

PROCEEDINGS OF THE 47TH ANNUAL MEETING OF THE

Entomological Society of Alberta

Waterton, Alberta
October 14 - 16, 1999

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THE ENTOMOLOGICAL SOCIETY OF ALBERTA

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

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

One of the prime motives for establishing the Society was to encourage interest in amateur entomology, which had declined from its earlier vigour. The objectives of the Society are succinctly stated in the original Constitution, which differs only slightly from the present Bylaws:

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

OFFICERS 1999

President	Ken Fry
Vice-President	Daryl Williams
Past-President	Mark Goettel
Secretary	Gerald Hilchie
Treasurer	Greg Pohl
Editor	Erica Lee
Directors (South)	Troy Danyk
(Central)	Rob Longair
(North)	Lloyd Dosdall
ESC Director	Rob Bouchier
Auditors	Louis Morneau

PRESIDENT'S REPORT

This past year as President of the ESA has been a rich and enjoyable time due in large part to the vigorous efforts of a great many members of this Society.

I would like to formally recognise and thank the members of the Local Organizing Committee for preparing and staging this very successful and enjoyable 47th Annual Meeting. The Chair was Mark Goettel and it must be testament to his organizational skills that this meeting has functioned so well in his absence. I think a great measure of the success is due to the efforts of Christine Noronha for the program, the accommodations and entertainment, Hector Carcamo for the stimulating scientific program, and Christine, Stephanie Herb and Greg Pohl for registration, Rose Declerk-Floate as MC of the Banquet and Chantel Ouimet for her after dinner talk illuminating the desperate need for biodiversity studies in our national parks. Thanks, too, to all of the moderators, including Rick Butts, Ian Jonsen, Jennifer Otani, Rose Declerk-Floate, and Kevin Floate.

Our Society has made some significant strides toward increasing our contributions to publicising entomology through firstly

- 1) our web page and for that I would like to acknowledge the fine efforts of Troy Danyk

secondly through

- 2) participation in regional science fairs

and lastly through

- 3) a new initiative to increase awareness of entomology in schools

The Society is in sound, if not robust financial condition and judging by the number of Alberta student presentations at this meeting and the national meeting, the future of our Society looks to be secure.

Lastly, I would like to thank the Executive for their diligent work, innovative ideas and passionate devotion to the Society over the past year. I would like to take this opportunity to thank in advance of their departure, those members that are leaving us as their terms expire this year, Mark Goettel as Past President and Hideji Ono as auditor.

I can assure you the Society is in good hands with those people that remain. It has been a pleasure to work with this fine group and any success I may have witnessed is due to their efforts and those of the many Society members that contributed along the way.

Thursday October 14th, 1999

- 19:00 Executive meeting (Alpine room)
20:00 Registration and mixer

Friday October 15th, 1999:

- 08:00 Registration
08:45 Opening remarks by Hector Carcamo and Christine Noronha
08:55 Greetings from ESC president (Dan Johnson)
Symposium Strategies for dealing with pest introductions and outbreaks
09:10 Keynote address: Strategies for dealing with the introduction of the Russian Wheat Aphid into the United States.
Dr. Frank Peairs, Colorado State University, Fort Collins, Colorado
10:00 Coffee break
10:30 Symposium continued
12:00 Lunch
13:30 Session # 1: *Floreat entomologia*
15:00 Coffee break
15:30 Session #2: *viva la entomología!*
19:30 Banquet
Speaker: Dr. Chantal Ouimet Aquatic ecologist, Scientific consultant for Waterton Lakes National Park: Stepping beyond the scenery: research work, and play in Waterton Lakes National Park.

Saturday October 16th, 1999

- 08:30 Session # 3: *Entomological Diversity*
10:00 Coffee break
10:30 Session # 4: of beetles and more...
12:00 1999 Business meeting of the Entomological Society of Alberta

ABSTRACT OF KEYNOTE SPEAKER
A pest management response to Russian wheat aphid in Colorado
Dr. Frank Peairs,
Colorado State University, Fort Collins, Colorado

Russian wheat aphid was first observed in Colorado in 1986. Damage consists of stunted plants with tightly rolled, discolored leaves. The economic impact of this pest has been significant for the United States and for Colorado. In Colorado, more than 3 million acres have been treated with insecticides and the overall 1986 - 1998 impact on wheat producers has been estimated at US\$127 million. Thirteen years later, Russian wheat aphid persists as an important small grains pest in the western High Plains, but has become sporadic or nonexistent in many other areas affected during the initial outbreak. The Colorado Russian wheat aphid program developed an IPM response to this pest through research on pest biology, biological control, cultural control, plant resistance, treatment decisions and chemical control.

Field biology studies have focused on overwintering and oversummering requirements. Colorado provides the aphid with relatively good conditions for both, which may explain the relatively consistent infestations experienced in this state relative to its neighbors. Allison-Pike suction traps have been used to monitor aphid flight activity. Trap catches have varied spatially and temporally.

Russian wheat aphid has been the target of a significant classical biological control effort. More than 60 exploration trips were made by several groups and agencies, resulting in the importation and release of 29 species of natural enemies and 6 species of fungal pathogens. Four parasitoid species are considered to be established, although their impact has been negligible in Colorado to date.

A number of cultural controls have been evaluated for their effect on Russian wheat aphid. Several, including grazing and delayed planting, have significant but undramatic effects. These effects have been described but are poorly understood. Cultural controls play an important supporting role in Russian wheat aphid management.

More than 25,000 small grain accessions have been screened for resistance to Russian wheat aphid. At least 90 sources of resistance have been identified and 6 genes have been named. The five released cultivars have Dn4-based resistance. Some problems with resistance expression have been observed with this gene. Plant resistance has emerged as the key IPM tactic for Russian wheat aphid in the western High Plains.

A research-based economic threshold, based on 0.5% yield loss per 1% infested tillers, has been developed for Russian wheat aphid. A sequential sampling plan is also available. Implementation of this knowledge has been limited by cost. It seems unlikely that thresholds will be necessary for resistant cultivars.

Chemical control use patterns have changed little since the early years of the Russian wheat aphid outbreak. Adoption of newer products has been limited by efficacy or cost, particularly in dryland production systems.

Pest management for Russian wheat aphid in the foreseeable future in Colorado will rely on plant resistance, supported by cultural biological controls. Effective biological control may require more diversified cropping practices. Intensified rotations hold considerable promise in this regard, particularly since they are more profitable as well.

The success of the Colorado Russian wheat aphid program can be attributed to several factors. It has strong clientele support. It took a broad, shallow approach to the problem in order to develop several management tactics in a parallel fashion. It attempted to provide producers with both short and long term solutions. Communication and coordination with other entities involved in the problem was emphasized. Finally, research projects were evaluated periodically and terminated if sufficient information had been gathered or if progress was unsatisfactory. New projects addressing longer term goals could then be initiated.

ABSTRACTS OF SUBMITTED PAPERS

Note: These abstracts should not be considered as publications and may not be cited without the author's permission.

Ball, G.E. *Dicaelus dilatatus* Say (Coleoptera: Carabidae: Licinini) then and now, and an aging taxonomist's prayer.

The eastern North American genus *Dicaelus* Bonelli comprises 17 species. Most of the species are clearly differentiated in the adult stage by body form, various external structural details, and form of the male genitalia. However, specimens of one putative species, recently collected near the Gulf Coast of northern Florida, collectively exhibited a pattern of variation in body proportions indicating that the series was not uniform, and that possibly two species were represented. Bimodality of the external features was paralleled by bimodality of previously overlooked details of the male genitalia. Names were available for both species: *D. dilatatus* Say 1823, and *D. planicollis* LeConte, 1848, the latter name having been declared previously (and incorrectly) to be a junior synonym of the former name. The geographical ranges of the two species overlap broadly, in a zone extending in eastern United States from northern Florida to southernmost Virginia.

Brdar, C. and J. Roland. Butterfly barriers in the Rockies.

Fire suppression in Jasper National Park is allowing forest succession to continue unchecked. As a result, the forested areas surrounding open butterfly habitat are becoming more dense, and may act as barriers to movement. In this study, we determined how increasing forest density affects movement by butterflies across the meadow-forest boundary, through experimental observations at the edges of various types of forest. We observed the behaviour of individual butterflies in order to quantify the amount of movement that was occurring across these boundaries. We have found that as the forest becomes more dense, it does influence butterfly behaviour at the meadow-forest interface. Butterflies who prefer meadow habitat are affected to a greater degree than those that occasionally use forests as habitat.

Cárcamo, H.A., J. Otani, B. Byers, R. Butts and O. Olfert. Designed for *Lygus*, made for weevils: dealing with pesky immigrants in southern Alberta.

The cabbage seedpod weevil (csw) (*Ceutorhynchus obstructus* Paykull) is a native cruciferous pest from Europe that was first detected in southern Alberta in 1995 and has now reached pest proportions in canola south of Lethbridge. Approximately 5000 acres were sprayed for cabbage seedpod weevils in 1999 in southern Alberta. There is currently no information on the economic benefits of spraying for this new pest or estimates of its damage to canola. The objective of this study was to determine the effect of insecticide application to control csw on yield of canola. Application of Lorsban™ at two canola fields near Stirling and Decis™ at one field near Coaldale reduced percent of pods infested by half (range of pod infestations in checks was ca. 25-50%). Yields collected from quadrant samples at one field were about 20 % higher in the sprayed area compared to the check strips. Weevils consistently ate about five seeds from each pod (20 % of all the seeds in a pod). It appears that in addition to direct losses caused by larvae, adult feeding may also reduce yields and growers will need to add this weevil to the complex of insect pests to be managed in canola.

Cárcamo, H.A. , C.E. Prescott, C.P. Chanway, and F.B. Holl. Do soil fauna influence nitrogen cycling in forests of British Columbia, Canada?

The objective of this study was to improve our understanding of the role of soil invertebrates in the break-down of litter, cycling of nitrogen, microbial functional diversity and growth of seedlings in forests of British Columbia. A field experiment with forest floor material defaunated with liquid nitrogen showed greater comminution of birch leaves and N release in sacs that allowed access to larger animals than in sacs with fine mesh that excluded larger animals. In the laboratory, microcosms were used to manipulate the complexity of the faunal communities from two coastal sites and one sub-boreal site. Break-down of sentinel leaves was higher in the presence of millipedes in the two coastal sites but the presence of smaller animals did not increase litter break-down in either trial. Functional diversity of the microbial communities and metabolic activity assessed with Biolog™ plates were higher in microcosms with macrofauna than in the defaunated treatments in the coastal trial but there were no differences in microcosms with and without mesofauna in the sub-boreal trial. Nitrogen release was higher in the presence of fauna than in defaunated treatments in both trials. Growth of seedlings was slightly higher in treatments with the more complex faunal communities that included millipedes in the coastal trials. Our results suggest that soil fauna contribute to the maintenance of forest soil fertility and may enhance seedling growth in these forests.

