 Avenue South, Lethbridge, AB, Canada T1J 4V6

Responses of the Cabbage Seedpod Weevil, *Ceutorhynchus obstrictus* (Marsham), to Host Plant Quality

Spatio-temporal dynamics of adult and larval populations of the cabbage seedpod weevil (*Ceutorhynchus obstrictus*) were assessed in commercial fields of canola (*Brassica napus*) in southern Alberta in relation to levels of various nutrients in leaf tissue. Responses were observed to nitrogen, but not to potassium, phosphorus, or sulfur. Small plot studies were used to manipulate nutrient levels, and so validate results observed on a landscape level.

Contributed Paper (Session I; Tuesday 10:45)

Martin Erlandson, Douglas Baldwin, Dwayne D. Hegedus

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

Midgut Proteases of Larval *Mamestra configurata* (Bertha Armyworm): Gene Characterization and Analysis of Protease Adaption on Artificial and Plant Diets

Mamestra configurata is an oligophagous insect and its midgut protease complement reflects its varied plant diet. Sequence analysis of a midgut-specific expressed sequence tag library identified a large serine protease gene family consisting of trypsins, chymotrypsins and elastases as well as exopeptidases. Single and two-dimension in-gel protease analysis was used to examine the kinetics of changes in protease profiles after switching from cruciferous host plants to artificial diet.

Contributed Paper (Session II; Tuesday 15:30)

Maya L. Evenden¹, Regine Gries², Gerhard Gries²

¹Department of Biological Sciences, CW 405 Biological Sciences Building, University of Alberta, Edmonton, AB, T6G 2E9;

²Department of Biological Sciences, 8888 University Dr., Simon Fraser University, Burnaby, BC V5A 1S6

Laboratory and Field Testing of a Pheromone- and Permethrin-based Attracticide against the Ash Leaf Cone Roller, *Caloptilia fraxinella* (Lepidoptera: Gracillariidae)

An attracticide formulation containing permethrin and the *C. fraxinella* sex pheromone was tested for attractiveness and toxicity. Field studies showed the formulation was attractive at a range of doses and pheromone response by males was not affected by permethrin in the formulation. Mortality of male moths was high when males were exposed to the formulation in the laboratory. The formulation remained attractive but was less toxic to males after 5-weeks.

Poster #14 (Contributed)

Kevin Floate

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

***Wolbachia* - Impacts on Insect Reproduction and Physiology**

Wolbachia are obligate intracellular bacteria that infect arthropods and nematodes. Infections are common, occur in diverse host taxa, and can profoundly alter host reproduction. Effects can include the feminization of genetic males, death of female embryos, parthenogenesis, and mating incompatibilities. There is growing interest in the use of *Wolbachia* for biocontrol, either to enhance populations of biocontrol agents or to reduce populations of pest species. However, specific knowledge of these bacteria is generally unknown within the biocontrol research community. This talk provides an overview of *Wolbachia* with specific examples that illustrate the potential application of these bacteria in biocontrol programs.

Symposium I (Tuesday 11:00)

Michelle T. Franklin, Judith H. Myers

Department of Zoology, University of British Columbia, Vancouver, BC Canada V6T 1Z4

Refuges in Reverse: The Spread of *Bt* Resistance to Unselected Populations of Cabbage Looper, *Trichoplusia ni*

Maintenance of susceptible insects in refuges is key to resistance management of *Bt* crops. We describe the opposite situation, the movement of resistant *Trichoplusia ni* from greenhouses to neighbouring greenhouses where no *Bt* has been used. Arrival of susceptible immigrants from California has the potential to dilute resistance in greenhouses, but this has not occurred. Thus field populations do not appear to serve as refuges to combat resistance in greenhouses.

President's Prize Paper (Session D; Monday 11:00)

Carol Frost, Chris Buddle

Department of Natural Resource Sciences, Macdonald Campus, McGill University, 21,111 Ste-Anne-de-Bellevue, QC, Canada, H9X 3V9

Does Species Sorting Occur in Spider Colonization of Old Field Saplings?

Exploring the extent to which colonizers establish in a system is the first step in predicting how processes at different spatial scales affect community diversity. To find spider colonization rate and mechanism, and to compare diversity of colonizers to that of residents, I regularly collected colonizing spiders from a group of saplings, and compared the collected diversity to that of spiders in saplings from which colonizers had not been removed.

President's Prize Paper (Session B; Sunday 13:45)

Mark Frye, Brian Duistermars, Yan Zhu

Department of Physiological Science, University of California, Los Angeles, CA, USA

Flight Control and Controlling Flight: Sensory Integration and Motor Control in *Drosophila*

A fruit fly's ability to localize an attractive odor source requires that the animal track a fragmented plume through varied visual landscapes with a high degree of aerodynamic performance. We studied the functional interactions among sensory inputs and motor outputs using quantitative behavioral analyses and genetic manipulations. Visual feedback from horizontal edges, processed through specific peripheral visual circuits, is required for tracking an odor plume.

Symposium II (Wednesday 09:20)

Sonia O. Gaul¹, Evans Estabrooks², Charles Vincent³, Kenna MacKenzie¹

¹Agriculture and Agri-Food Canada, Atlantic Food and Horticulture Research Centre, 32 Main St., Kentville, NS B4N 1J5; ²Evans and Associates Agr Consulting, 207 Allee Shaw Lane, New Maryland, NB E3C 1J2; ³Agriculture and Agri-Food Canada, Horticulture Research and Development Centre, 430 Gouin Blvd., Saint-Jean-sur-Richelieu, QC, Canada J3B 3E6.

Distribution of *Rhagoletis mendax* (Diptera:Tephritidae) within New Brunswick, Canada, Based on Adult Trap Captures and Lowbush Blueberry *Vaccinium angustifolium*, Fruit Infestation

The distribution of *Rhagoletis mendax* (Diptera:Tephritidae) is expanding within eastern Canada. To determine the current distribution within New Brunswick, standard yellow sticky cards were placed in fields containing lowbush blueberries, *Vaccinium angustifolium*, at and to the north and west of known areas of blueberry maggot infestation. Berries were harvested from the fields. Current distribution of the blueberry maggot is defined based on both the adult captures and larval infestation.

Poster #15 (Contributed)

A. Hosseini Gharalari, M.A.H. Smith, S. Fox

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

The Effect of Color on Oviposition Rate of Wheat Midge, *Sitodiplosis mosellana* (Diptera: Cecidomyiidae)

Wheat midge, a key pest, may use color as a visual cue to detect the ground and orient toward wheat canopy, to find suitable spikes for oviposition. Effect of color on insects' behavior has practical use in the laboratory and field. Laboratory experiments with five colors indicated that red and black had a negative effect on oviposition rate. Blue and green were the most attractive.

Poster #11 (President's Prize)

Gary A.P. Gibson¹, Carolina Reigada²

¹Agriculture and Agri-Food Canada, Biodiversity and Integrated Pest Management, K. W. Neatby Bldg., 960 Carling Avenue, Ottawa, Ontario, Canada, K1A 0C6; ²Instituto de Biociências, Departamento de Parasitologia, Unesp - Campus de Botucatu, Distrito de Rubião Júnior, s/nº, 18618-000, Botucatu, São Paulo, Brasil.

The Bizarre Male of *Spalangia dozieri* Burks (Hymenoptera: Chalcidoidea, Pteromalidae, Spalangiinae) — A Case of Male Phoresy?

Species of *Spalangia* Latreille are all solitary, usually primary parasitoids of Diptera puparia. One of the easiest chalcid genera to recognize, species are all quite similar structurally and are differentiated mostly by sculpture. The newly recognized male of *Spalangia dozieri* Burks is an exception, displaying several bizarre features that readily differentiate it from females and other species. The modifications suggest the male might be phoretic, though other known phoretic parasitic Hymenoptera usually are egg parasitoids and female.

Contributed Paper (Session II; Tuesday 14:00)

Dave Gillespie¹, Bernie Roitberg²

¹Agriculture and AgriFood Canada Research Centre, Agassiz, BC Canada V0M 1A0; ²Dept of Biology, Simon Fraser University, 8888 University Drive, Burnaby, BC Canada V5A 1S6

Effects of Plant Quality on Performance of an Omnivore in Biological Control

Plant quality is widely known to affect the performance of herbivores, but less is known of its effects on the carnivorous omnivores. We show that high and low nitrogen fertilizer treatments on pepper (*Capiscum annuum* L) plants affect the longevity and reproduction of an omnivorous bug, *Dicyphus hesperus* Knight (Hemiptera: Miridae). These fitness effects have consequences for biological control of greenhouse whitefly on pepper crops.

Contributed Paper (Session III; Wednesday 10:50)

Henri Goulet

Agriculture and Agri-Food Canada, K. W. Neatby Building, 960 Carling Avenue, Ottawa, Ontario K1A 0C6

Introduction to the Impact of Earthworms on the Ground Beetles of the Eastern Deciduous Forest Leaf Litter

In recent decades alien earthworms have established in forest litter and altered it completely. Native forest ground beetles have been displaced by this new microenvironment and replaced by mainly two alien species of ground beetles. The differences between the two types of litter are illustrated. No doubt many other arthropods are affected by intensive earthworm activities and should be investigated. Water behaves quite differently in each of the litter types and would have impact on water quality, quantity and cycle of a region and forest.

Contributed Paper (Session I; Tuesday 09:00)

Jack Gray

Department of Biology, University of Saskatchewan, SK

Through the Mind of a Locust (and Moth): Sensory Coding for Behaviour

Flight is a complex behaviour that requires integration of sensory information into motor programs that control wing kinematics. We use combinations of behavioural, neurophysiological and virtual reality techniques to study how locusts and moths respond to visual and olfactory cues. Our findings demonstrate how single, identified neurons encode aspects of a complex environment and suggest that sensory cues driving adaptive behaviour are integrated through context-dependent, dynamic functional ensembles of neurons.