Cartar, R. Bumble bees remember rewarding plants.

Foragers usually collect food in environments where food is patchily distributed, and where the patches themselves differ in quality. When foragers move through a regenerating environment on successive occasions, they can potentially benefit from remembering the most profitable locations, and return preferentially to these (the "memory" hypothesis). Alternatively, they can visit many patches along a foraging route, and stay longer in the rewarding ones (the "local experience" hypothesis). I examine these alternatives in study sites in SW Alberta, using marked worker bumble bees visiting flowers of 5 plant species chosen for their different handling characteristics. In each flower species, I experimentally produced variation in nectar secretion rate by defoliation and fertilization of individual plants. The results from all 5 species support the local experience hypothesis. More importantly, the memory hypothesis is supported in 3 of the 5 species: those with the greatest natural among-plant differences in nectar production rate. When it pays, bumble bees remember rewarding plants.

Colwell, D.D and M. O'Connor. Maggots between the toes: a case of human cutaneous myiasis by an unidentified sarcophagid.

Twenty four maggots were recovered from the foot of a 2-mo old child from southern Alberta, Canada. The child had a 3-d history of irritation and swelling of the foot. Larvae were observed in the skin on the plantar surfaces of the left foot. The lesions were not furuncular, but erythema and a serous exudate were evident and swelling of the infested toes was noted. Larvae were removed and fixed. They were identified as second instar sarcophagid larvae. Scanning electron microscopy showed typical features that are common to most other described larvae of this family. Comparison of structural details of cephalic, thoracic and posterior abdominal regions did not yield information that would aid in positive identification of the larvae.

Danyk, T. and D. Johnson. The effect of seed-treatment with imidacloprid and an analogue (TI-435) on grasshoppers (Orthoptera: Acrididae) and one of their parasitoids, *Blaesoxipha atlantis* (Diptera: Sarcophagidae).

Grasshoppers that hatch in the spring can move into young cereal plantings and cause significant damage. The natural enemies of grasshoppers include *Blaesoxipha atlantis* that emerges from soil in mid-June and can parasitize grasshoppers in July. We summarize some of the work conducted on two novel insecticides and a grasshopper parasitoid to determine the feasibility of including these insecticides in a pest management plan. In Experiment 1, wheat plants were grown in trays from seed treated with Gaucho 480 (25, 50 or 100 g a.i. imidacloprid per 100 kg seed plus Vitaflo 280: 44 g a.i. thiram and 51 g a.i. vitavax), control (Vitaflo 280) or untreated (no pesticides). Three trays of each seed-type were placed into screen cages in a greenhouse, and unmated flies (16 male and 12 female) were added to each cage. After 10 days, surviving female flies were brought into the lab and placed in cages that contained *M. sanguinipes*. Within sex, there was no difference in percentage mortality of flies across seed-type in greenhouse cages; percentage survival of males was less than that of females, but was not due to seed-treatment. There was no difference across seed-type in percentage of females that were mated, viability of larvae within female flies, fitness of female flies or sex ratio of offspring. In Experiment 2, 18 male and 18 female adult wild-type *M. sanguinipes* were singly parasitized, and an equal number of unparasitized insects, were placed individually in cups and fed plants grown from seed-types used in Experiment 1. Insects were fed daily and maintained at 24°C : 20°C (day : night) and a 16-h photoperiod. Mortality of parasitized hosts exceeded that of unparasitized counterparts in untreated and control groups. Mortality of unparasitized insects increased with dose of imidacloprid. Whereas mortality of parasitized insects that fed on insecticide-treated plants exceeded that of unparasitized counterparts at the same dose, mortality of parasitized insects that ate treated plants was less than that of parasitized insects that fed on untreated or control wheat. Imidacloprid significantly reduced the percentage of parasitoids that completed development, and increased developmental time relative to insects that ate untreated wheat. Dry mass of flies did not differ across seed-type. In Experiment 3, field plots were established with seed treated with Gaucho 480 (10, 20, 30 or 40 g a.i. imidacloprid plus Vitaflo 280: 49 g a.i. thiram and 56 g a.i. vitavax), an analogue (10, 20, 30 or 40 g a.i. GUS-7009 plus Vitaflo 280) or a control (Vitaflo 280). Leaves were harvested and presented to second- and/or third-instar *M. bivittatus* maintained individually in cups at 27°C : 20°C (day : night) and a 16-h photoperiod or in a greenhouse. Percentage mortality of *M. bivittatus* did not differ between testing locations or between control and imidacloprid treatments. However, mortality in GUS-7009 groups exceeded that in imidacloprid groups; LD₅₀ of GUS-7009 was 13. Insects in insecticide groups experienced paralysis, but whereas *M. bivittatus* tended to recover in imidacloprid groups, the same was not true in GUS-7009 groups. Imidacloprid and GUS-7009 may be satisfactory candidates for use in a grasshopper management strategy, especially if these pesticides are used in spring wheat. More research is needed to further elucidate the potential activity of these seed-treatment insecticides in the field utilizing IPM methodology.

De Clerck-Floate, R., P. Plue and T. Lee. Lessons learned during the design of an arthropod and pathogen quarantine facility.

The Lethbridge Research Centre, of Agriculture and Agri-Food Canada, has completed design for a 883 square metre (9500 square foot) quarantine facility for the containment of biocontrol arthropods, and insect and plant pathogens. During the

design phase of the project, several quarantine facilities in the U.S. were toured and information was gathered from people involved with quarantine design and maintenance in North America and abroad. From these tours and interviews, and our own challenges in design, we have developed a list of architectural and mechanical engineering solutions to meet user/ regulatory requirements and budget constraints on such a project. These include: 1) Using a clustered, modular design for small insect-rearing rooms. The rooms have special ventilation to address wide temperature range capabilities, elevated relative humidity, and potential allergy problems related to the rearing of insects. 2) Lowered ceilings in insect rearing rooms and imported shipment room to give better control of escaped insects and ease in cleaning. 3) Establishment of quarantine barrier at the ceiling, above which is located all mechanical equipment in a large non-quarantine interstitial space. 4) Natural light in many areas within quarantine to enhance work with insects (e.g. for mating and rearing requirements, insect trapping, improved viewing of insects during identification/sorting). 5) Mechanical and air barrier separation of the arthropod from pathogen areas of quarantine. The pathogen suite has its own entrance with shower, controlled pressure differentials, separately-treated waste water, and HEPA filtered exhaust air. 6) Flexible, economical waste management system. This includes triple-tank septic and batch chlorine systems for treatment of liquid wastes from arthropod and pathogen parts of quarantine, respectively, and pass-through autoclave and hot-box for treatment of solid materials. 7) Individual fan coil units for cooling greenhouse compartments versus dedicated air handlers.

Dosdall, L.D. The cabbage seedpod weevil: a new pest of canola in Alberta.

The cabbage seedpod weevil, *Ceutorhynchus assimilis*, is a relatively new pest of canola in Alberta. It has been known to occur in the Creston Valley and the lower mainland of British Columbia for many years, but was only discovered in Alberta in 1995. Since then its populations have increased dramatically from relatively low densities (approx. 0 to 0.5 weevils per sweep net sample) in 1997 and 1998, to outbreak levels (approx. 6 to 15 weevils per sweep sample) in 1999. Several research initiatives were undertaken to study its biology in spring canola in Alberta, and to investigate chemical and biological control strategies. The cabbage seedpod weevil emerges from its overwintering sites when air temperatures reach approximately 10 °C. Although it will feed on several cruciferous weed species, it prefers wild mustard (*Brassica kaber*) over flixweed (*Descurainia sophia*) and stinkweed (*Thlaspi arvense*). It is attracted to canola crops in the bud and early flowering stages, and oviposits as soon as pods are 1 to 2 cm in length. Crop losses can occur in several ways, including damage by adults to developing buds and flowers, seed loss by feeding of larvae within pods, fungal damage to infested pods after exit holes are created, damage to immature pods by new generation adults, and premature shattering of infested pods. Chemical control trials determined that some products currently registered for use against other canola pests are also effective against *C. assimilis*. No natural enemies have been found to attack cabbage seedpod weevil, so it is imperative that work begin at once to screen and introduce potential biocontrol agents from Europe or the United States.

Floate, K.D., P. Coghlin and G.A.P. Gibson. Dispersal of the filth fly parasitoid *Muscidifurax raptorellus* (Hymenoptera: Pteromalidae) following mass-releases in cattle confinements.

Pupae of house fly, *Musca domestica* L. (Diptera: Muscidae), reared in the laboratory were used to assess the movement of *Muscidifurax raptorellus* (Hymenoptera: Pteromalidae) following mass-releases of this filth fly parasitoid in cattle confinements. Parasitism of pupae was 34%, averaged for three mass-releases (ca.

220,000 individuals/release) at each of two sites. Parasitism declined only slightly with the distance (1 to 100 m) of pupae from the point of parasitoid release (for data combined from all releases, $P < 0.001$, $r^2 = 0.032$). Wind direction had no detectable effect on parasitism for four releases ($P > 0.05$), appeared to enhance parasitism of pupae downwind from a fifth release ($P = 0.048$), and enhanced parasitism of pupae upwind from a sixth release ($P < 0.001$). Twenty-nine specimens of *M. raptorellus* were recovered in 1998, following release of more than 1.3 million individuals in previous years. Because the winter of 1997-98 was unusually warm, further studies are required to determine whether the parasitoid can survive winters more typical of southern Alberta. These results suggest that: 1) mass-releases of *M. raptorellus* can be used to manage populations of stable fly and house fly in cattle confinements, 2) mass-releases at intervals of 200 m should achieve fairly uniform coverage of the confinement facility with parasitoids, and 3) mass-releases will be required each year. Eight additional species of parasitoids (Hymenoptera) were recovered from pupae during the study. Each previously have been reported from southern Alberta, with the exception of *Eupelmus* (*Macroneura*) *vesicularis* (Retzius) (Eupelmidae).

Floate, K.D. and A.S. Fox. Indirect effects of ivermectin residues across trophic levels: *Musca domestica* (Diptera: Muscidae) and *Muscidifurax zaraptor* (Hymenoptera: Pteromalidae).

Common house fly, *Musca domestica* Linnaeus, were reared to pupation with exposure to ivermectin, washed, and then exposed to parasitism by *Muscidifurax zaraptor* Kogan & Legner. Pupae exposed to 0.25 ppm ivermectin produced 63% fewer parasitoids than did control pupae. Pupae exposed to 0.01 ppm ivermectin produced 23% more parasitoids. Exposure to 0.10 ppm ivermectin had no detectable effect. Treatments did not affect the developmental time of male or female F_1 parasitoids. Treatments did not affect the production of adult F_2 progeny by F_1 females, nor the sex ratios of these offspring. This study documents an indirect effect of ivermectin residues across trophic levels. It identifies altered host quality as another mechanism by which faecal residues of ivermectin may affect insect activity in dung of treated cattle. The importance of this phenomenon under field conditions is undetermined.

Fry, K. M., M. S. Goettel, and B.A. Keddle. Evaluation of *Beauveria bassiana* isolates for efficacy against western flower thrips.

There are currently no commercial *Beauveria bassiana*-based mycoinsecticide products developed specifically for managing pest thrips. Thrips, the western flower thrips *Frankliniella occidentalis* (Pergande) specifically, are a major pest in both the greenhouse ornamental and vegetable industries worldwide. In pursuit of a viable commercial fungal pathogen for managing thrips we tested 70 isolates of *B. bassiana*. Four concentrations of each isolate were assayed against 3-day old adult female western flower thrips in petri dish arenas using bush bean leaf disks as a food source. Mortality was checked daily beginning two days post-application and for the next four days. 10 isolates exhibited higher rates of mortality 6 days post-application when compared to a commercially-available strain. Significant differences were observed in LD_{50} values. Correlation between pathogenicity and host of origin or geographic origin of the different isolates will be discussed.

Graham, A. Spider fauna of natural and restored wetlands near Hay Lakes, Alberta.

Differences in spider fauna among restored and natural wetlands were assessed by hand collecting specimens from live pitfall traps at 6 ponds in the Hay Lakes area, Alberta. 16 species in 7 different families were identified, and no significant differences in number of individuals or species richness were found between natural and restored ponds. Possible reasons for the apparent similarities in spider fauna among the 6 ponds are discussed, as well as implications for wetland management.

Hartley, D.J. My Mexican adventure.

This summer a few beetle guys travelled south of the border for a month. Wacky adventures, superb food, amazing insects and great laughs were had by all. This is pure entertainment with minimal science. There will be some invaluable information about the rules of the road in Mexico and some helpful tips on insect collecting in the tropics. Come along for the ride in the Golden Escarabajo (Beetle).

Heigh, L., B. Freeze and K. Floate. Feasibility of an insectary in Canada to produce biocontrol agents for the livestock industry.

Biological agents are sold in Canada for the control of insect pests associated with livestock. Canadian distributors were contacted to assess the feasibility of establishing a Canadian source of these agents. Results indicate that: 1) all biocontrol agents sold in Canada are obtained from suppliers in Europe and in the United States, 2) parasitoid wasps of pest flies are the most common agent sold, 3) interest in the use of biocontrol agents is steadily increasing, 4) advertising is largely word-of-mouth, and 5) the use of biocontrol agents is primarily by the swine and poultry industry. We conclude that the current, limited demand for these agents would not support a commercial insectary for these agents in Canada. However, such an insectary will become feasible as the market continues to expand.

Johnson, D. Case studies of the impact of insect spatial distribution and movement on field plot experiments.

Insects that inhabit crops and pastures in Alberta often have spatial distributions within fields or pastures that reflect parameters of insect movement, selective behavior and plant maturity. Some insects move into new habitat from contiguous, or at least nearby, neighboring habitat (for example, from rangeland to pasture, from pasture to cereals, or from early-stage crops to flowering crops). Patterns of insect abundance associated with field edges depend on the rate of movement once the insects enter the field. Once insects have entered a field or pasture, distribution is affected by site selection at other scales, often related to differences in degree of attractiveness within the vegetation (such as due to crop maturity variability) or to microclimate. Distribution may change markedly when a second generation is produced. Real cases studies with several insects will be examined to show how the resulting patterns can strongly affect typical randomized block experimental designs.

Jones, J., H.A. Carcamo, J. Otani, R. Butts, R. McKenzie, E. Solberg and J. DeMulder. Lygus bug feeding damage to early stage canola.

Lygus bug adults were caged on individual argentine canola plants in experiments conducted at Ellerslie, Hubbles Lake, Lethbridge and Beaverlodge, Alberta. In an infestation density experiment conducted at Beaverlodge, Ellerslie and Lethbridge, lygus were caged at densities of 0, 2, 4, 6 and 10 bugs per cage from bud stage through flowering. In an infestation duration experiment conducted at Lethbridge and Ellerslie,

four lygus per cage were introduced for periods of 0, 5, 10, 15 and 20 days. A sulphur trial at Hubbles Lake used 0, 10 and 20 kg actual sulphur per ha on plots having four caged lygus bugs per plant for the same duration as Experiment 1. All were randomized complete block experiments and used equal numbers of male and female lygus bugs per cage.

Kanashiro, D.A., V. Behan-Pelletier, M.J. Clapperton, and W.D. Willms. Differences in the soil mite communities associated with heavy and light grazing of a Fescue prairie.

There were more families and genera represented within the mite community associated with a lightly grazed compared with a heavily grazed Fescue prairie. There were genera that were uniquely associated with each grazing treatment as well as shifts in percent species composition. The field site is a Fescue prairie located at the Agriculture and Agri-food Canada substation in Staveland Alberta Canada.

Korinus, L. Agroforestry, pest management and spider diversity in cacao plantations in southeast Sulawesi, Indonesia.

Agroforestry is a mixed cropping system that combines harvestable crops with woody perennials (i.e., trees) and attempt to restore traditional features to modern agriculture. Among these features are reduced reliance on agri-chemicals, more natural control of pest populations and enhanced diversity of agricultural systems. Modern agriculture replaces diverse natural habitats with single crops grown in large monocultures that provide less diverse natural habitats for organisms. In addition to having effects on natural enemy species that contribute significantly to natural pest control, monocultures amplify the general problem of species loss associated with the biodiversity crisis.

In Southeast Sulawesi, the cocoa pod borer (CPB) is a significant pest of cacao grown in monoculture systems. In cacao agroforestry systems (crop trees grown inside the forest margin or intercropped with the leguminous tree species, *Glyricidia sepium*), the CPB is less of a problem. Generalist natural enemies such as spiders are considered as significant predators of the CPB. However, it is not known how different crop systems (monoculture vs. agroforestry) affect diversity and abundance of generalist predators, or if changes in natural enemy assemblages are associated with increased losses to pests in monocultures.

I will compare the effects of different cropping systems on biodiversity, using spiders as a model taxon in three systems: (1) the natural shade trees-cacao system, (2) the *Glyricidia*-cacao system, and (3) the cacao monoculture system. By assessing pest impacts along with the diversity and abundance of spiders in these systems, the work will illuminate relationships among vegetation diversification (cacao monoculture vs. agroforestry), population dynamics of a significant herbivorous pest (CPB) and structure of a guild of natural enemies (spiders). This knowledge will support decisions about cacao cropping systems that enhance biodiversity and minimize pest damage.

Lysyk, T.J. Tick paralysis - a reemerging problem in livestock.

Tick paralysis occurs worldwide, and is caused by various species of ticks. In North America, tick paralysis is most commonly associated with *Dermacentor andersoni* (Stiles), the Rocky Mountain Wood Tick. Although this tick is distributed from the Coastal Mountains of British Columbia to central Saskatchewan, most cases of tick paralysis are restricted to the south-central region of British Columbia. Paralysis is caused by feeding adult females, and occurs during April (10 - 27). The number of ticks

per host that cause paralysis varies greatly, ranging from 75-150 ticks/head for cattle, 7-10 for sheep, 1 - 3 for horses, and 1 per host for dogs and humans. Paralysis is ascending, and begins with posterior ataxia, then full ataxia with sternal recumbency, lateral recumbency, and finally death. Animals will recover if ticks are removed early. Approximately 30,000 - 50,000 cattle are treated annually using Lindane. This cost of Lindane is relatively minor compared to the \$56/head that it costs to feed animals in pens during the paralysis period. Lindane's registration will likely expire in the year 2000, and is unlikely to be renewed due to international agreements. Since 1995, we have been focusing on developing rearing methods for wood ticks, and developing a paralyzing strain of ticks to facilitate toxin identification. After 5 generations of selection, we have increased the paralyzing potency of a strain to less than 1 tick/hamster from >2.5 ticks per hamster. We have also determined that storage of adults at 10 degrees increases virulence, and that previous host exposure reduces virulence. Engorgement and reproduction of this strain is comparable to wild ticks. Development of this strain will allow us to make reliable biochemical comparisons with non-paralyzing ticks. Our current research is therefore focusing on isolation and identification of the tick toxin using a variety of techniques. We hope to identify the toxin gene to develop a protective vaccine.

Mitchell, A.A. and J. Roland. Predation of parasitoid pupae: does fragmentation make a difference?

In fragmented landscapes, forest tent caterpillar (FTC) outbreaks tend to be prolonged and parasitism rates are lower. Because the FTC dipteran parasitoid community is thought to be a major control of FTC populations, these prolonged outbreaks suggest that these parasitoids are negatively impacted by forest fragmentation. One possible explanation may be a decrease in parasitoid abundance through increased mortality in fragmented areas. FTC dipteran parasitoids pupate and remain in the soil for ten months, and therefore may be at significant risk of predation by generalist predators, such as beetles and small mammals. To assess whether generalist predation can account for decreases in FTC parasitism, I have conducted field experiments to compare the predation of parasitoid pupae in continuous and fragmented forests. More specifically, I have investigated whether temporal differences exist. Preliminary results suggest that predation is higher in edge and fragmented habitats and that time is not an important factor yet. The type of predation may also differ with time and location. Identifying how the parasitoids respond to fragmentation will improve our ability to understand the dynamics of forest tent caterpillars.

Mitchell, A.A. and F. Sperling. Higher level phylogeny of mosquitoes (Diptera: Culicidae) and molecular evolution of the mitochondrial genes COI and COII.

Much alpha taxonomic work has been carried out on mosquitoes because of their great medical importance. However, the higher level phylogenetics of Culicidae has received far less attention and is comparatively poorly known. The traditional classification maintains three subfamilies of Culicidae: Anophelinae, Culicinae, and Toxorhynchitinae (with a single genus, Toxorhynchites). Although this view is not contradicted by published molecular studies, a rigorous and comprehensive recent morphological phylogenetic analysis of the family suggested that Toxorhynchites belongs within the Culicinae and does not deserve subfamily status. We investigated the phylogenetic placement of Toxorhynchitinae, using complete DNA sequences (2,300 bp) of the mitochondrial genes COI and COII. Our data provided the first molecular evidence in support of the latter hypothesis. We also investigated the effects of biased base composition, typical of insect mitochondrial genes, to ensure that our phylogenetic analyses were not compromised.

Morneau, L. Hey moth! How do you like this clearcut?