Symposium II (Wednesday 10:30)

Ann E. Hajek

Department of Entomology, Cornell University, Ithaca, NY, USA 14853-2601

Behavioral changes in fungal-infected insects

Insects struggle to avoid infection and prevent death due to entomopathogenic fungi while entomopathogenic fungi struggle to successfully invade hosts and evade host defenses. Traditionally investigations of host/pathogen interactions have often focused on host physiology. I will instead discuss the influence of pathogen-induced and host-mediated behavioral changes in fungal-infected insects on the ultimate fitness of insect hosts and fungal pathogens.

Symposium I (Tuesday 09:25)

Abdul Hakeem¹, Jerome F. Grant¹, Paris L. Lambdin¹, Frank Hale² and Rusty Rhea³

¹Department of Entomology and Plant Pathology, The University of Tennessee, Knoxville 37996-4560; ²University of Tennessee, Nashville, TN 37211; ³Forest Service USDA, Asheville, NC 28804

Non-Target Impact of Imidacloprid on Spider Abundance on Eastern Hemlock, *Tsuga canadensis*

To assess non-target impact of imidacloprid on spider populations associated with eastern hemlock, a study was done in Cherokee National Forest, Tennessee. Imidacloprid was applied as soil drench, soil injection and tree injection while horticultural oil as foliar spray. Data collected from beat-sheets, direct observation of trunk and malaise traps indicated higher numbers of spiders from horticultural oil treatments followed by soil injection, tree injection and soil drench, respectively

Poster #17 (Contributed)

Dustin J. Hartley, John R. Spence

Department of Renewable Resources, University of Alberta, 751 General Services Building, Edmonton, AB, T6G 2H1

Expansion of *Pterostichus melanarius* Ill. (Coleoptera:Carabidae) in the Edmonton Area over 17 Years

P. melanarius (Coleoptera:Carabidae) was introduced in Canada from Europe and detected in the Edmonton area in the 1950's. Previous studies, in 1990 and 1998-99, show that *P. melanarius* populations are expanding by flight to the outlying areas. During the summer of 2007, the urban-rural gradient was resurveyed to assess the expansion of *P. melanarius*. The relative density of *P. melanarius*, and the proportion of long-winged were analyzed.

Contributed Paper (Session I; Tuesday 08:30)

Karen Hawkin¹, Paul Fields², Dean Stanbridge³

¹Department of Entomology, University of Manitoba, Winnipeg, Manitoba, Canada R3T 2N2, ²Agriculture and Agri-Food Canada, Cereal Research Centre, 195 Dafoe Rd., Winnipeg, Canada, R3T 2M9; ³The Steritech Group Corp., Box 246 Stn. Main, 348 Bronte St South, Unit 9 and 10, Milton, Ontario, L9T 4N9.

Sampling Flour Beetles in Flour Mills

The flour beetles *Tribolium castaneum* and *Tribolium confusum* are important pests of flour mills. Competition studies between these two species, which are often cited in animal ecology textbooks, show that one species always eliminates the other when the two species are placed in a vial together. Laboratory research on these flour beetles (i.e. competition studies) has focused on their behaviour in small and confined spaces like vials and jars. It is unclear how those findings relate to the behaviour seen in the larger and more complex flour mill environment. This presentation will focus on the efficacy of *Tribolium* pheromone traps in flour mills and discuss how these species can exist together in flour mills but not in a confined laboratory environment.

Samples of flour were taken from different areas inside a Canadian flour mill. Both *T. confusum* and *T. castaneum* were found in all samples. The ratio of *T. confusum* and *Tribolium castaneum* found in these samples was compared the ratios found inside pheromone traps placed in the flour mill; the results indicate *T. confusum* are caught less often in traps than *T. castaneum*. This species difference was also seen when beetles were released into a warehouse containing pheromone traps.

Milling equipment in three different Canadian flour mills was sampled and the numbers of beetles found inside the machines were compared the numbers of beetles caught in traps placed next to the machines.

There was no correlation found between trap capture rates and infestation inside machinery.

The information from these studies will help milling companies to better monitor insect populations, which will lead to better control of infestations.

Graduate Student Symposium (Tuesday 15:50)

Dwayne D. Hegedus¹, Douglas Baldwin¹, Mahmood Chamankhah², Martin Erlandson¹

¹Agriculture and Agri-Food Canada, Saskatoon Research Centre, Saskatoon, SK Canada, S7N 0X2; ²Department of Biotechnology, Tehran University, Tehran, Iran

Characterization of the *Mamestra configurata* (bertha armyworm) *Serpin 1* Gene and Its Coordinate Regulation during Molting

Serpins (serine protease inhibitor) regulate many developmental and biochemical processes. The *Mamestra configurata Serpin 1* gene encodes a single serpin scaffold on which nine inhibitor peptides can be displayed through differential mRNA splicing. Gene expression was restricted to early to middle instar foregut, hindgut and fat body, with the protein located in the hemolymph. At molt, *Serpin 1* expression declines concomitant with an increase in serine protease activity in the hemolymph.

Contributed Paper (Session II; Tuesday 15:45)

Gagandeep Hehar, Regine Gries, Grigori Khaskin, Gerhard Gries

Department of Biological Sciences, Simon Fraser University, Burnaby, British Columbia V5A 1S6, Canada

Aggregation Pheromone of the European Earwig, *Forficula auricularia* (Dermaptera: Forficulidae)

There is controversy about, and thus we reinvestigated, the components of the aggregation pheromone of the European earwig (EE). Results of dual-choice still-air olfactometer experiments revealed that males, females and nymphs produce and respond to an airborne aggregation pheromone. The pheromone components were identified by gas chromatographic-electroantennographic detection (GC-EAD) and GC-mass spectrometry. In laboratory and field experiments, a complex synthetic blend attracted significantly more EEs than did corresponding control stimuli.

President's Prize Paper (Session A; Sunday 13:45)

Jennifer M. Holowachuk, Margie Gruber, Julie Soroka

Agriculture and Agri-Food Canada, Saskatoon Research Centre, Saskatoon, SK Canada, S7N 0X2.

Pre-feeding Behaviors and Feeding Preference of the Crucifer Flea Beetle, *Phyllotreta cruciferae* on Transgenic *Brassica napus*

Two genes from *Arabidopsis* involved in trichome development were transformed into *Brassica napus*. These transgenic plants exhibited dense trichome coverage on the seedling stem and leaves but not on the cotyledons. Both field and lab bioassays support the observation that flea beetles, when given a choice, generally prefer not to feed or remain on the transgenic 'very hairy' plants. This information provides insight into developing germplasm to inhibit flea beetle feeding without using chemical measures.

Poster #16 (Contributed)

Mustapha F.A. Jallow¹, Gary J. R. Judd²

¹Okanagan-Kootenay Sterile Insect Release Program, 227 Dawson Avenue Penticton, BC Canada, V2A 3N6; ²Agriculture and Agri-food Canada, Pacific-Agri-Food Research Centre, 4200 High-Way 97, Summerland, BC Canada, V0H 1Z0

Effect of Rearing Strategy and Handling on the Quality of Mass-Reared Codling Moths *Cydia pomonella* (Lepidoptera: Tortricidae)

We investigated the effect of rearing strategy and different length of adult cold storage on the field quality of codling moths *Cydia pomonella* (L.) treated with 250 Gy of gamma radiation. Moths reared under fluctuating temperatures were significantly more competitive than moths reared under either constant temperature or diapause. These effects were observed regardless of the sampling method (i.e. capture in pheromone-baited traps, virgin female-baited traps, or in mating tables).

Contributed Paper (Session III; Wednesday 08:45)

Wade Jenner^{1,2,3}, Ulrich Kuhlmann¹, Naomi Cappuccino², Peter G. Mason³

¹CABI Bioscience Switzerland, Rue des Grillons 1, CH-2800 Delémont, Switzerland; ²Department of Biology, Carleton University, 1125 Colonel By Drive, Ottawa, ON, Canada; ³Agriculture and Agri-Food Canada, Eastern Cereal and Oilseed Research Centre, 960 Carling Avenue (K.W. Neatby Bldg), Ottawa, ON, Canada, K1A 0C6

Field Efficacy Trials of a Candidate Biological Control Agent for Leek Moth

Diadromus pulchellus Wesmael is a European pupal parasitoid being evaluated for release into Canada as a classical biological control agent of leek moth. In tandem with studies on its host specificity and overwintering strategy, field efficacy trials were conducted in the agent's native range. Small-scale field releases of *D. pulchellus* into infested leek plots were carried out to measure the establishment and impact of the agent on leek moth populations.

President's Prize Paper (Session D; Monday 11:30)

Zaid Jumean, Charlene Wood, Gerhard Gries

Department of Biological Sciences, Simon Fraser University, Burnaby, British Columbia, V5A 1S6

Does Larval Aggregation Pheromone of Codling Moth, *Cydia pomonella*, Induce Attraction or Arrestment of Receivers?

Aggregation of codling moth larvae is mediated by pheromones. It was unknown, and thus we tested, whether pheromone induces attraction or arrestment of receivers. In laboratory experiments, we determined that larvae: 1) move faster and farther towards a pheromone source than to a control and 2) orient anemotactically to, and selected as first and final choices, sites harbouring cocooned conspecifics rather than control sites. We provide evidence for attraction, rather than arrestment, of larvae to aggregation pheromone.

President's Prize Paper (Session A; Sunday 14:15)

J. P. Kapongo¹, L. Shipp¹, P. Kevan², J.C. Sutton², B. Broadbent³

¹Agriculture and Agri-Food Canada, Greenhouse and Processing Crops Research Centre, Harrow, ON N0R 1G0; ²University of Guelph, Department of Environmental Biology, Guelph, ON N1G 2W1; ³Agriculture and Agri-Food Canada, Southern Crop Protection and Food Research Centre, London, ON N5V 4T3

Determination of Optimal Concentration of Combined Inoculum '*Beauveria bassiana* + *Clonostachys rosea*' as Vectored *Bombus impatiens* for Control of Insect Pest and Disease in Greenhouse Tomato and Pepper

Bumble bees carried the mixture of *Beauveria bassiana* and *Clonostachys rosea* from dispenser affixed to the hive in greenhouses tomato and pepper. Five different concentrations were evaluated. It resulted that the mixture of 6.24×10^{10} conidia of *Beauveria* and 1.38×10^7 conidia of *Clonostachys* was an optimal for control of whiteflies, *Lygus* and suppression of grey mould on leaves and flowers.