Although clearcutting is an effective way to collect wood fiber, its impacts on invertebrates are poorly understood. This study asks: Do recent clearcuts act as barriers to moth dispersal on a patchy landscape? Abundance of moths was low (79 moths) in the two harvested blocks studied due to environmental factors (more wind, more moonlight, less humidity) and to summer 1999 bad weather. Most species caught (>75%) were grass or early succession species (i.e. poplars) feeders. The majority of those species were long-distance fliers based on size and Family. Only one 'forest specialist' was found: *Eilema bicolor* (Grt.), a small arctiid feeding on lichen. Thus, clearcuts seem to act as barriers to moth dispersal due to sub-optimal environmental conditions and lack of resources such as food plants. However, a larger project is needed to answer more clearly this question.

Park, J. Habitat selection and dispersal in bark beetles in a harvested landscape.

Bark beetles are wood inhabiting insects that generally feed on the phloem of weakened, dying or dead trees. However, the potential exists such that populations can reach a critical threshold at which they may reach epidemic proportions. In these circumstances, populations may colonize apparently healthy trees. Logging produces a landscape vastly different from an intact forest by increasing the amount of available habitat for bark beetles (freshly dead trees) and stand density. Therefore, it is important to examine the movement and dispersal of bark beetles in a harvested landscape.

Research concerning the effects of stand density and stand type on the habitat selection and dispersal of bark beetles will be conducted within the EMEND (Ecosystems Management by Emulating Natural Disturbance) project. Three replicates of each stand type (aspen dominated, conifer dominated, aspen with conifer understory, and mixed) have been divided into several treatment compartments, of which the control, 10% residual, 20% residual and 50% residual will be examined. Residuals refer to the percentage of trees that are left after harvest. By using 12-funnel Lindgren traps to trap dispersing beetles, the impact of different stand types and densities will be examined. If bark beetles can distinguish between host trees and non-host trees, the catches in these traps will show a correlation between stand types with host trees and number of dispersing beetles. In addition to the collection of bark beetles from traps, data has also been collected regarding the settlement habits and reproductive success in each treatment.

This study will determine the relative importance of stand type, density, and habitat abundance to the dispersal and movement of bark beetles. It will also provide important information concerning the settlement and movement preferences of bark beetles in a harvested landscape. The results of this study will help to contribute insight to ecological questions of habitat selection and dispersal of organisms, as well as provide the information for the management of these forest pests.

Ranasinghe, S.K., M. Maximchuk, and M. Undershultz. Comparative efficacy of three pheromone trap types in monitoring forest tent caterpillar, *Malacosoma disstria* Hübner, populations in Alberta.

The forest tent caterpillar, *Malacosoma disstria* Hübner (Lepidoptera: Lasiocampidae), is a serious defoliator of trembling aspen, *Populus tremuloides* Michx., and other broadleaf species in Alberta. Although forest tent caterpillar (FTC) sex pheromone has been available for some time, it has not been field-tested in Alberta.

In the summer of 1997, a field trial was carried out in north-western Alberta to test the efficacy of FTC sex pheromone in conjunction with three trap types. We selected 15 sites for this study, based on the defoliation severity observed in 1996. At

each site, we used two pheromone-baited traps, and one unbaited trap (check) belonging to each trap type, i.e., altogether nine traps per site. In June, before the moth flight, the traps were set up randomly in a zigzag pattern with no two traps being closer than 40 m from each other. In July, the traps were collected after the moth flight period and the number of moths in each trap was recorded. We used Wilcoxin Signed-Rank Test for Paired Data to analyse the tabulated data.

Although the trap catches were relatively low, a significantly higher number (at 95% level) of moths was found in the baited-traps, compared to the unbaited traps. Delta® traps had significantly higher number (95% level) of moths compared to either Pherocon II® traps or Multi-Pher I® traps. There was no significant difference in the trap catches between Pherocon II and Multi-Pher I traps.

Reichardt, T. Calgary's integrated pest management plan - balancing bugs & blooms.

In 1998, The City of Calgary approved Alberta's first municipal Integrated Pest Management (IPM) Plan. The IPM plan framework will be reviewed (i.e. monitoring, pest identification, injury/action thresholds, prescriptions, evaluation). A step-by-step procedure to implement an IPM plan will be discussed. Specific real life examples will be used throughout the presentation.

Reid, M.L., and S. Glubish. Mountain pine beetle settlement with respect to tree quality: vigour isn't better.

We examined whether recent vigour of healthy lodgepole pine, *Pinus contorta*, influenced the settlement of mountain pine beetles (MPB), *Dendroctonus ponderosae*, and the spread of their fungi. Focal trees were baited with pheromones, ensuring rapid colonization by MPB. In addition, we examined the nearest unbaited tree that was colonized by MPB (spillover) and the nearest tree that did not get colonized. Disks from the study trees were taken from the base of trees to measure recent vigour and fungal staining. We found that tree vigour, measured as phloem thickness or recent growth rate, did not explain the density of MPB or the length of their breeding galleries in either baited or spillover trees. There were some weak effects of tree vigour on some aspects of fungal colonization. In contrast to the strong effect of recent lodgepole pine vigour observed previously in *Ips pini* breeding in freshly dead trees, MPB appear to be insensitive to tree vigour at least when populations are large.

Schmidt, C. and J.Roland. After the crash: improved techniques for monitoring endemic forest tent caterpillar populations.

The forest tent caterpillar, *Malacosoma disstria* (Hbn.), is a widespread defoliator of forest trees throughout most of North America. Periodic outbreaks often result in complete defoliation of forest stands. The primary mortality factors believed to suppress *M. disstria* populations are viral pathogens and insect parasitoids. Studies on the population ecology of *M. disstria* have provided important insights into the dynamics of cyclic insect outbreaks. However, most studies of *M. disstria* have been restricted to populations at moderate and high densities, and parasitoid-host dynamics at low host densities may be especially crucial in determining the mechanisms which result in population increase prior to outbreak levels. To adequately assess *M. disstria* population levels, a reliable protocol for monitoring population change is needed. Preliminary results of field trials testing pheromone blend and concentration, in conjunction with new pheromone release technology, suggest potentially high-resolution population level estimates.

Shpeley, D. The Genus *Notiobia* Perty (Coleoptera: Carabidae: Harpalini) in Florida.

The genus *Notiobia* Perty is recorded as having three species, *N. nitidipenni* LeConte, *N. sayi* Blatchley, and *N. terminata* Say, which have their respective ranges extending into Florida. Some material, recently received at the Strickland Museum, had been collected in a Florida taxonomist's back yard. One of the taxa of *Notiobia* did not match either of the three species. Closer examination of this fourth Florida taxon, as well as type material, resulted in reestablishing *N. cephalus* Casey as a valid species, which had been considered conspecific with *N. nitidipennis*. This one example proves that material of interest can still be found close to home.

Sousa, J. M. Leavin' la vida ova! Effect of habitat complexity on mating status of a parasitoid of water strider eggs.

A parasitoid emerging from a host within a patch has the option of dispersing unmated or mating with a neighbour beforehand. The effect of three host patch sizes on the dispersal of *Tiphodytes gerriphagus* was examined. It is predicted that males will leave smaller patches more readily because of the low number of females that may emerge.

Males generally emerged earlier in the day than females, however no wasps emerged during darkness (1 am - 6am). Female residence time was significantly lower than that of males across all patch sizes. Finally, the presence or absence of neighbours (patch size) had no effect on residence of males or females.

Experiments are in progress to determine the effect of different vegetation densities on mate location and reproductive behaviour.

Spence, J.R. and W.J.A. Volney. Around the bend with EMEND.

The EMEND (Ecosystem Management by Emulating Natural Disturbance) project sets out to compare the basic characteristics of forests initiated by harvest with those arising through the action of wildfire and other inherent natural processes. The optimal impact experiment design of our experiment is illustrated and discussed. We are using controlled burns and untreated control blocks to interpret the effects of natural and anthropogenic disturbances on a wide range of forest patterns and functions. A contiguous forest landscape was stratified into four forest types (conifer dominated, hardwood dominated, mixed wood, and hardwood with conifer dominated) characteristic of boreal sites in western Canada. Pre-experiment surveys ensured homogeneous blocks within each class and a second season of pre-treatment data were collected to characterize each block. The experiment was established on c. 1000 ha during 1998-99 through application of five harvesting prescriptions that leave green trees at residual volumes ranging from 2-70% and three intensities of controlled burning. Mensurational characteristics of residuals, regeneration, fate of coarse woody material and fuel loading, soil characteristics and biological diversity are being monitored in all stands, both with and without subsequent silvicultural intervention. Primary productivity, biodiversity and nutrient fluxes derived from these estimates will help develop approaches to minimize long-term habitat loss inherent in industrial harvest of boreal mixedwood forests.

Sperling, F., M. Caterino, R. Reed, and M. Kuo. Higher-level phylogenies for swallowtail butterflies.

Interest is heating up in DNA-based phylogenies for the swallowtail butterfly family Papilionidae. Three main research groups have recently produced competing studies; from France, Japan, and my own group (previously California - now Alberta). It is hard to

make direct comparisons since these studies only use some of the same species and none of the same DNA regions. However, it is clear that longer sequences are providing more reliable phylogenies, and these are then being corroborated by using different genes. The good news is that those portions of molecular phylogenies that are well-supported are essentially congruent with prior morphology-based hypotheses of relationship.

White, K. Burning and beetle biodiversity: What a large-scale prairie fire did to beetle populations.

The purpose of this study is to determine the effect of disturbance, such as fire, on the biodiversity of beetle communities of short-grass prairie. The study was conducted at two locations on the southern edge of a large burn, which occurred near Granum, Alberta in December, 1997. Comparisons between on- and off-burn beetle communities were made using samples collected by pitfall traps and pantraps, during the summer of 1998. It was found that there were strong differences between the two sites, making generalizations difficult. However, the general trend appears to be decreased beetle diversity on the burned prairie. The disturbance of the burn also appeared to affect different families of beetles differently. This study and further work involved in the project should enhance our understanding of trophic-based community structure, as well as provide insight into the cost and benefits of burning from a conservation perspective.

Wilkins, S. Calgary's urban ecosystem analysis. Part I - UFORE Implementation & results.

The Urban Forest Effects Model (UFORE) measures the effect of the urban forest on carbon storage, carbon sequestration, pollution levels and heating/cooling costs. In partnership with the USDA (D. Nowak), Calgary is the first city in Canada to implement the UFORE model. Details of this project and its relevance within the framework of urban forestry management will be provided.

Poster presentations:

Do soil fauna influence nitrogen cycling in forests of British Columbia, Canada?

Cárcamo, H.A. ¹, Prescott, C.E. ², C.P. Chanway, ² and F.B. Holl, ² (1. Lethbridge Research Centre, 2. University of British Columbia).

Lessons learned during the design of an arthropod and pathogen quarantine facility.