Contributed Paper (Session III; Wednesday 11:05)

Jan Klimaszewski¹, David W. Langor², H.E. James Hammond²

¹Natural Resources Canada, Canadian Forest Service, Laurentian Forestry Centre, 1055 du P.E.P.S., P.O. Box 3800, Stn. Sainte-Foy, Québec, Québec, Canada G1V 4C7; ²Natural Resources Canada, Canadian Forest Service, Northern Forestry Centre, 5320-122 Street, Edmonton, Alberta, Canada T6H 3S2

The Effects of Patch Harvesting and Ground Scarification on Rove Beetles (Coleoptera, Staphylinidae) in Yellow Birch Dominated Forests of South-eastern Quebec

We studied the impacts of gap-cuts size, their number and the effects of ground scarification on rove beetle (Coleoptera, Staphylinidae) species richness, abundance, and community composition in yellow birch dominated forest in south-eastern Quebec. Small gap harvesting proved to be more favourable to the maintenance of the structure of the natural rove beetle assemblages than larger clear cuts.

Contributed Paper (Session I; Tuesday 09:15)

Wayne Knee¹, **Heather Proctor**¹, Terry Galloway²

¹Department of Biological Sciences, University of Alberta, Edmonton, Alberta, T6G 2E9; ²Department of Entomology, University of Manitoba, Winnipeg, Manitoba, R3T 2N2

Biodiversity Right under Your Nose: The First Survey of Nasal Mites (Arachnida: Acari) from Birds in Canada

Prior to this survey, only seven records of nasal mites have been reported from birds in Canada. We examined 172 bird species from Alberta and Manitoba for nasal mites. Fifty-four species of mites from three families were identified. Most were Rhinonyssidae (48 species), five being undescribed species. Other taxa included Ereyenetidae (5 spp.) and Turbinoptidae (1 sp.). Extrapolation suggests that at least 75 species of rhinonyssids inhabit birds in Canada.

Poster #18 (Contributed)

Paul Kozak, Robert Currie

Department of Entomology, Animal Science Building, University of Manitoba, Winnipeg, MB, Canada

The Effects of Variation in the Hive Environment on the Survival of the Honey Bee Parasite, *Varroa destructor*

The parasitic mite, *Varroa destructor*, is a leading cause of honey bee mortality. However, little is known about how variation in the atmosphere of the honey bee hive affects mite survival rates. To stimulate the range of conditions found within clusters of bees, bioassay cages, containing honey bees and introduced varroa mites were kept in closed systems with variable rates of ventilation at high and low temperatures. Mite mortality rates tended to be greater under lower ventilation rates, similar to those found in winter clusters and was compared to carbon dioxide levels in each treatment.

Poster #19 (President's Prize)

Roger Kroeker, F. F. Hunter

Department of Biological Sciences, Brock University, St. Catharines, ON Canada L2S 3A1

Distribution of Native and Invading Tree-hole and Container-breeding Mosquitoes (Diptera: Culicidae) in Ontario

Ochlerotatus japonicus has expanded its range throughout Southern Ontario and is spreading northward. This invasive, diurnal mosquito is capable of vectoring West Nile virus and other diseases. Sampling for larvae and eggs in artificial containers and phytotelmata provided confirmation of its distribution as well as evidence of associated species with which competition may be occurring. Invasive potential could largely depend on competition with native mosquitoes.

President's Prize Paper (Session B; Sunday 14:15)

Kevin Lam, Kelsie Thu, Margo Moore, Gerhard Gries

Department of Biological Sciences, Simon Fraser University, 8888 University Drive, Burnaby, British Columbia, Canada, V5A 1S6

Bacterial Symbionts on House Fly, *Musca domestica* (Diptera: Muscidae), Eggs Mediate Conspecific Oviposition, Inhibit Fungal Growth, and Supplement Larval Nutrition

House fly larvae face several challenges during their development to adulthood. They must: (1) condition their resource while avoiding intraspecific competition; (2) inhibit growth of competitive fungi; and (3) obtain sufficient bacteria as food supplements. Here we show that house fly eggs are provisioned with bacterial symbionts that play a major role in addressing all of these challenges.

President's Prize Paper (Session C; Monday 11:30)

David W. Langor, Adrienne Rice, Daryl Williams, Colin Myrholm

Natural Resources Canada, Canadian Forest Service, 5320- 122 Street, Edmonton, AB, Canada, T6H 3S5

Mountain Pine Beetle Invasion of Boreal Forests – A Prognosis

In 2006, the mountain pine beetle (MPB) invaded the boreal forests of northwestern Alberta and became established there. Thousands of hybrid pines have been overcome and jack pine is at risk of invasion. Live jack pine are susceptible to ophiostomoid fungi associated with MPB. In laboratory rearing studies, MPB successfully reproduced in jack pine bolts. However, the thin phloem of jack pine may decrease the risk of large outbreaks in the boreal.

Contributed Paper (Session III; Wednesday 09:00)

Tanya Latty, Mary Reid

Department of Biological Sciences, University of Calgary, 2500 University Drive N.W., Calgary AB Canada T2N 1N4

Who Goes First and Why: Pioneering and Joining in the Mountain Pine Beetle (*Dendroctonus ponderosae*)

How and why animals cooperate is a central issue in evolutionary and behavioural ecology. In some group-living animals, aggregations are initiated by individuals known as pioneers who find new settlement sites instead of joining established aggregations. While alone, pioneers may suffer higher costs than individuals that join aggregations. Given the cost of pioneering, why do individuals become pioneers? By arriving at the settlement area first, pioneers might gain a “head start” advantage. If they recruit conspecifics, pioneers may produce more offspring than joiners. Alternatively, pioneering may be a “desperation” strategy, such that individuals only pioneer when they have no alternative. We examined these two hypotheses using the mountain pine beetle (*Dendroctonus ponderosae* herein MPB). The reproductive success of MPB's depends on group-attack to overcome the defences of live trees. Aggregations are initiated by pioneers who attract conspecifics with pheromones. MPB pioneers are thought to experience high mortality because of the onslaught of tree defences. We confirmed that 70% of pioneers fail to recruit conspecifics, and that of these, 19% died. Contrary to our “head start” hypothesis, pioneers did not produce more offspring than joiners. We also found that beetles became pioneers faster when they were in poor condition, but that overall, good condition beetles had a greater probability of pioneering. These results give partial support for the desperate pioneering hypothesis. Interestingly, individuals were more likely to pioneer early in the season. Finally, we used a simulation model to examine why cheaters (individuals who never pioneer) do not overrun this system. We found that cheaters settle in higher density trees and often do not locate suitable hosts before the season ends. These costs outweigh the benefits of avoiding pioneering. MPB has

proven to be an excellent “micro-scale” model animal for answering big questions about altruism, cheating and the dynamics of groups.

Graduate Student Symposium (Tuesday 15:15)

Joelle K. Lemmen, Maya L. Evenden

Department of Biological Sciences, CW 405 Biological Sciences Building, University of Alberta, Edmonton, AB, T6G 2E9

Juvenile Hormone Mediates Pheromone Response in a Long-lived Moth, *Caloptilia fraxinella* (Gracillariidae: Lepidoptera)

Caloptilia fraxinella is a long-lived moth that undergoes reproductive diapause during summer aestivation and overwintering. Pheromone response by males in diapause is reduced. Applications of the juvenile hormone mimic methoprene to males in diapause restored pheromone responsiveness in a wind tunnel assay. Electrophysiological studies were conducted on males in different physiological states to determine whether juvenile hormone mediates pheromone response through changes in the peripheral nervous system response.

President’s Prize Paper (Session A; Sunday 14:45)

Zoë Lindo

University of Victoria, Department of Biology, P.O. Box 3020, Stn CSC, Victoria, BC, V8W 3N5

Patch Size and Colonisation Patterns: An Experimental Analysis of the Species-Area Relationship Using Artificial Canopy Habitats

An observed species-area relationship in assemblages of oribatid mites inhabiting natural canopy habitats (suspended soils) led to an experimental investigation of the mechanisms underlying this relationship. Specifically, I tested the habitat heterogeneity hypothesis, random placement hypothesis, and principles of island biogeography theory.

Ninety artificial canopy habitats (ACHs) of three sizes were placed at three heights along the trunks of ten ancient western redcedar trees in the Walbran Valley, Vancouver Island, British Columbia, for one year. The relationship between oribatid mite species richness, abundance, and moisture content of ACH substrate associated with size and height parameters was modelled using regression and analysed by ANOVA. Rarefaction curves were used to extract patterns of non-randomness, and the oribatid mite community composition was compared to other habitats that were identified as potential source pools.

Fifty nine species of oribatid mites colonised the ACHs. A significant effect of ACH size on species richness supported a positive species-area relationship described by the power law function: $S = 0.223 * dwt^{0.616}$ ($R^2 = 0.313$, $p < 0.001$). Community compositional analysis suggested the colonising source pools were naturally occurring canopy suspended soils. Habitat heterogeneity hypothesis, random placement hypothesis and island biogeography theory were not supported as primary structuring mechanisms of the observed species-area relationship. However, elements of these mechanisms apply to the observed patterns in species richness that were attributed to gradients in the abiotic environment and differences in colonisation/extinction dynamics among artificial canopy habitats. Canopy ecosystems in ancient temperate rainforests, where diversity is dominated by oribatid mites, are ideal model ecosystems to test principles of resource limitation, island biogeography and metacommunity dynamics. This study demonstrates how microscale subjects such as oribatid mites are serving to address megascale research questions.

Graduate Student Symposium (Tuesday 16:25)

D. Thomas Lowery¹, James T. Troubridge², Gary J.R. Judd¹

Identification of Climbing Cutworm (Lepidoptera: Noctuidae) Damaging Buds of Grapevines in the Southern Okanagan Valley, BC

Cutworm feeding damage to the buds of grapevines in the southern Okanagan was previously attributed to the spotted cutworm, *Amathes* (= *Xestia*) *c-nigrum*, but we have yet to collect this species from grapevines. Rather, we have identified a complex of more than a dozen cutworm species feeding on grape, with the dominant species being *Abagrotis orbis*, *A. nefascia*, and *A. reedi*. This presentation will also present information relating to rearing methods and biology of these major pests of grapes.

Poster #10 (Contributed)

Lisa M. Lumley, Felix A.H. Sperling

Department of Biological Sciences, CW405 Biological Sciences Centre, University of Alberta, Edmonton, Alberta, Canada, T6G 2E9

Messy Molecules and Morphology...also Known as the Systematics of the *Choristoneura fumiferana* Species Complex (Lepidoptera: Tortricidae)

Spruce budworm (*Choristoneura fumiferana*) species boundaries have received an enormous amount of attention. Nonetheless, they remain unresolved. However, new developments based on an integrative survey of molecular markers and morphology at zones of species contact not only bring us closer to resolving the systematics of the spruce budworm, but also give insights into species concepts and speciation.

President's Prize Paper (Session C; Monday 10:45)

Kenna MacKenzie, Beata Lees

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

Trials with Ecotrol, an Essential Oil Insecticide, for Management of Root Weevils in Strawberry

The primary active ingredients of Ecotrol, an essential oil based broad spectrum insecticide registered in the USA, are Rosemary oil (10%) and Peppermint Oil (2%). We tested this product on black vine weevil (BVW) adult feeding and longevity using a strawberry leaf disc dip bioassay. For bioassays with larvae BVW, strawberry plants were inoculated with eggs and Ecotrol applied as a drench three or eight weeks later. Larval survival was assessed at ten weeks after inoculation. Results of these trials were disappointing indicating that Ecotrol is probably not a solution to root weevil problems in strawberry.

Contributed Paper (Session III; Wednesday 09:45)

Chris J K MacQuarrie¹, David W Langor², John R Spence¹

¹Department of Renewable Resources, University of Alberta, Edmonton, AB Canada, T6E 2B9; ²Canadian Forest Service, Northern Forestry Centre, Edmonton, AB, Canada, T6H 3S5

Life History and Population Dynamics of Ambermarked Birch Leafminer (*Profenusa thomsoni* Konow) an Alien Species Infesting Urban Birch (*Betula*) Forests in Alaska

The population dynamics of an alien birch leafmining sawfly infesting urban birch were examined. Stage frequency data were used to determine the survivorship, developmental time and the size of the population for each developmental stage. These parameters were compared for three heights within trees and across years. No effect of position in tree was observed but survivorship and population size differed across years, with warmer, dryer years having greater survivorship.

President's Prize Paper (Session B; Sunday 15:45)

Andrew C Mason

Integrative Behaviour & Neuroscience Group, Dept. Biological Sciences, University of Toronto Scarborough

Navigating Complexity with a Simple Sensory System

The parasitoid fly *Ormia ochracea* locates its cricket host by phonotactic responses to cricket songs. The small size of the flies severely limits the directional cues available to them. Nevertheless, female flies are capable of surprisingly accurate localisation of cricket calls. When presented with songs from a single source, directional responses are mediated by direction-dependent interaural amplitude and phase differences in tympanal vibration that are encoded as interaural latency differences in primary auditory receptors. I have examined the effects of more complex acoustic conditions on the accuracy of phonotactic responses.

Symposium II (Wednesday 11:10)

Robert McGregor

Institute of Urban Ecology, Douglas College, PO Box 2503, New Westminster, BC, V3L 5B2

Assessment of Disturbance of Urban Riparian Habitat Using Ground Beetle (Coleoptera: Carabidae) Surveys

Riparian habitat in the Greater Vancouver area is subject to disturbance associated with urban development and public use of parkland. Surveys for ground beetles (Carabidae) may provide a simple method to quantify disturbance in such habitats. Sampling for six common species of carabids was done in riparian habitat near Hoy Creek and a nearby disturbed meadow habitat in Coquitlam, B.C. Two native specialist ground beetles were consistently associated with streamside habitat (*Scaphinotus angusticollis*, *S. marginatus*). Generalist species introduced from Europe were associated with the disturbed meadow habitat (*Carabus nemoralis*, *C. granulatus*, *Calthus fuscipes*, *Pterostichus melanarius*).

Contributed Paper (Session I; Tuesday 08:45)

Glyn A. McMillan, Jack Gray

Department of Biology, University of Saskatchewan, 112 Science Place, Saskatoon, SK, Canada, S7N 5E2

Sensory Coding in an Identified Motion-sensitive Visual Neuron of *Locusta migratoria*

Visual stimuli trigger adaptive behavioural responses in locusts. The descending contralateral movement detector (DCMD) is part of a looming-sensitive neural pathway that responds to approaching (looming) and translating objects in its visual field. To test whether the DCMD can encode more complex aspects of the visual scene, DCMD activity was correlated with the motion of a computer simulated black disc changing from non-looming to looming trajectories (e.g. a predator's approach).

President's Prize Paper (Session C; Monday 09:15)

Marie-Pierre Mignault

Canadian Food Inspection Agency, 59 Camelot Drive, Ottawa, On, K1A 0Y9, Canada

Hitchhikers on Temperate Fruits: Potential Threats to Canadian Agriculture

Each year, Canada imports large volumes of fresh fruits – such as grapes, apples and pears – from temperate countries around the world. The potential introduction of new pests associated with these crops, which are also important to Canadian agriculture, represents a major threat for the sustainability of this dynamic industry. Current regulations and potential risks associated with fruit importation from temperate regions of the world are discussed.

Contributed Paper (Session III; Wednesday 08:30)

Samual M. Migui¹, **Robert J. Lamb**^{1,2}

¹Department of Entomology, University of Manitoba, Winnipeg, MB, Canada, R3T 2N2; ²Agriculture and Agri-Food Canada, Cereal Research Centre, 195 Dafoe Road, Winnipeg, MB, Canada, R3T 2M9

Trophic Interaction between Three Species of Aphid (Homoptera: Aphididae) and Spring Wheat: Implications for Pest Management

The interactions of genetically diverse Canadian spring wheat, *Triticum aestivum* L. and *Triticum durum* Desf., with three aphid species, *Rhopalosiphum padi* (L.), *Sitobion avenae* (Fabricius) and *Schizaphis graminum* (Rondani), were measured as changes in biomass for aphids and plants, to quantify levels of resistance, components of resistance, and impact of aphids on yield. Current economic thresholds probably underestimate the damage that cereal aphids cause to spring wheat at heading.

Contributed Paper (Session III; Wednesday 09:15)

Christine E. Miluch¹, Lloyd M. Dosedall¹, Maya L. Evenden²

¹Department of Agricultural, Food and Nutritional Science, University of Alberta, Edmonton, Alberta, Canada, T6G 2E1; ²Department of Biological Sciences, University of Alberta, Edmonton, Alberta, Canada, T6G 2E1

Development of a Semiochemical-based Monitoring System for Diamondback Moth *Plutella xylostella* (L.) (Lepidoptera – Plutellidae) on Canola

Plutella xylostella (L.) is an important pest of canola on the Canadian prairies. The goal of this research is to develop a reliable semiochemical-based monitoring tool to detect incipient outbreaks of this pest. We investigated the effect of pheromone dose, lure type and trap colour on male attraction in field trapping experiments. Attractiveness of the pheromone blend in combination with a green leaf volatile to male moths was also assessed.

President's Prize Paper (Session A; Sunday 15:30)

Fernando Montealegre-Z.¹, Glenn K. Morris², Andrew C. Mason¹

¹Integrative Behaviour and Neuroscience Group, Department of Life Sciences, University of Toronto at Scarborough, 1265 Military Trail, Scarborough, Ontario, Canada, M1C 1A4 ²Department of Biology, University of Toronto at Mississauga, 3359 Mississauga Road, Mississauga, Ontario, Canada, L5L 1C6

Highest Frequency Pure-tone Call Produced by an Insect

The highest frequency ultrasound of any known arthropod is produced by the male *Arachnoscelis* (Orthoptera: Tettigoniidae), a predatory katydid from Colombia. We measured the katydid's call at 130 kilohertz, the source of which is a novel mechanism of stridulation using cuticle deformation on the insect's right wing. A scraper generates the ultrasound as it springs back into shape after being distorted during rubbing of the wings together.

Contributed Paper (Session II; Tuesday 13:45)

Gaétan Moreau¹, Christer Björkman²

¹Département de Biologie, Université de Moncton, Moncton, NB, E1A 3E9; ²Department of Entomology, Swedish University of Agricultural Sciences, P.O. Box 7044, 750 07 Uppsala, Sweden

Teasing out the Effects of Host Plant Quality and Predator Foraging Strategies on Leaf beetle Survival in Bioenergy Crops

Previous studies have suggested that the dynamics of the willow leaf beetle (*Phratora vulgatissima* L.) in willow plantations are primarily influenced by insect predators. Here, to separate the underlying host plant effects from the mortality formerly attributed to predators, we examined the foraging strategies and resource tracking by these predators, as well as the mortality rates of leaf beetles in manipulative experiments.

Contributed Paper (Session I; Tuesday 09:30)

Judith H. Myers¹, J.S. Cory²

¹Depts. of Zoology and Agroecology, University of British Columbia, 6270 University Blvd. Vancouver, B.C. V6T 1Z4, Canada; ²Department of Biology, Algoma University College, Laurentian University, 1520 Queen Street East, Sault Ste. Marie, ON, P6A 2G4

Synchrony and Periodicity of Western Tent Caterpillar Populations: Looking for Mechanisms

Infection by nucleopolyhedrovirus increased from almost zero to over 80% in western tent caterpillar populations in BC, between 2003 and 2004, a particularly sunny spring. This agrees with our prediction that sunny conditions and increased body temperature from the basking by caterpillars promotes the viral infection. One population had peak density and a viral epizootic in 2003, however, and thus while sunny springs may promote viral infection, they are not necessary for epizootics.