De Clerck-Floate, R. ¹, P. Plue ² and T. Lee ³ (1. Lethbridge Research Centre, 2 Eastern Cereal and Oilseed Research Centre; 3. Public Works and Government Services Canada).

Dispersal of the filth fly parasitoid *Muscidifurax raptorellus* (Hymenoptera: Pteromalidae) following mass-releases in cattle confinements.

Floate, K.D. ¹, P. Coghlin ¹ and G.A.P. Gibson ² (1. Lethbridge Research Centre, 2. Eastern Cereal and Oilseed Research Centre).

Indirect effects of ivermectin residues across trophic levels: *Musca domestica* (Diptera: Muscidae) and *Muscidifurax zaraptor* (Hymenoptera: Pteromalidae).

Floate, K.D. and A.S. Fox (Lethbridge Research Centre).

Feasibility of an insectary in Canada to produce biocontrol agents for the livestock industry.

Heigh, L., B. Freeze and K. Floate (Lethbridge Research Centre).

Differences in the soil mite communities associated with heavy and light grazing of a fescue prairie.

Kanashiro, D.A. ¹, V. Behan-Pelletier, ², M.J. Clapperton, ¹, and W.D. Willms, ¹ (1. Lethbridge Research Centre, 2. Eastern Cereal and Oilseed Research Centre).

Entomological Society of Alberta

Spring Executive Meeting

March 13, 1999, 1:00 PM
Room 2-27 Earth Sciences Building
University of Alberta, Edmonton, AB

1. Call to Order at 1307 h.

Executive present: Ken Fry (President), Daryl Williams (Vice-President), Gerald Hilchie (Secretary), Greg Pohl (Treasurer), Rob Longair (Regional Director, Central), Troy Danyk (Regional Director, Southern).

Absent: Mark Goettel (Past President), Rob Bouchier (Regional director to ESC), Lloyd Dosdall (Regional Director, North), Michelle Williamson (Editor).

2. Approval of Agenda

Williams/Longair CARRIED

3. Approval of Minutes, Executive Meeting, Thursday October 22, 1998.

Minutes were submitted as a draft version pending review by executive. Tabled to next executive meeting (Fall 1999).

4. Reports:

4.1 Treasurer's Report:

The 1998 year end unaudited financial statement was presented which showed closing assets of \$23,900.64.

At present the Society has 79 paid up members and another 58 in arrears. Of these 90 are regular members, 43 student members and 4 library subscriptions. There are an additional 5 honorary members and 19 free library subscriptions.

Interim Financial Statement: as of Feb. 28, 1999:

chequing		\$2,603.91
term deposit #2: 5.4%,	matures Aug. 16, 2000	\$5,000.00
term deposit #4: 3.3%,	30 day auto-rollover	\$5,314.27
term deposit #5: 3.05%,	30 day auto-rollover	\$1,081.50
term deposit #6: 3.85%,	matures June 25, 1999	\$10,000.00
common shares		\$116.74
total:		\$24,116.42

No significant transactions have occurred since the 1998 financial statement.

Respectfully submitted, Greg Pohl

Motion to accept the treasurers report.

Troy/Fry **Carried**

4.2 Editor (Michelle Williamson)

Tabled, no report.

4.3 Regional Director to ESC (Rob Bouchier)

Tabled, no report.

4.4 Webmaster (Troy Danyk)

Interim Report from the Editor of the Homepage

I established the homepage of the Entomological Society of Alberta in September 1998. The Department of Biological Sciences at the University of Alberta was kind enough to donate space on their server for our homepage.

I have received unsolicited comments from several members of the ESA all of whom state that they approve of the homepage and its content. This is encouraging. The homepage was designed to be simple (i.e., quick to load) and easily surfable, and appears to have fulfilled its original function-- to inform members of the ESA and other about the ESA and its features. I believe it is not the role of our homepage to be the electronic gateway to the entomological world; there are a number of other homepages that do that quite well and duplication is not warranted.

Since the launch of the homepage, the diversity of links has changed only in the addition of a link to an application form for membership in the ESA. Most often, the content of the homepage has changed only when I receive updated information (last update was made on January 13, 1999). There are gaps in the information and I attempted to remedy them by soliciting members of the Executive via e-mail. Some submissions trickled in, but the information about the ESA is far from complete. Specifically lacking is information about the various awards that the Society offers.

An additional link that would be useful would be one to the Proceedings. I believe that the text within the Proceedings can be converted easily to hypertext and uploaded. The images may be another story and I would need to discuss the matter first with the Editor of the Proceedings to determine the feasibility of such an initiative.

In order to better serve our members and people interested in entomology in Alberta, let's work together to complete the information on the homepage.

Troy Danyk
Editor of the Homepage
March 12, 1999

Motion to accept the Webmaster's report.

Williams/Longair **Carried**

5. Old Business:

5.1 Undergraduate Awards

A general discussion took place on what the requirements are. Fry

delegated Goettel, Bouchier and the regional directors to come up with a standard form for the Undergraduate Award. This and the Student Travel Grant forms can then be placed on the WEB.

5.2 Student Travel Grants

It was suggested that one of the requirements of approving student travel grants is that they must present a paper at the meeting.

5.3 Amateur Award

Fry indicated a need for a report on the solicitation of candidates. It was also suggested to include previous amateur award winners on the WEB site.

5.4 Science Fairs

Mary Reid organized a lot of judging for the Science fairs in the Calgary area. The northern area has been delinquent in participation. There have been a few stumbling blocks, the Edmonton science fair wants a minimum of \$300 for a prize, and no book prizes and at the National level the minimum prize goes up to \$1000, and no book prizes. Fry was going to follow up getting to the northern science fairs. In the south at Medicine Hat Bob Mutch is representing the ESA on March 27, and in Lethbridge Troy Danyk is representing the ESA. The type of book prize was going to be left up to the individual judge.

Further discussion ensued on how to better get the entomology message out to the public and classrooms. Danyk volunteered to look at the Ent. Soc. B.C guidelines for ideas on how to proceed with helping with insect projects in the classroom. A suggestion was made to go through the Alberta Teachers Association and it was suggested we as a society could help fund projects re the B.C. model. This led to the idea of placing URL link to the Ent. Soc. of America on our web page. Another issue came up re what is our policy re exotic insects in schools. i.e. tropical insect and the potential release of these into Alberta. Danyk was asked to follow this up and make a presentation at the next meeting.

5.5 Revenue Sharing with ESC

This was effectively dealt with at the AGM in 1998 and no further action is required.

6. New Business

6.1 1999 Annual Meeting

Fry read an E-mail report submitted by Goettel re our options for the next meeting at Waterton Lakes. The executive agreed that the meetings should take place in the Lodge at Waterton Lakes on October 14, 15 and 16, 1999.

The executive agreed that the registration for students should be 50% of the regular fee. It was suggested that students may wish to use the new Waterton Lakes Associate Hostel to keep expenses down. Hilchie indicated that the students did not need to be a member of the Hostelling International, Canada to get the discount member rate. The Department of Biological Sciences, U of Alberta, has a group membership card (c/o G. Hilchie). A

deposit is required to hold the beds. Regular members could use The Lodge at Waterton Lakes.

6.2 Publication Date for Proceedings

Some concerns were made re the late timing of distribution of the Proceedings. It was pointed out, by distributing the Proceedings at the meeting it saved the Society considerable postage charges.

7. Adjournment

Motion to adjourn. Williams.

Meeting adjourned at 1607 h.

Entomological Society of Alberta

Fall Executive Meeting

October 14, 1999, 7:00 PM
Lodge at Waterton Lakes

1. Call to Order at 7:15 PM.
Executive present: Ken Fry (President), Daryl Williams (Vice-President), Gerald Hilchie (Secretary), Greg Pohl (Treasurer), Rob Longair (Regional Director, Central), Lloyd Dosdall (Regional Director, North), Troy Danyk (Regional Director, Southern)
Absent: Mark Goettel (Past President), Rob Bouchier (Regional Director to ESC), Michelle Williamson (Editor)
2. Approval of Agenda
Dosdall/Pohl **Carried**
3. Approval of Minutes, Executive Meeting, March 13, 1999
Hilchie/Danyk **Carried**
Approval of Minutes, Executive Meeting, October 22, 1998
Danyk/Dosdall **Carried**
4. Reports:
 - 4.1 Treasurer's Report
Interim Financial Report - October 14, 1999

Bank balance as of Aug. 31, 1999: chequing	\$ 1,990.24
term deposit #2: 5.4%, matures Aug. 16, 2000	\$ 5,000.00
term deposit #5: 2.75%, 30 day auto-rollover	\$ 1,096.70
term deposit #7: 3.95%, matures June 25, 2000	\$ 15,754.07
common shares	\$ 116.74
total:	\$23,957.75

No significant transactions have occurred since the 1998 financial statement.

Respectfully submitted
Greg Pohl

Pohl/Hilchie **Carried**
 - 4.2 Editor (Michelle Williamson)
No report.
 - 4.3 Regional Director to ESC (Rob Bouchier)
No report.
 - 4.4 WWW Editor (Troy Danyk)
Interim Report of the WWW Editor, 1999

Since the inception of the homepage in September 1998, we have received excellent service from the University of Alberta who host our homepage free of charge.

The homepage is kept current by the upload of new or revised information as it becomes available. Improvements over the past year include the addition of:

- application for membership;
- information and applications for the Student Travel Grant and Undergraduate Award in Entomology;
- an announcement for a meeting of the Canadian Forum for Biological Control;
- a link or two to sites devoted to entomology in Alberta;
- registration information for the 1999 meeting of the Entomological Society of Alberta.

The information about the ESA is not complete. For example, the homepage could benefit from the addition of the following:

- information about, and past winners of, the Amateur Award;
- Proceedings of the ESA;
- more links to entomology homepages in Alberta;
- involvement of the ESA with science fairs.

If members have further information or ideas that they wish to see posted or implemented, I would be happy to receive your input.

Danyk/Pohl Carried

5. Old Business:

5.1 Undergraduate Award(s)

One applicant, Mike Hagen, a student of Mary Reid at U of Calgary. The Award is to be announced at the Banquet, value of Award is \$500.00

Motion: Award Winners can apply for up to \$100 to defray expenses to attend the meeting.

Fry/Pohl Carried

5.2 Student Travel Grant(s)

Discussion: on wording. On the form make the change "To be eligible the student must present a paper or poster at the meeting".

5.3 Amateur Award

No nominations.

5.4 Science Fairs

Troy: No entrants in the Lethbridge area.

Fry: Was unable to attend the Edmonton Science fair. There is a requirement of \$300 minimum value for prizes.

Williams: Barhead area, advertised to Northern Science Fairs.

Discussion: Low level science fairs happy to have book type prizes.
Junior and Senior highs want high dollar value prizes.

Motion: Individuals who incur expenses as Judges at regional Science Fairs should be reimbursed for expenses.

Williams/Danyk Carried

5.5 Revenue Sharing with ESC

A letter was sent to the Treasurers of the various affiliate societies inquiring as to the arrangements they have with the Entomological Society of Canada with respect to revenue sharing from the Joint meetings. One reply was received. Subsequent to the letter, the Entomological Society of Canada made a decision. Choice 2 was decided on.

No Discussion. This was costed to accommodate four ESC functions. A \$2500 start up fund is available. The National Society would accept liability for a minimum of 50% of a loss.

5.6 Entomology in schools and exotic insects in schools (Troy Danyk)

Danyk highlighted parts of an e-mail from Ward Strong (dated August 30, 1999) of the Entomological Society of British Columbia to inform the board on ESBC's experience in bringing entomology into the schools. The ESBC established a grant program that gave funds to teachers to enable them to purchase materials and supplies for experiments or study programs in the classroom. Exerts of the e-mail follow, and consist of answers of Strong to questions asked by Danyk.

How/where did the ESBC advertise the grants? I contacted the Ministry of Education and the BCTF (teacher's union) and wrote short articles for their newsletters. These went to all teachers and schools in BC. I asked them to contact me for application info and forms, or go the ESBC website, where I had a page and electronic form. More than half the applications came by email from the website.

How many applications were received by the ESBC? I got 83 applications, about 1/2 from major urban areas and 1/2 from the rest of BC.

What was the budget for the grants? Budget was \$1200. We had \$600, and the ESC will match up to \$200 per year, cumulative to \$600. We did this in 1995, then in 1998, and plan it again in 2001.

How many grants were given out? We funded 14 projects; some of these had matching funding from other sources.

What was the range in values of the grants? Range was \$30 to \$150; mean was \$87.47.

Did you think this was a worthwhile effort (i.e., did the benefit outweigh all the work involved)? There was quite a lot of work involved, and for fourteen \$87 grants it at first glance hardly seems worth it. However, these little grants meant a lot to the schools, who are getting hammered by budget cutbacks. It also was a mechanism whereby, for very little money, we could bring attention to entomology in the classroom, which is to the benefit of entomology (and

therefore the ESBC) in general. So, I think overall it was very worthwhile despite the low dollars involved.

Would you recommend that a Society with limited manpower reserves (like the ESA) do such a thing? It took overall probably 25 hours of my time, about 1/2 of which was reading and evaluating the applications. I used mail mergers and automatic faxes to speed things up, and being a one-person committee I could make decisions quickly and without debate, which sped things up considerably. If you can find a volunteer with that sort of time, it's a worthwhile thing to do. I'll volunteer again for ESBC in 2001.

Discussion : Given that the ESC apparently gives \$200 per year to regional societies for use in public education, we (the ESA) should apply for these funds and use them to establish an ESA grant program to bring entomology into the classroom. The matter of curriculum development was discussed and the board felt that the ESA should investigate and help develop curriculum to put bugs into school. However, it was noted that such an effort may represent a considerable amount of work, and that we may wish to use curricula developed by other organizations. It was suggested that sample experiments, either composed by the ESA or other entomology organizations, could be made available to grant applicants to assist them to design activities for students in the classroom. It was suggested to designate \$1000 for 3 years and earmark \$500 of it for this year and then evaluate for the following year. When the grant program has been established, information and application forms could be made available on the homepage.

Motion: Five Hundred dollars be set aside for a school grant program to be implemented within 3 Years.

Danyk/Longair **Carried**

6. New Business

6.1 2000 Annual Meeting

Suggestions for meetings, Vegreville, Lloydminster, Athabasca or Edmonton.

6.2 Awarding of Student Travel Grant(s)

Struck from Agenda

6.3 Undergraduate Award(s) in Entomology

Struck from Agenda

6.4 Publication Date for Proceedings

Hector Carcamo volunteered for the short term to help get the Proceedings published

6.5 Correspondence

Nothing to record of note.

6.6 Alberta Insects.

Longair spoke briefly to this point

7. Adjournment

Meeting Adjourned at 9:35 PM

Entomological Society of Alberta Annual General Meeting

October 16, 1999, 1200 PM
School House next to Lodge at Waterton Lakes

1. Call to Order at 12:31 PM. 22 members present.

2. Approval of Agenda

Volney/Floate **Carried**

3. Approval of Minutes, of the Annual Meeting 1998

The minutes were not published at the time of the meeting. Minutes adopted as read at the meeting.

Spence/Danyk **Carried**

4. Greetings from the Entomological Society of Canada

Representative not present.

5. Reports:

5.1 Treasurer (Greg Pohl)

Interim Financial Report - October 14, 1999

Bank balance as of Aug 31, 1999: chequing	\$ 1,990.24
term deposit #2: 5.4%, matures Aug. 16, 2000	\$ 5,000.00
term deposit #5: 2.75%, 30 day auto-rollover	\$ 1,096.70
term deposit #7: 3.95%, matures June 25, 2000	\$ 15,754.07
common shares	\$ 116.74
total:	\$23,957.75

No significant transactions have occurred since the 1998 financial statement.

Society membership:

paid members	102
members in arrears	28
total paying membership	130
regular members	89
student members	37
honorary members	5
paid library subscriptions	4
free library subscriptions	19
total mailing list	154

Respectfully submitted,
Greg Pohl, Treasurer

Motion to accept the report.

Volney/Jones **Carried**

5.2 Editor (Michelle Williamson)
Absent.

Fry: There is no functioning Editor, Hector Carmaco has been given a temporary appointment until the proceedings are published.

5.3 Regional Director to ESC (Rob Bouchier)
Absent, no report.

5.4 Presidents Report

This past year as President of the ESA has been a rich and enjoyable time due in large part to the vigorous efforts of a great many members of this Society. I would like to formally recognize and thank the members of the Local Organizing Committee for preparing and staging this very successful and enjoyable 47th Annual Meeting. The Chair was Mark Goettel and it must be testament to his organizational skills that this meeting has functioned so well in his absence. I think a great measure of the success is due to the efforts of Christine Noronha for the program, the accommodations and entertainment, Hector Carmaco for the stimulating scientific program, and Christine, Stephanie Herb and Greg Pohl for registration. Rose Declerk-Floate as MC of the Banquet and Chantel Ouimet for her after dinner talk illuminating the desperate need for biodiversity studies in our national parks. Thanks, too, to all of the moderators, including Rick Butts, Ian Jonsen, Jennifer Otani, Rose Declerk-Floate, and Kevin Floate.

Our Society has made some significant strides toward increasing our contributions to publicizing entomology through, first our web page. For that I would like to acknowledge the fine efforts of Troy Danyk. And second, through participation in regional science fairs and last through a new initiative to increase awareness of entomology in schools

The Society is in sound, if not robust financial condition and judging by the number of Alberta student presentations at this meeting and the national meeting, the future of our Society looks to be secure.

Last, I would like to thank the Executive for their diligent work, innovative ideas and passionate devotion to the Society over the past year. I would like to take this opportunity to thank in advance of their departure, those members that are leaving us as their terms expire this year, Mark Goettel as Past President and Hideji Ono as auditor.

I assure you, the Society is in good hands with those person's that remain. It has been a pleasure to work with this fine group and any success I may have witnessed is due to their efforts and those of the many Society members that contributed along the way.

Motion to accept the report.

Fry/Jones **Carried**

5.6 WWW Editor (Troy Danyk)

Since the inception of the homepage in September 1998, we have received excellent service from the University of Alberta who host our homepage free of charge.

The homepage is kept current by the upload of new or revised information as it becomes available. Improvements over the past year include the addition of:

- application for membership;
- information and applications for the Student Travel Grant and Undergraduate Award in Entomology;
- an announcement for a meeting of the Canadian Forum for Biological Control;
- a link or two to sites devoted to entomology in Alberta;
- registration information for the 1999 meeting of the Entomological Society of Alberta.

The information about the ESA is not complete. For example, the homepage could benefit from the addition of the following:

- information about, and past winners of, the Amateur Award;
- Proceedings of the ESA;
- more links to entomology homepages in Alberta;
- involvement of the ESA with science fairs.

If members have further information or ideas that they wish to see posted or implemented, I would be happy to receive your input.

Motion to accept the report.

Declerk-Floate/Carcamo **Carried**

6. Old Business:

6.1 Undergraduate Award(s) (Struck from agenda)

6.2 Student Travel Grant(s) (Struck from agenda)

6.3 Amateur Award

Longair noted that the award was not advertised enough and that applications should be sent to him.

6.4 Science Fairs

Williams made a plea to the membership to participate as judges in the Science fairs. Claim for reasonable compensation can be made for expenses while representing the society. It was also brought to the membership attention that the Ent. Soc. of Canada has a \$200 per year grant towards education support. Advertising is possible on the Science and Technology Hot line.

6.5 Revenue Sharing with ESC

Fry reiterated from the executive minutes that he sent a communication to the national Society but that he had no reply. The ESC guideline was option 2, which covers at least 50% of any loss.

7. New Business

7.1 Elections

Vice-President	Simon Wilkins
Secretary	Gerald Hilchie
Treasurer	Greg Pohl
Regional Director	none
Auditors	Louis Morneau, Cathy McCloskey

7.2 Awarding of Student Travel Grant. Strike/ awarded at Banquet.

7.3 Undergraduate Award in Entomology. Strike/ awarded at Banquet.

7.4 2000 Annual Meeting

It is the North's turn, Invitations to host in order of preference

1) Athabasca, 2) Vegreville, 3) Lloydminster and 4) Edmonton

7.5 Resolutions

Moved that letters of thanks be sent by the Secretary to:

Dr. Frank Pierce, our Keynote speaker.

Dr. Ouimet, our after dinner speaker

The Lodge at Waterton, for hosting the meeting.

Williams/Pohl **Carried**

7.6 Entomological research in Waterton National Park.

A general discussion on how to assist and participate in research with in the Park. Spence suggested that it should left to individual initiatives.

Longair indicated there was more work being done than what was alluded to in the after dinner talk.

Motion: That the secretary draft a letter to the National park indicating that individuals of the Entomological Society of Alberta have the expertise to carry out arthropod inventory work and encourage the Canadian Park service to cooperate with us.