Contributed Paper (Session III; Wednesday 11:20)

Helen Nichol

Department of Anatomy and Cell Biology, College of Medicine, University of Saskatchewan, 107 Wiggins Rd., A315, Saskatoon, SK S7N 5E5

Casting New Light on Familiar Insects

The synchrotron is a powerful new tool now being applied to insect systems. X-ray absorption spectroscopy (XAS) in particular has contributed to our understanding of insect metal metabolism. For example, XAS shows how Lepidoptera change the chemical form of elements they absorb and can be used to localize and speciate metals in *Drosophila* models of human neurodegenerative disease. How might you use the Canadian Light Source to address your questions?

Plenary Session (Sunday 10:30)

S. Oghiakhe, N. J. Holliday

Department of Entomology, University of Manitoba, Winnipeg, MB, Canada R3T 2N2

Effect of Time of Tree Removal on Potential of *Hylurgopinus rufipes* (Eichhoff) to Transmit Dutch Elm Disease Pathogens from Newly-diagnosed American Elm Trees in Manitoba

In Manitoba, *Hylurgopinus rufipes* is the vector of Dutch elm disease, and trees showing symptoms in summer are removed either immediately or the following winter, to prevent disease transmission. Effect of removal time on potential for transmission was studied by removing trees at intervals after symptom appearance, enumerating beetles in brood galleries and estimating the proportion of beetles carrying spores. In 2006, adult spore-carrying beetles emerged from newly-symptomatic trees before winter.

President's Prize Paper (Session D; Monday 09:30)

Christel Olivier¹, Lorne Stobbs², Tom Lowery³

¹Agriculture and Agri-Food Canada, Saskatoon Research Centre, Saskatoon, SK Canada, S7N 0X2; ²Agriculture and Agri-Food Canada, Vineland Research Centre, Vineland, ON, Canada, L0R 2E0; ³Agriculture and Agri-Food Canada, Summerland Research Centre, Summerland, BC, Canada, V0H 170

Interactions between Phytoplasmas and Their Insect Vectors

Phytoplasmas are a worldwide group of obligate parasites that are graft-transmissible and which have yet to be cultured *in vitro*. They are associated with yellows diseases and are transmitted by phloem-feeding insects, mainly leafhoppers. Phytoplasmas multiply in the phloem of the plant hosts and in most of the organs of the insect vectors. The presentation will review the latest on ecological and molecular interactions between insect vectors and phytoplasmas.

Symposium I (Tuesday 11:30)

Christel Olivier¹, Won-Sik Kim², Brian Galka¹, Lori Bittner², Tom Lowery³, Lorne Stobbs²

¹Agriculture and Agri-Food Canada, Saskatoon Research Centre, Saskatoon, SK Canada, S7N 0X2; ²Agriculture and Agri-Food Canada, Vineland Research Centre, Vineland, ON, Canada, L0R 2E0; ³Agriculture and Agri-Food Canada, Summerland Research Centre, Summerland, BC, Canada, V0H 170

Phytoplasma Diseases in Grapevines of Ontario and British Columbia

In 2006, phytoplasma were detected for the first time in vineyards of Ontario (ON) and British Columbia (BC). Epidemiology of phytoplasma diseases in vineyards was investigated by sampling insects and grapes in BC and ON, and using nested/DRT-PCR techniques to detect phytoplasma and DNA sequencing to identify the strains. Identification of the phytoplasma strains, incidence of the diseases and checklist of the leafhopper species present in vineyards are presented.

Contributed Paper (Session III; Wednesday 11:50)

Jennifer Otani

Agriculture and Agri-Food Canada, Beaverlodge Research Farm, Beaverlodge, Alberta, T0H 0C0

The European Invasion of the Red Clover Casebearer, *Coleophora deauratella* (Lepidoptera: Coleophoridae) in the Peace River Region Continues

Three years of severe yield losses have been observed in the Peace River region due to the red clover casebearer, *Coleophora deauratella* (Lepidoptera: Coleophoridae). The region, producing approximately 21,000 acres of alsike plus red clover annually, suffered extensive larval feeding damage in red clover since 2005. The seasonal biology and damage caused by this new insect pest of red and alsike clovers in Canada will be described.

Contributed Paper (Session II; Tuesday 14:15)

Stewart B. Peck

Department of Biology, Carleton University, Ottawa, ON Canada K1S 5B6

Beetle Ectoparasites of American Beavers: Distribution and Biology

The beetle family Leiodidae, subfamily Platypsyllinae, contains 4 genera modified for an ectoparasitic life on host rodents and insectivores. Two species (*Platypsyllus castoris* Ritsema and *Leptinillus validus* Horn) are specialists on the American Beaver *Castor canadensis* Linnaeus. *L. apodontiae* Ferris is limited to the mountain beaver, an unrelated primitive rodent of the Pacific Northwest. Their biology and distribution is summarized. A call made for fresh alcohol preserved specimens for molecular study.

Poster #26 (Contributed)

Carolina I. Perez Orella, Carl A. Lowenberger

Department of Biological Sciences, Simon Fraser University, 8888 University Drive, Burnaby, BC Canada, V5A 1S6

The effects of the trehalase inhibitor, Validoxylamine A, on *Aedes aegypti* (Diptera: Culicidae)

Glycoside inhibitors may provide novel methods for insect control by interfering with basic metabolism. *Aedes aegypti* larvae were reared in various concentrations of the trehalase inhibitor, Validoxylamine A (VAA). No measurable effects were seen in immatures, however emerging adults were unable to fly. The metabolic reserves of larvae reared for 72h in 0.2mg/mL VAA were analyzed. Glycoside inhibitors may be incorporated into existing control strategies and applications.

President's Prize Paper (Session D; Monday 09:00)

Steve Perlman, Christina Ball

Department of Biology, University of Victoria, PO Box 3020, Stn CSC, Victoria, BC, V8W 3N5

Effect of Nematode Parasites on Mate Choice and Fitness in the Mushroom-feeding Fly, *Drosophila falleni*

Twenty-five years after Hamilton and Zuk's groundbreaking paper, the role of parasites as a major force in shaping host sexual selection and mate choice remains controversial.

Using the mycophagous fly *Drosophila falleni* and its obligate specialist nematode parasite *Howardula* sp. as models, we will present our initial results exploring this issue, focusing on experiments testing how nematode infection affects mate choice, mating success, and fecundity.

Contributed Paper (Session II; Tuesday 13:30)

Iain D. Phillips

Saskatchewan Watershed Authority, Stewardship Division, Watershed Monitoring and Assessment, #330 – 350 Third Avenue North, Saskatoon, Saskatchewan, Canada, S7K 2H6

Diet of *Skwala parallela* (Plecoptera: Perlodidae) and *Zapada cinctipes* (Plecoptera: Nemouridae) in a Prairie Headwater Stream

Stoneflies are uncommon in Canadian prairie streams and understanding the habitat requirements supporting their presence is an important prerequisite to expecting their presence in benthic invertebrate biomonitoring programs. Here I use gut analysis and stable isotopes to elucidate the food web position and diet of two stonefly species. Both stoneflies show trophic preferences as only a few taxa constituted their gut contents, independent of availability in the benthos.

Poster #27 (Contributed)

Jaime Pinzon, John Spence

Insect Ecology Lab, Department of Renewable Resources, University of Alberta, T6G 2E3, Edmonton, AB Canada

Effects of Harvesting on Spider Assemblages in the Canopy of Aspen (*Populus tremuloides*) and White Spruce (*Picea galuca*) Stands in the Boreal Forest

Forest harvesting is one of the main threats for sustaining biodiversity in the Boreal Forest. The effects of these practices on ground-dwelling spider assemblages are well known, however few information is available on higher forest strata. To determine the effects of forest cover and harvesting, spiders were collected from the canopy of pure deciduous and conifer stands at EMEND research facilities. Species diversity, composition and abundance were compared.

President's Prize Paper (Session B; Sunday 13:30)

Greg R. Pohl¹, Bruce D. Gill², Jeannette Wheeler³, James W. Jones⁴

¹Canadian Forest Service, Northern Forestry Centre, Edmonton, AB T6H 3S5; ²Canadian Food Inspection Agency, Bldg. 18, 960 Carling Ave., Ottawa, ON K1A 0C6; ³Public Services Division, City of Medicine Hat, 580 1st St. S.E., Medicine Hat, AB T1A 8E6; ⁴Western Pest Mgmt., Box 17 Site 475 RR4, Sherwood Park, AB T8A 3K4

The Banded Elm Bark Beetle, *Scolytus schevyrewi* (Curculionidae: Scolytinae): A New Exotic Pest Species in Western Canada

The Banded Elm Bark Beetle, *Scolytus schevyrewi*, is a Eurasian species that can kill elm trees and transmit Dutch Elm Disease (*Ophiostoma novo-ulmi*). It was detected for the first time in Canada in 2006, based on a single specimen collected at Medicine Hat. In 2007 a monitoring program was initiated to determine if it has become established in the area. Preliminary trapping results are presented and discussed.

Contributed Paper (Session II; Tuesday 14:30)

Sohail S. Qazi, George G. Khachatourians

Microbial Biotechnology/ Molecular Microbiology Laboratories, Applied Microbiology Graduate Program, University of Saskatchewan, Saskatoon, Canada

Biochemical Analysis of the Isoforms of Proteinase from the Conidia of *Beauveria bassiana* and *Metarhizium anisopliae*

Conidia of entomopathogens, *Beauveria bassiana* and *Metarhizium anisopliae* when washed with Tween (Tw) or water (Ww) and incubated in water for up to 2 days released citrate, ammonia and subtilisin, trypsin and metalloproteases. Biochemical and functional proteomic techniques generated the first evidence of the diversity of conidial isozymes and pH modulation. The complex role of proteases before germ tube / appressoria formation, for breaching host cuticle is elucidated.