Pohl/Volney **Carried**

8. Adjournment

Meeting Adjourned at 2:45 PM

ESA 1999 Financial Statement

Opening Balance (Jan. 1, 1999)	
chequing account	\$ 2,406.06
term deposit #2 - 4 yrs. at 5.4% (matures Aug. 16, 2000)	\$ 5,000.00
term deposit #4 - 30 day autorenewing, floating %	\$ 5,285.55
term deposit #5 - 30 day autorenewing, floating %	\$ 1,076.10
term deposit #6 - 1yr, 3.85% (matures June 25, 1999)	\$10,000.00
credit union shares	\$ 116.74
total closing bank balance	\$ 23,884.45
opening cash on hand	\$ 16.19
total opening assets	\$ 23,900.64

Credits	
membership dues	\$ 1,049.83
98 meeting revenues	\$ 285.00
term deposit interest	\$ 769.07
bank dividends	\$ 47.91
total credits	\$ 2,151.81

Debits	
bank service charges	\$ 19.24
corporate registry	\$ 8.00
student travel grant	\$ 50.00
undergrad award	\$ 500.00
1998 meeting expenses (U of Calgary)	\$ 1,107.54
proceedings photo expenses (Leech, Montes de Oca)	\$ 76.04
office supplies & postage (Pohl)	\$ 87.78
exec meeting expenses (Danyk, Fry, Longair)	\$ 155.82
science fair expenses (Longair)	\$ 36.27
total debits	\$ 2,040.69

Closing Balance (Dec. 31, 1999)	
chequing account	\$ 1,980.20
term deposit #2 - 4 yrs. at 5.4% (matures Aug. 16, 2000)	\$ 5,000.00
term deposit #5 - 30 day autorenewing, floating %	\$ 1,106.65
term deposit #7 - 1yr, 3.95% (matures June 25, 2000)	\$15,754.07
credit union shares	\$ 164.65
total closing bank balance	\$24,005.57
closing cash on hand	\$ 6.19
total closing assets	\$24,011.76

Balance Sheet	
total opening assets	\$23,900.64
total credits	\$2,151.81
total debits	(\$2,040.69)
closing balance	\$24,011.76

Notes:

The revenues here from the 1998 meeting represent a portion of the \$828.46 profits. Revenues of \$24.87 from the 1999 meeting were not deposited as of Dec. 31, 1999. Charges for printing the 1998 proceedings will appear in the 2000 statement.

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Updated October 1999

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Paid Library Subscriptions

Albert R. Mann Library Cornell University, Serials Unit, Acquisitions Division, Ithaca,
NY, USA 14853-4301

British Museum (Natural History) Department of Library Services, Aquisitions
Section, Cromwell Road LONDON, U.K., SW7 5BD

Colorado State University Library Serials Section, Fort Collins, CO, USA 80523

Senckenbergische Bibliothek Bockenheimer Landstr. 134 - 138, 6000 FRANKFURT
AM MAIN 1, GERMANY

Free Library Subscriptions

Athabasca University College Library 1 University Drive, Athabasca, AB, T9S 3A3
Augustana University College Library 4901 - 46 Ave., Camrose, AB, T4V 2R3
Cameron Library 5th floor, Periodicals, University of Alberta, Edmonton, AB, T5G 2E3
Concordia University College Library 7128 - Ada Blvd., Edmonton, AB, T5B 4E4
Glenbow Alberta Institute 130 - 9th Ave. SE, Calgary, AB, T2G 0P3
Grande Prairie Regional College Library 10726 - 106 Ave., Grande Prairie, AB, T8V 4C4
Lakeland College Library 5707 - 47 Ave. West, Vermilion, AB, T9X 1K5
Agriculture and Agri-Food Canada, Lethbridge Research Station P.O. Box 3000, Lethbridge, AB, T1J 4B1, (403) 327-4561
Medicine Hat College Library 299 College Dr. SE, Medicine Hat, AB, T1A 3Y6
N.A.I.T. Library 11762 - 106 St., Edmonton, AB, T5G 2R1
National Library of Canada Canadian Acquisition Division and Legal Deposit Office, 392 Wellington St., Ottawa, ON, K1A 0N4
Northern Forestry Centre Library Canadian Forest Service, Northern Forestry Centre, 5320 - 122 St., Edmonton, AB, T6H 3S5
Olds College Library 4500 - 50 St., Olds, AB, T4H 1R6
Provincial Museum and Archives 12845 102 Ave., Edmonton, AB, T5N 0M6
Red Deer College Library Box 5005, Red Deer, AB, T4N 5H5
S.A.I.T. Library 1301 - 16 Ave. NW, Calgary, AB, T2M 0L4
Strickland Library University of Alberta, Strickland Library, Edmonton, AB, T5G 2E3
University of Calgary Library Calgary, AB, T2N 1N4
University of Lethbridge Library 4401 University Drive, Lethbridge, AB, T1K 3M4, (403) 329-2263

ENTOMOLOGICAL SOCIETY OF ALBERTA

BY-LAWS

Article I

Title

This society shall be known as the Entomological Society of Alberta in affiliation with the Entomological Society of Canada.

Article II

Object

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

Article III

Memberships, Dues, and Expenditures

- a. Any persons interested in entomology may become a Full Member by submitting a completed membership application form and membership fee payment to the Secretary of the Society.
- b. A member may withdraw from the Society upon giving notice to the Secretary.
- c. An annual fee necessary for the operation of the Society shall be levied for each member as provided for in Section 1 of the Rules and Regulations.
- d. The Executive shall have power to meet expenses required in the normal operation of Society business. Such expenditures shall be subject to subsequent ratification at the Annual Meeting by the majority of the members present.
- e. A member who neglects to pay the annual fee for two consecutive years shall automatically cease to be a member.

Honourary Life Membership may be conferred on anyone who has performed long and distinguished service in the field of entomology. The total of Honourary Life Members shall not exceed five percent of the total membership at the time of election. An Honourary Life Member will enjoy all the rights and privileges of Full Members but will be exempt from payment of dues. All Full Members are entitled to propose the name of prospective Honourary Life Members provided each such proposal is supported by two other Full Members and documentation is submitted in writing to the Secretary at least one month prior to the Annual Meeting. Such Honourary Life Members will be elected at an Annual Meeting.

Article IV

Meetings

Meetings may be called each year by the President at times and places suitable to the majority of the members. The fall meeting shall be considered the Annual Meeting and shall be held in the locality decided upon the preceding Annual Meeting. One-quarter of the total paid-up membership shall constitute a quorum.

Article V

Officers

These officers shall constitute the Executive of the Society with full power to act on behalf of the Society within the bounds of the Rules and Regulations, and to appoint committees as necessary.

Article VI

Council

The Council shall consist of the five Officers, the immediate Past-President, a Regional Director to the Entomological Society of Canada, and three Ordinary Directors. The Ordinary Directors shall represent the various fields of entomology and the geographical areas of Alberta as widely as possible.

Article VII

Elections

Elections shall be held once a year at the Annual Meeting, and Officers so elected shall take office at the beginning of the following calendar year and remain in office for a term of one year.

The office of President shall not normally be held by the same person for two consecutive years. The Vice-President shall normally follow his/her term for office with a term as President. The Secretary, Treasurer, and Editor shall be eligible for immediate re-election.

The Directors shall also take office at the beginning of the calendar year following their election. The Regional Director shall be elected for a period of three years, with his/her term of office beginning at the end of an Annual Meeting of the Entomological Society of Canada. A Regional Director is not immediately eligible for re-election.

The term of office of each Ordinary Director shall be three years, with one Director replaced in each year. Ordinary Directors are not immediately eligible for re-election.

Article VIII

Vacancies

Vacancies in any office (except that of President) on the Council between elections shall be filled by appointment by the President, with the concurrence of Council, the tenure of such co-opted members to terminate at the end of the calendar year during which the appointment is made. A vacancy in the office of President shall be filled by the Vice-President who will then serve his/her normal term as President.

Members elected at the Annual Meeting to fill vacancies on Council shall complete the period of service of the Council members whose places they have taken. On completion of this term they shall be eligible for re-election only if their period of service (co-opted and/or elected) has not exceeded 18 months.

Article IX

Duties of Officers

The President shall preside at all meetings and act ex-officio on all committees. The Vice-President shall, in the temporary absence or disability of the President, perform the duties and exercise the powers of the President, shall chair the Science Fair Liaison

Committee and the Membership Committee, and shall perform such other duties as shall from time to time be imposed upon the Vice-President by the Council.

The Secretary shall maintain a record of all meetings and act as custodian of minute books and current correspondence, and shall forward appropriate material to the Agriculture Canada Station in Lethbridge for storage in the Society's archives.

The Treasurer shall receive and disperse all funds, handle all correspondence relating to membership in the Society, and prepare the annual financial statement.

The Editor shall receive and record reports and publications on behalf of the Society and act as editor of the Proceedings.

Article X

Signing Officers

The signing officers of the Society shall be the Treasurer and either the President or Secretary.

Article XI

Alteration of the By-Laws

The By-Laws may be altered or amended at any Annual Meeting of the Society with the approving vote of three-fourths of the members present and in good standing. Such alterations must be made by Notice in Motion, which shall have been sent to the Secretary and a copy of such forwarded to all members at least two weeks before the Annual Meeting.