President's Prize Paper (Session D; Monday 10:30)

William R Reid¹, Melissa Strom², Martin Erlandson²

¹Department of Applied Microbiology and Food Sciences, University of Saskatchewan, 51 Campus Dr. Saskatoon, SK, S7N 5A8, ²Agriculture and Agri-Food Canada, Saskatoon Research Centre, Saskatoon, SK Canada, S7N 0X2

Genetic Characterization and Comparison of Two MadiNPV Pick Plaque Isolates

Two pick plaque (pp) isolates of MadiNPV, a baculovirus infecting *Malacosoma disstria*, that demonstrate different budded virus titres in insect cell culture have been characterized genetically. Partial genetic maps have been generated from end sequencing of cloned restriction enzyme fragments combined with Southern blot data. The estimated genome sizes are 131 kbp for pp 3 and 120 kbp for pp 11 suggesting a deletion event in pp 11. The potential impact of genetic differences on virus isolate infectivity and virulence are discussed.

Poster #3 (President's Prize)

Anais Renaud¹, Rob Roughley¹, Jade Savage²

¹Department of Entomology, University of Manitoba, Winnipeg, MB, Canada, R3T 2N2; ²Department of Biological Sciences, Bishop's University, Sherbrooke, QC, Canada, J1M 0C8

A Biodiversity Study of Muscid and Fanniid flies (Diptera: Muscoidea) of Churchill (MB)

The Muscidae and Fanniidae of Churchill are inventoried to determine if the species composition has changed in this northern region since the publication of Hockett's memoir (1965). Material collected in 2006-2007 will be compared with published records and collection specimens going back to the beginning of the last century to detect recent modifications to the geographical range and changes in the relative abundance of species over the last decades.

Poster #25 (President's Prize)

Markus Riegler¹, Joris Witsenburg^{1,2}, **Kevin Floate**³, Ryuichi Yamada¹, Jeremy Brownlie¹, Scott L. O'Neill¹

***Wolbachia* in the Fruit Fly – An Invasion Success Story**

Five variant strains of the symbiotic bacteria, *Wolbachia pipientis*, have been detected in populations of the fly, *Drosophila melanogaster*. One of these strains, *Wolbachia* variant wMel, appears to have globally replaced the other four variants (i.e., wMelCS, wMelCS2, wMel2, wMel3) in wild populations of *D. melanogaster* within the last century. Higher fecundity of wMel-infected versus wMelCS-infected flies on iron-deficient diets may provide a partial answer to this phenomenon.

Poster #5 (Contributed)

Bill G. Riel¹, **Terry L. Shore**¹, Andrew Fall²

¹Canadian Forest Service, Natural Resources Canada, Pacific Forestry Centre, 506 West Burnside Road, Victoria BC, V8Z 1M5; ²Gowlland Technologies Ltd. 220 Old Mossey Rd. Victoria BC, V9E 2A3

Modelling Mountain Pine Beetle Pathways to the Boreal Forest

A method of projecting likely pathways of mountain pine beetle (*Dendroctonus ponderosae* Hopkins) across Alberta and into Saskatchewan is being developed based on connectivity of suitable habitat and expected cost paths through the landscape. Using this approach, possible effects of climate change on mpb movement can be explored, and some implications for management derived.

Contributed Paper (Session I; Tuesday 09:45)

Roy E. Ritzmann

Department of Biology, Case Western Reserve University, Cleveland, Ohio, USA

How Do Insects and Insect Inspired Robots Deal with Barriers?

Insects must evaluate barriers and use the resulting information to appropriately alter their direction of movement. A similar autonomous ability would be invaluable to robots that negotiate tortuous terrain. We employ a combination of behavioural and neurobiological techniques to understand how insects accomplish these tasks and, with engineering colleagues, implement them in robots. I will describe the choices that cockroaches make in climbing over, tunnelling under or turning around barriers. Then I will examine how information is evaluated within the central complex neuropils of the brain and how reflexes are modified in thoracic circuits as the insect performs these adjustments.

Plenary Session (Sunday 11:10)

Amanda D Roe¹, Brian Scholtens², **Thomas Simonsen**³, Susan Weller¹

¹1980 Folwell Ave. Rm 219 Hodson Hall, Department of Entomology, University of Minnesota, St. Paul MN 55108; ²211 Science Center, College of Charleston 66 George Street, Charleston, SC 29424-0001; ³CW310 Dept. Biological Science, University of Alberta, Edmonton AB Canada T6G 2E9

Preliminary Molecular Phylogeny of the Pyralidae, with Special Focus on the Subfamily Phycitinae

The Pyralidae is a large family of moths with a wide variety of larval life histories and diverse genitalic structures. The subfamily Phycitinae the largest subfamily of pyralid moths, and is notoriously difficult to identify or classify, prompting the use of molecular characters to understand the evolution of these taxa.

Here we present a preliminary molecular phylogeny of the Pyralidae, focusing specifically on members of the Phycitinae. We inferred this phylogeny using cytochrome c I oxidase (COI) and elongation factor 1-a (EF1a) sequences. Evolution of morphological structure and larval life history will be discussed, as well as future research directions.

Poster #24 (Contributed)

Bernard D Roitberg¹, Woodbridge A Foster²

¹Dept. Biology, Simon Fraser University, Burnaby, BC V5A 1S6; ²Dept. Entomology, The Ohio State University, Columbus, Ohio 43210-1220

The Forgotten Sex: Impact of male mosquitoes on population dynamics in *Anopheles gambiae*

We used experimental data and theoretical models to evaluate the impact of male numbers and performance on population dynamics in the African malaria mosquito *Anopheles gambiae*. In the lab, we show that when nectar is rare male per capita insemination rates and survivorship are greatly compromised. We then used those data in a coupled 2-gender, population projection matrix to show how reduction of nectar availability can impact population size.

Contributed Paper (Session I; Tuesday 11:15)

Tina Rousselle¹, Jean-Pierre Privé², Anita Leblanc², **Gaétan Moreau**¹

¹Département de Biologie, Université de Moncton, Moncton, NB, E1A 3E9; ²Agriculture et Agroalimentaire Canada, Ferme expérimentale Sénateur-Hervé-J.-Michaud, Bouctouche, NB, E4S 2J2

Seasonal Shifts in Ground Beetle Diversity and Abundance in Raspberry Plantations as Affected by Reflective Groundcover

Reflective groundcovers rolled out between rows can improve light distribution within crops. However, groundcovers act as a barrier that could influence the movement and survival of insects within the agroecosystem, with potential impacts on expected gains from the use of groundcovers. As an integral part of studies on Extended Reflective Groundcovers on raspberry crops, an experiment was conducted to examine the effects of groundcovers on ground beetles (Coleoptera: Carabidae).

Poster #22 (Contributed)

Eloise Rowland¹, Paul W. Schaefer², Stephen Takács¹, Gerhard Gries¹

¹Department of Biological Sciences, Simon Fraser University, 8888 University Drive, Burnaby, British Columbia, Canada, V5A 1S6; ²United States Department of Agriculture, Agricultural Research Service-North Atlantic Area, Beneficial Insects Introduction Research, 501 S. Chapel Street, Newark, Delaware, 19713-3814

Bioacoustic Communication in Lymantriid Moths: Sound as a Short-range Orientation Signal

There are 19 reported independent evolutions of audition in the Insecta. However, little is known about bioacoustic communication in lymantriid moths. Acoustic signals of three lymantriid moth species, *L. fumida*, *L. monacha*, and *L. mathura*, were acquired, characterized, and tested for their role in mate location or courtship behaviour. Results indicate that acoustic signals mediate short-range orientation of males to females.

President's Prize Paper (Session C; Monday 09:45)

Rana M. Sarfraz¹, Lloyd M. Dossdall², Andrew B. Keddie¹

¹Department of Biological Sciences, University of Alberta, Edmonton, Alberta, Canada T6G 2E9; ²Department of Agricultural, Food and Nutritional Science, University of Alberta, Edmonton, Alberta, Canada T6G 2P5

Tritrophic Interactions: Effects of Host Plant Nutritional Quality on the Performance of the Herbivore *Plutella xylostella* and its Parasitoid *Diadegma insulare*

We manipulated soil fertility regime to investigate bottom-up effects on *Brassica napus* plants, and then on the important pest, the diamondback moth, *Plutella xylostella* and its parasitoid *Diadegma insulare*. Different fertilizer applications significantly affected the nutritional quality of *B. napus*, and this in turn influenced the performance of *P. xylostella* as well as *D. insulare*. In integrated crop management programs, selecting optimal fertility levels should consider not only effects on yield in the absence of pests, but also effects on compensatory abilities of plants when under attack, and downstream effects on the developmental biology of herbivores and their parasitoids.

President's Prize Paper (Session D; Monday 11:45)

Daynika Schade, Steven Vamosi

Department of Biological Sciences, University of Calgary, 2500 University Drive N.W., Calgary, AB, T2N 1N4

Consequences of Larval Competition on Mating Strategies of Female Bruchids (Coleoptera: Bruchidae)

Bruchid larvae develop inside of dried beans, often experiencing intraspecific competition for resources and emerging smaller and less fecund. As adults, females may mate with multiple males. Longevity, fecundity, body fat content and remating strategy were compared for females from two larval competition levels. Preliminary results suggest that females reared with larval competition are less likely to accept multiple mates than females reared alone.

President's Prize Paper (Session C; Monday 11:45)

Eric Siljander¹, Dan Penman¹, Harold Harlan², Regine Gries¹, Gerhard Gries¹

¹Simon Fraser University, Department of Biological Sciences, 8888 University Drive, Burnaby, BC Canada, V5A 1S6; ²621 Maple Hill Lane, Crownsville, MD 21032, U.S.A.

Contact and Airborne Aggregation Pheromones of the Common Bed Bug, *Cimex lectularius* Linnaeus (Hemiptera: Cimicidae)

In dual choice olfactometers, paper discs previously exposed to bed bugs elicited arrestment responses by bioassay insects and revealed evidence for juvenile- and adult-specific contact pheromones. In extracts of headspace volatiles from the bed bug laboratory colony, 14 candidate pheromone components were identified by gas chromatography – mass spectrometry. In olfactometer experiments, 10 of these 14 components were essential to elicit behavioural responses from juveniles.

President's Prize Paper (Session A; Sunday 13:30)

Thomas J. Simonsen

Department of Biological Sciences, University of Alberta, Edmonton, AB, Canada, T6G 2E9

Towards a Phylogeny of the Cactus-feeding Genera in Phycitinae (Pyralidae). *Step 1: Morphology*

The cactus-feeding genera and their closest allies in the Phycitinae (Lepidoptera: Pyralidae) may comprise a monophyletic group within the subfamily. However, the hypothesis has never been tested based on phylogenetic methods. Here I present a phylogenetic study focused on the cactus associated genera within Phycitinae based on 75 characters from adult morphology. This study is the first step in a total-evidence approach towards the phylogeny of the cactus associated Phycitinae.

Contributed Paper (Session II; Tuesday 16:00)

Brian H. Smith

School of Life Sciences, Arizona State University, Tempe, AZ 85287-4501

Learning, and Learning not to Learn, in the Honey Bee

Animals learn about the relationships between stimuli and important events, such as food, predators and mates. We normally think about learning of stimuli that are correlated with those events and hence predict them. However, it is also important to learn not to associate stimuli that are not relevant to solving a task. This kind of learning involves several different behavioral mechanisms. The presentation will cover behavioral and neural mechanisms through which honey bees solve this kind of learning task. It will also review how learning in honey bees can be used for both basic and applied biomedical and agricultural problems.

Symposium II (Wednesday 08:40)

Marjorie A.H. Smith, Robert J. Lamb

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

An Interspersed Refuge Strategy to Preserve Wheat Midge Resistance in Wheat

Spring wheat carrying a gene conferring antibiosis resistance against wheat midge will soon be available commercially. A few larvae survive in experimental plots of resistant wheat suggesting that a virulence gene allowing them to adapt to the resistance may be present in the population. We developed a computer simulation model to explore the effectiveness of an interspersed refuge in the resistant wheat, to slow the spread of virulence.

Contributed Paper (Session I; Tuesday 11:00)

Juliana Soroka¹, Clayton Myhre², Larry Grenkow¹, Ross Weiss¹

¹Agriculture and Agri-Food Canada, Saskatoon Research Centre, Saskatoon, SK, Canada, S7N 0X2; ²FarmPure Global, P.O. Box 100, Nipawin, SK, Canada, S0E 1E0

Red Clover Seed Insect Pests - What You See Isn't Necessarily What You've Got

The lesser clover leaf weevil *Hypera nigrirostris* (Fab.) was first seen as a serious pest of red clover seed production in north eastern Saskatchewan in the early 1980s. Recently it has again been implicated in clover seed yield reductions, and producers are asking for methods of control of the pest to increase their seed yields. A study initiated this spring used sweep and foliage sampling of a dozen commercial red clover seed fields to determine the insect fauna present, and insecticide trials in three fields to evaluate the efficacy of insecticides for *H. nigrirostris* control. Results, although tentative, are unexpected.

Contributed Paper (Session III; Wednesday 10:20)

Jessica Stolar, Arthur R. Davis

Department of Biology, University of Saskatchewan, 112 Science Place, Saskatoon, SK Canada, S7N 5E2

Pollination Ecology of *Lilium philadelphicum* L., Saskatchewan's Floral Emblem

Field research was conducted at two sites near Pike Lake Provincial Park in central Saskatchewan, to investigate the potential pollinators of *Lilium philadelphicum*. Following anthesis, previously-bagged mature buds were unbagged to permit insect visits. Flower visitors included members of the Halictidae, Formicidae, Megachilidae and Nymphalidae. Counts of pollen tubes per style using fluorescence microscopy, and dissection of mature fruits to determine seed set, allowed quantitative ranking of flower visitors as pollinators.

Poster #21 (President's Prize)

Jon Sweeney¹, Peter Silk¹, Jerzy Gutowski², Junping Wu¹, Jessica Price¹

¹Natural Resources Canada, Canadian Forest Service, Fredericton, NB Canada, E3B 5P7; ²Forest Research Institute, Department of Natural Forests, 17-230 Białowieża, Poland

Effect of Pheromone Chirality and Release Rate on Attraction of *Tetropium fuscum* (F.) (Coleoptera: Cerambycidae)

Attraction of the brown spruce longhorn beetle, *Tetropium fuscum* (F.), to synthetic pheromone ("fuscol") was tested in field trapping experiments in May-July 2007 in Halifax, Nova Scotia and Białowieża, Poland, with the objective of determining the most effective tool for use in trapping surveys. Four pheromone enantiomer blends, pure *S*-, pure *R*-, 95/5 (*S/R*), and 50/50 (*S/R*) (racemic), were tested alone and in combination with host volatiles. Racemic fuscol was also tested at four different release rates, alone and in combination with host volatiles.

Contributed Paper (Session II; Tuesday 14:45)

Zachary A. Sylvain, Christopher M. Buddle

Department of Natural Resource Sciences, Macdonald campus of McGill University, 21111 Lakeshore Rd, Montreal, QC Canada, H9X3V9

Spatial Distribution of Oribatid Mite (Acari: Oribatida) Assemblages in a Southern Quebec Forest

Oribatid mites are the most numerous arthropod group in soils, yet little is known about what environmental factors influence their assemblage structure and composition. Four forest stand types within the Morgan Arboretum of McGill University were sampled from, and within two of these stand types three litter treatments were established. Oribatids were sampled over two years, identified to species and analyzed to compare abundance, species richness and composition.

President's Prize Paper (Session B; Sunday 14:00)

James A. Tansey¹, Lloyd M. Dossall¹, B. Andrew Keddie²

¹University of Alberta, Department of Agricultural, Food and Nutritional Science. 410 Ag/For Building, Edmonton, AB, Canada. T6G 2P5; ²University of Alberta, Department of Biological Sciences. CW 405 Biological Sciences Centre, Edmonton, AB, Canada. T6G 2E9

The Influence of Visual and Olfactory Cues on Host Selection by the Cabbage Seedpod Weevil

The cabbage seedpod weevil, *Ceutorhynchus obstrictus* is an increasingly important pest of canola in western Canada. Recently, introgression of *Sinapis alba* L. to *B. napus* has produced genotypes resistant to CSPW. Our results suggest that variability among visual and olfactory traits among genotypes and between these genotypes and *B. napus* and *S. alba* may influence host selection and contribute to demonstrated resistance.

President's Prize Paper (Session D; Monday 11:15)

Aynsley Thielman, F. F. Hunter

Department of Biological Sciences, Brock University, St. Catharines, ON Canada L2S 3A1

***Anopheles perplexens* and the *An. quadrimaculatus* Complex (Diptera: Culicidae): New Records for Canada?**

Studying *Anopheles* systematics in Canada has revealed potential new species records. Therefore, the collection and identification of specimens using morphological and molecular data were attempted to establish the presence of these isomorphic species. Gravid females of specimens resembling *An. perplexens* were collected to study egg morphology. Specimens identified as *An. quadrimaculatus* were re-examined using morphological and molecular data to determine which sibling species are present in Ontario.

President's Prize Paper (Session C; Monday 11:00)

Umut Toprak^{1,2}, Martin Erlandson¹, Cedric Gillott², Dwayne D. Hegedus¹

¹Agriculture and Agri-Food Canada, Saskatoon Research Centre, 107 Science Place, Saskatoon, SK, Canada S7N 0X2; ²Department of Biology, University of Saskatchewan 112 Science Place, Saskatoon, SK, Canada S7N 5E2

Characterization of Three New Insect Intestinal Mucins From Lepidopteran Peritrophic Matrix (PM) and Interaction of MacoNPV Enhancin with the PM Protein, McIIM1

The peritrophic matrix (PM) is composed of chitin and proteins and serves as a barrier to pathogen entry. The *Mamestra configurata* nucleopolyhedrovirus (MacoNPV) encodes a viral enhancing factor, enhancin, that is a metalloprotease and facilitates MacoNPV infection by degrading insect intestinal mucins, a key subset of protein components of the PM. Here we describe insect intestinal mucins from *M. configurata* and investigate those targeted by MacoNPV enhancin.

President's Prize Paper (Session C; Monday 11:15)

Amanda Van Haga^{1,2}, Andrew B. Keddie², Stephen F. Pernal¹

Field and Laboratory Studies on the Use of Lysozyme to Control Chalkbrood in Honey Bees

Chalkbrood, caused by *Ascophaera apis*, is a cosmopolitan fungal disease of honey bee larvae (*Apis mellifera*) for which there is no chemotherapeutic control. Using *in vitro* larval rearing methods, lysozyme-HCl, a food-grade antimicrobial extracted from hen egg albumen, was found to suppress chalkbrood at levels of 0.75-1.5% ($\mu\text{g}/\text{mL}$ of larval diet). Disease severity, population growth, and honey yield of artificially infected package colonies administered 0-18 g of lysozyme-HCl were evaluated.

President's Prize Paper (Session D; Monday 09:45)

Brian H. Van Hezewijk, Robert S. Bouchier

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

Using Coupled Plant-Herbivore Models to Explain, and Perhaps Predict, the Success of Weed Biocontrol Programs

Coupled host-parasitoid models have played a central role in insect biocontrol because they capture the dynamic and reciprocal interactions between species. Surprisingly, similar models for plant-herbivore communities have only recently been applied to weed biocontrol. The development of such a coupled model enables incorporation of density-dependent feedbacks that better explain the impact of *Larinus minutus* on diffuse knapweed and may provide a tool for predicting impacts in other systems.