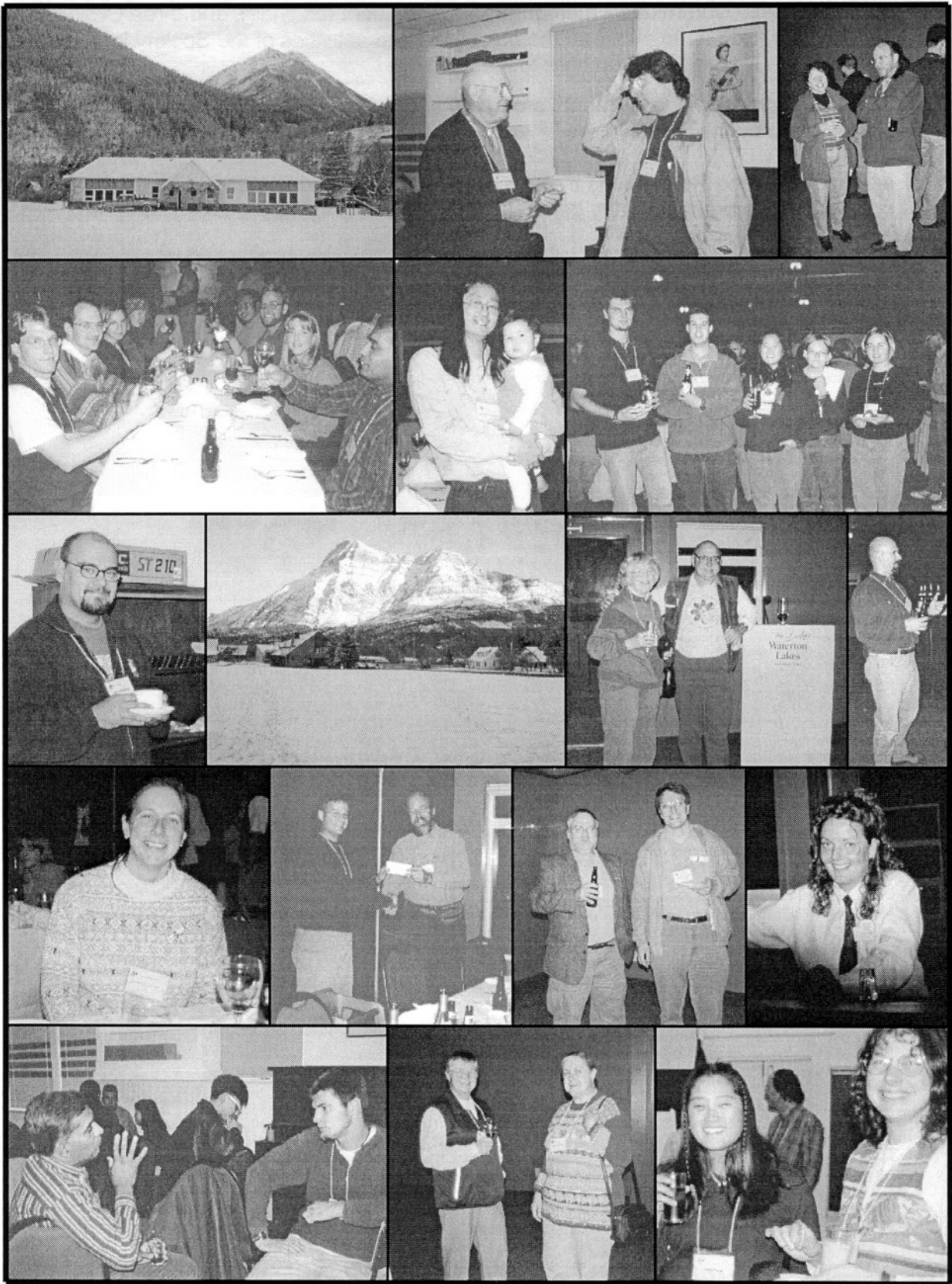
ENTOMOLOGICAL SOCIETY OF ALBERTA

RULES AND REGULATIONS

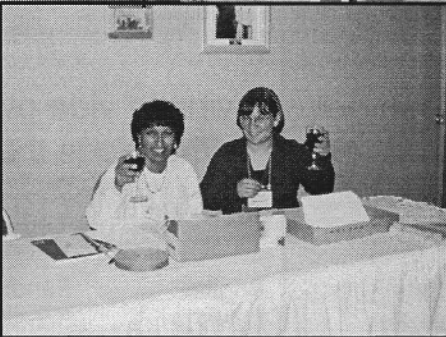
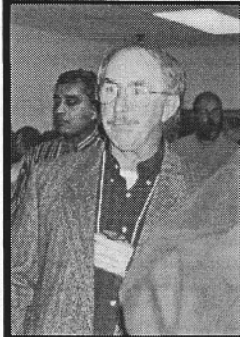
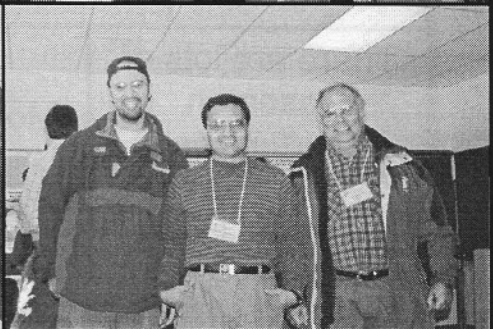
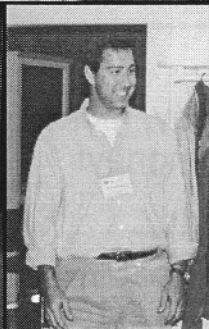
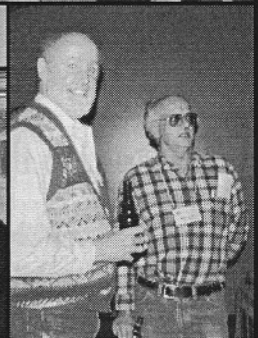
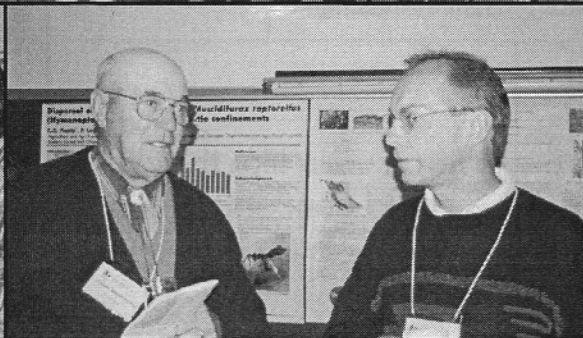
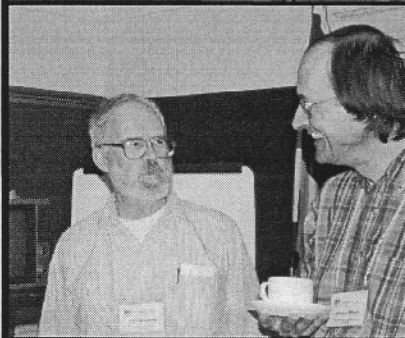
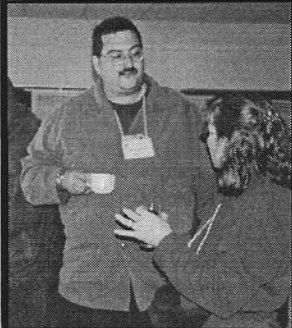
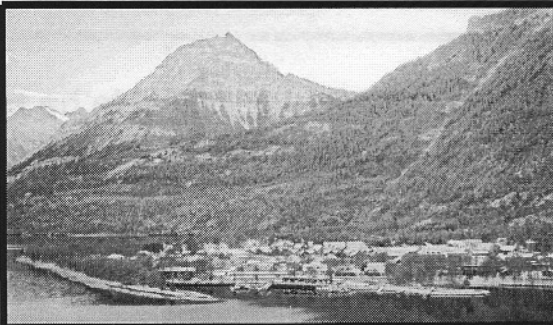
(July 1998)

1. a. The annual fee for full membership shall be \$10.00.
 - b. The annual subscription fee for the Proceedings is \$10.00 for institutions outside the Province of Alberta. Free subscriptions are available to institutions within Alberta and to the National Library of Canada.
 - c. The fiscal year of the Society shall coincide with the calendar year; fees are payable in advance, at the time of the Annual Meeting.
2. a. The interim financial statement shall be presented by the Treasurer at the Annual Meeting and the final, year-end statement at the first general meeting following the end of the fiscal year.
 - b. Two Auditors shall be elected at each Annual Meeting to examine the accounts of the current year and the annual financial statement.
3. a. Registration fees for student members of the Entomological Society of Canada attending the Entomological Society of Canada meetings shall be reduced when these meetings are held in Alberta with the Entomological Society of Alberta as host.
4. The following standing committees shall exist to assist the ESA Council achieve the objectives of the Society:
 - a. Awards Committee - members: Past President, Regional Director to ESC, and the Regional Directors of the ESA. Duties: to solicit and generate nominations of the Entomological Society of Alberta members for Entomological Society of Canada awards (e.g., Gold Medal, Gordon Hewitt, Norman Criddle) and Entomological Society of Alberta awards (e.g., Honourary Membership, Undergraduate Award, Student Travel Grant, Amateur Award).
 - b. Environment Council of Alberta - one ESA member shall be elected to represent the Society.
 - c. ESA-ESC Joint Meeting Committee - to be established a year preceding any joint meeting of the Entomological Society of Canada and the Society; members to be selected from Society membership.
 - d. Nomination Committee - members: the Past President, Vice-President, and one member in good standing shall prepare a nomination slate prior to each Annual Meeting and the Vice-President shall present the slate of nominated Executive Council members at the Annual Meeting.
 - e. Resolutions Committee - members: two Society members shall be appointed by the Nomination Committee immediately preceding each Annual Meeting.
 - f. Science Fair Liaison Committee - members: Vice-President (as chair) and three Ordinary Directors. Other members to be appointed as necessary by the Committee. Duties: to maintain contact with the principal Science Fairs in AB.

- g. Membership Committee - members: Vice-President (as chair), and three Ordinary Directors. Duties: to publicize the objectives and activities of the Society in such a way as to recruit new members to the Society.
 - h. All elections and appointments are not to exceed one year unless otherwise approved by the Society.
5. a. The Rules and Regulations may be changed by a motion approved by the majority of members present at any general meeting.



<p>The school house where it all took place.</p>	<p>Let me see if I have this right...</p>	<p>Ha ha ha, oh Rick!</p>
<p>Mike Undershultz</p>	<p>Joseph Shemanchuk</p>	<p>Rose DeClerk-Floate Rick Butts</p>
<p>What a good looking table!!</p>	<p>Present and future ESA member.</p>	<p>Grad students and beer do they mix?</p>
<p>Hideji Ono Dan Lux Erica Lee Sunil Ranasinghe</p>	<p>Derrick and Zoë Kanashiro</p>	<p>Chris Schmidt Louis Morneau Jane Park Erin Laing Corina Brdar</p>
<p>The man who roped me into this job. I'll get you back!</p>	<p>With a view like this, who could concentrate on bugs?</p>	<p>Having a ball.</p>
<p>Daryl Williams</p>	<p>Dr. Kay and Dr. George Ball</p>	<p>Our Pres. Ken Fry</p>
<p>There are lots of research opportunities at Waterton Lake National Park!</p>	<p>Money, money, money!</p>	<p>Of EMEND and butterflies.</p>
<p>Chantal Ouimet</p>	<p>Troy Danyk Robert Longhair</p>	<p>John Spence Felix Sperling Ferraha the bartender</p>
<p>If we team up, we can get these forest tent caterpillars!</p>	<p>Living la vida ova? What does that mean?</p>	<p>Bark beetles rock!</p>
<p>Sunil Ranasinghe Chris Schmidt</p>	<p>Brigitte Byers Sandra Schaaf</p>	<p>Jane Park Mary Reid</p>



Oh little town of Waterton.		The wine is good, The company is great, Let's hope there's no bugs on our plate!		Cheese! Cathy McCloskey
UFORE or bust. Simon Wilkens	How about a group hug?		Rub a dud dub, three entomologists in a tub. Mike Derrick Daryl McFarlane Kanashiro Williams	
Are you trying to bug me? Ron Steve Gooding Mihak	Chatting over coffee. Joseph Lloyd Shemanchuk Dosdall		Turn that flash off! Bruce Al Heming Schaaf	
Another round for this table!		And from Cowntown Todd Reichardt	Sinister smiles? João Hector Jan Sousa Cárcamo Volney	
I don't believe it! Not for a minute! Frank Peairs	Lygus bugs? They don't eat trees. Hideji Ono	Mixing business with pleasure. Christine Stephanie Noronha Erb		Good party. Chairs would be nice. Alice Erin Graham Laing
				Rowdy Rod McLeod