Contributed Paper (Session I; Tuesday 10:30)

R. Verspui, J.R. Gray

Department of Biology, University of Saskatchewan, Saskatoon, SK, Canada

Responses to Multimodal Sensory Cues in the Moth, *Manduca sexta*

Odour-guided flight of male *Manduca sexta* is used as a model system to study the neurophysiological principals underlying multimodal sensory integration. We recorded behavioural and neurophysiological responses from male *M. sexta* while presenting them with looming stimuli and or female pheromone gland extract. Preliminary data suggests that contrary to the well described locust DCMD, descending visual activity in *M. sexta* involves multiple neurons that do not appear to habituate.

President's Prize Paper (Session C; Monday 09:00)

Diego Viteri¹, Irma Cabrera¹, Amanda Hodges², Consuelo Estévez de Jensen¹, Byron Vega¹

¹University of Puerto Rico, Department of Crop Protection, Mayaguez, Puerto Rico, 00681; ²University of Florida, Entomology and Nematology Department, Gainesville, Florida, USA, 326111

Field Evaluation of Trapping Methods for Insects on Soybean (*Glycine max* L.) and Dry Bean (*Phaseolus vulgaris* L.) in Puerto Rico

Preliminary results of trapping methods for insects in soybean and dry bean plots in Isabela, Adjuntas and Juana Diaz indicate significant differences in populations. The visual method identified the highest number of insects compared to the sweep net and grow cloth method. In Adjuntas the visual and grow cloth method

are recommended for insect surveillance of plots without insecticide treatment. Coleoptera was the order with more abundant species.

Poster #13 (President's Prize)

Wolly Wijayarathne

Department of Entomology, University of Manitoba, 12 Dafoe Road, Winnipeg, Manitoba R3T 2N2

Smoke from Burning Rice Husks Controls Stored-product Insects

In laboratory trials, carbon monoxide over 5000 ppm generated from rice husk combustion caused 100% mortality after 13, 14 or 18 hours of exposure for *Rhyzopertha dominica*, *Sitophilus oryzae* and *Tribolium castaneum* respectively. In a warehouse trial, *Rhyzopertha dominica* and *Sitophilus oryzae* adults had approximately 80% mortality on the outside of bags and 56% mortality just inside bags. Insects at centre of bags were not killed.

President's Prize Paper (Session D; Monday 08:45)

Rosanna Wijenberg, Melissa Cook, Stephen Takács, Gerhard Gries

Department of Biological Sciences, Simon Fraser University, 8888 University Drive, Burnaby, British Columbia, Canada, V5A 1S6

Female German Cockroaches, *Blattella germanica* L. (Dictyoptera: Blattellidae), Join Conspecific Groups Based on Auditory Cues

Insects deciding whether to join a group of conspecifics may utilize olfactory and auditory signals, or cues, from the group as indicators of its size or suitability of its shelter. Here we show that female German cockroaches, utilize auditory cues associated with wing-fanning behaviour when deciding whether or not to join a group. These cues appear to convey information on group size and allow sonotactic orientation to the group's location.

President's Prize Paper (Session C; Monday 09:30)

Tyler J. Wist^{1,2}

¹Department of Biological Sciences, CW 405 Biological Sciences Bldg., University of Alberta, Edmonton, Alberta, Canada, T6G 2E9;

²City of Saskatoon, Pest Management, 1101 Ave P N, Saskatoon, Saskatchewan, Canada, S7K 0J5

Novel Use of Ash Leaflets Rolled by the Ash Leaf Coneroller, *Caloptilia fraxinella* (Lepidoptera: Gracillariidae), by the Cottony Ash Psyllid, *Psilopsis discrepans* (Homoptera: Psyllidae)

Since 1998, the ash leaf coneroller, *Caloptilia fraxinella*, an invasive pest of ornamental ash species, has been spreading across the urban landscape of many prairie cities including Edmonton and Saskatoon. In 2006, an alien invasive pest of black and Manchurian ash, the cottony ash psyllid, appeared in Saskatoon and adapted rapidly by producing a second generation that developed within leaflets rolled by the ash leaf coneroller. This commensalism represents a novel relationship where an invasive insect benefits from another invasive species.

President's Prize Paper (Session B; Sunday 14:45)

Nathan Woodbury, Gerhard Gries

Department of Biological Sciences, Simon Fraser University, Burnaby, BC Canada, V5A 1S6

Pheromonal Communication in Common Silverfish, *Lepisma saccharina*, Giant Silverfish, *Ctenolepisma longicaudata*, and Firebrat, *Thermobia domestica* (All Thysanura: Lepismatidae)

Little is known about communication in thysanurans. Here we show that common and giant silverfish produce species-specific aggregation pheromones. These non-volatile pheromones are produced by male, female and juvenile insects, and induce arrestment by conspecifics upon contact. Our results demonstrate that the contact aggregation pheromone of the firebrat, *Thermobia domestica* (Lepismatidae) appears to be frass-derived. Isolation and chemical identification of these pheromones are currently underway.

President's Prize Paper (Session A; Sunday 14:00)

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The Entomological Society of Canada would like to thank Natural Resources Canada's Canadian Forest Service, specifically Mr. Jim Farrell (CFS ADM) and the Forest Science Division, for the advance copies of the **2008 Forest Insects in Canada** calendar. The calendar highlights the importance of insects in Canada's forest ecosystems, as well as the need for taxonomic expertise, such as that of John Huber and Klaus Bolte, to correctly identify insects and understand their impacts. We are pleased to have this attractive product that is also a useful learning tool.

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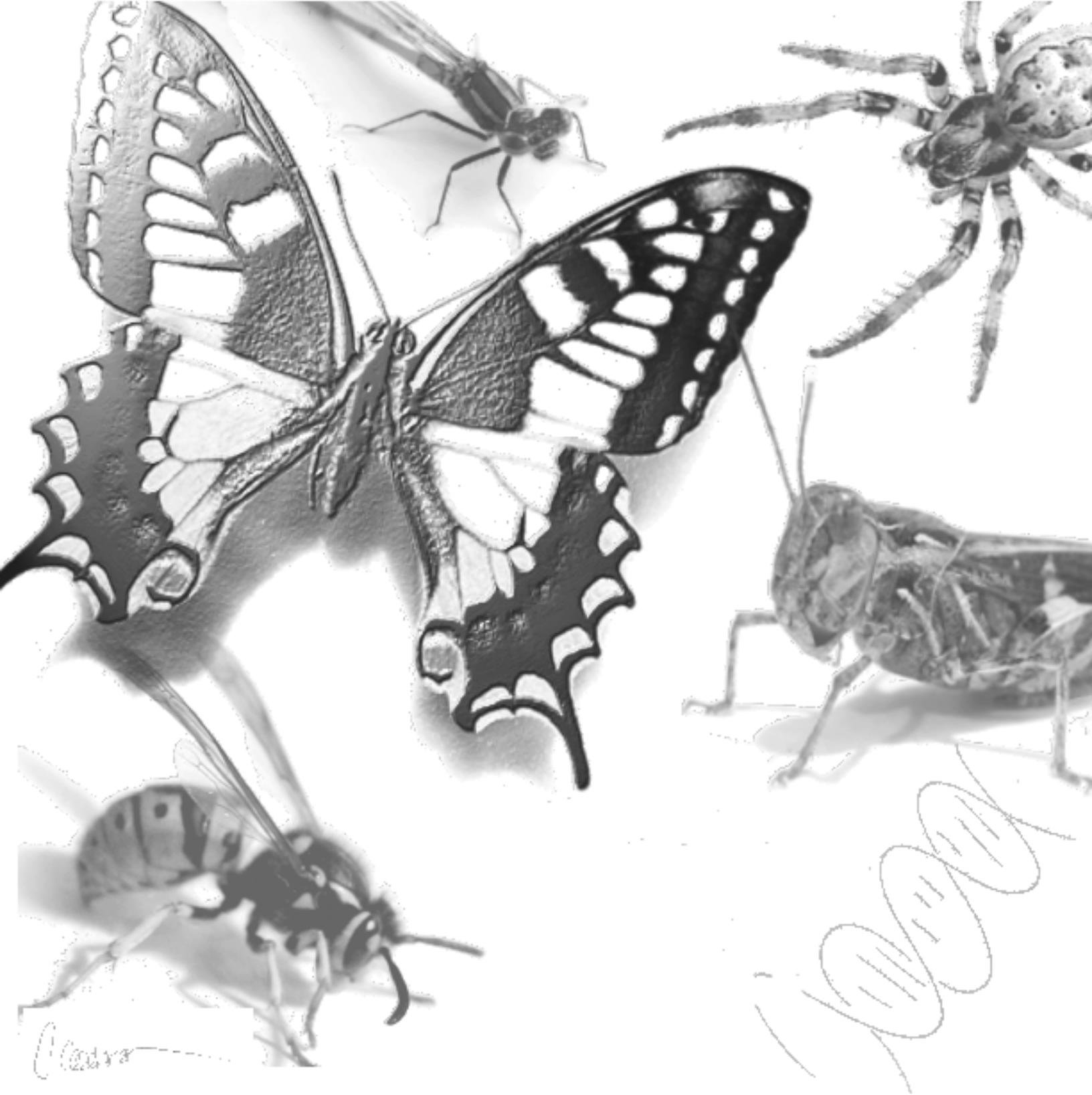
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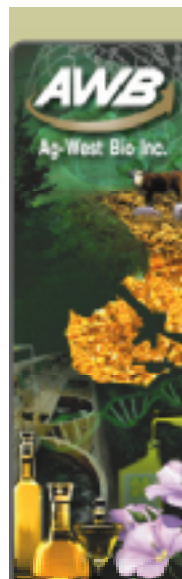
Colleen Cochran, a grade 12 student at Saskatoon's Walter Murray Collegiate in 2006-2007, won the Student Competition to design artwork for the ESC JAM 2007. Colleen was attending the graphic art class taught by K. Babiuk and is seriously thinking of following a career in art.

ESC JAM 2007 is very grateful for the support of these organizations



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