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PROCEEDINGS OF THE 50TH ANNUAL MEETING OF THE

Entomological Society of Alberta

Lethbridge, AB
October 24 - 26, 2002

Contents

Entomological Society of Alberta, 50th Annual Meeting, October 26th, 2002.

PRESIDENT'S REPORT

In 1989 I attended my first entomology meeting in Athabasca and ever since, I look forward with great anticipation to this friendly get together to share our entomological experiences during the year. If someone had mentioned to me back in 1989 that I would have the honour to serve as president of the society during the 50th anniversary year, I would have thought that they had a bit too much to drink at the social. It has been a real privilege and honour to be your president during such an important historical year. The members of the executive all did a wonderful job in running the society while we concentrated on organizing the meeting. I wish to acknowledge the hard work of our new Treasurer Trevor Hindmarch who has the one position that entails a lot of arduous work. Greg Pohl is another member that I wish to thank for his constant mentoring to the rest of us in the executive. Ever since I have been attending these meetings, Greg has been an active servant of the Society and it is thanks to people like him that we can boast about our successes and be confident about our future.

It has been a very enjoyable task to help co-ordinate the organization of the meeting as it gave me a chance to interact more closely with many of my colleagues in Lethbridge. It was a treat to meet our Charter Members. I must confess that I have done rather little real work in organizing the meeting. The hard work was done by other people and there are far too many to name individually but they are listed in the program and to all of them I extend my sincere gratitude. I do want to point out a few people that deserve special thanks because of the enormous effort they have invested. First of all, Stephanie Erb as Local Arrangements Chair, has devoted many, many hours working tirelessly, to ensure everything ran smoothly. Dan Johnson, as Chair of the Scientific Program did a great job promoting the meeting and should be credited for what may be a record number of scientific presentations. Kevin Float and Al Alexander did a superb job running the audiovisual equipment. Joe Shemanchuk and Bob Byers did an excellent job organizing the Heritage Symposium. Rose DeClerck-Floate did a terrific job as MC of the evening program. Derrick Kanashiro took over as interim editor from Cara Fitzpatrick and ensured the Proceeding from 2001 were published and ready for this meeting.

Since this is a historical year for our society I would like to include in my report a bit of a historical reflection and to that end I went back to the Proceedings of our first meeting. In 1953 at the First Annual Meeting held in Calgary, Strickland, in his presidential address, made mention to the disappearance of "true amateur entomologists", i.e. those that were not formally trained or employed in entomology but contributed to the science. It is of interest that fifty years after the foundation of our society, our local organizing committee decided against having a speaker to review 50 years of amateur entomology in Alberta. We felt that there had not been a great deal of activity in this area with the notable exception of a few well known individuals such as Berth and John Carr. Does this mean that the society has not done enough to fulfill one of its mandates as set out

by Strickland? I would like to think that our society has in fact been very successful at fostering entomology in our province and perhaps the reason we have not had many "true amateur" entomologists is that the majority of people who have developed interest in entomology take advantage of the formal training opportunities available and are successful at turning professionals. At this meeting we heard of many examples of how our members have been instrumental in developing and nurturing the budding interests of young entomologists; an excellent example is Ruby Larson's early entomology club in Lethbridge. More recently, the birth of the Alberta Lepidopterists Guild, with input from some of our members and the contributions of the "King Bugster" himself, our own John Acorn the Nature Nut, will no doubt pay high dividends in inspiring even greater numbers of bright minds to turn to six or eighth legged science.

Our society has more than doubled in membership over the past 50 years and I have no doubt that a bright future lies ahead and our young members who will live to attend the 100th anniversary in 2052 will need a room at least twice the size of the one used this year. Happy 50th to all of us! *Que viva la Entomologia*!

OFFICERS, 2002

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Vice President	Derrick Kanashiro	
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	Troy Danyk	Kevin Floate
	Kendra Grams	Tim Lysyk
	Joe Shemanchuk	Sheila Torgunrud

PROGRAM, 2002

Thursday, October 24

7:00 -10:00 p.m.	Registration and Mixer
7:00 p.m. -	Executive meeting

Friday, October 25

8:00 – 8:30 a.m.	Registration and Parchment Signing
8:30 – 8:45 a.m.	Welcoming remarks
8:45 – 11:00 a.m.	Heritage Symposium
11:00 – 5:45 p.m.	Submitted papers
7:30 - 8:30 p.m.	Banquet
8:30 – 9:00 p.m.	Award presentations
9:00 – 10:00 p.m.	After Dinner: “Insect Managers, Artists and Teachers”, Bill and Elsa Cade

Saturday, October 26

8:30 – 12:00	Submitted papers
12:00 – 1:00 p.m.	ESA Annual General Meeting
1:00 – 3:00 p.m.	Tours of New LRC Facilities

HERITAGE SYMPOSIUM

Records of a regional scientific organization: Proceedings of the Entomological Society of Alberta 1953-2002[1].

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Introduction

As part of the program celebrating the 50th anniversary of the Entomological Society of Alberta, the organizers of the meetings planned, appropriately, a series of talks to review the contributions of members and the events that marked the passage of the first half century of the Society's existence. For a general review, the organizers turned to a person who had enjoyed and profited from a long association with the Society-- I joined in 1954, when I attended the second annual meeting, at which I was welcomed warmly by the members. Although I realized that the task of preparation of such a treatment could be daunting, the person issuing the invitation to speak, Joseph Shemanchuk, was an old friend who had distinguished himself among his colleagues throughout his years of membership, so declining the honor that he offered to me was out of the question.

This was to be a presentation of history. Jeffrey Schwartz (1999: 126) wrote "Hindsight is perhaps the greatest of human inventions. With it, one can sweep away a history of problems and inconsistencies and leave in place only those aspects of, say, a person's life or ideas that are pleasant to contemplate or fit one's own predispositions". I did not want to present an account that could be viewed in such a light. In casting about how to proceed, I decided it would be appropriate to focus on the Society itself, rather than to attempt something more general and diffuse. Recalling the Society Proceedings, an early issue of which I had consulted recently in connection with the Society logo (or emblem, or insignia, before the current generation of electronic media ad-men corrupted the English language), it occurred to me that this series of publications might serve as a suitable focal point. Such a series, an invaluable source of information, deserves at least periodic review, if not more sustained attention, by Society members. In my review, to avoid the pitfall inherent in "hindsight", I took a numerical approach. But using numbers has its own special pitfall: the possibility of displaying "the price of everything, and the value of nothing".

Previously, other members of the Society have addressed various historical topics: Strickland (1954), entomology in the "early years"; Holmes (1964), a half century (1913-1963) of applied entomology, at what is now the Lethbridge Research Centre; Riegert (1978), amateur entomology in Western Canada; and Charnetski (1986), entomology as practiced in federal government and provincial government labs, and in the province's educational institutions. Other treatments of entomological history in a broader context relevant to the Society were presented by Riegert (1980), and Anstey (1986). These presentations focused on individuals and their accomplishments in particular parts of entomology. In contrast, this historical treatment is complementary, because it is centered on a Society that embraces all of those aspects of entomology that are of expressed interest to one or more members.

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[1]Based on a talk entitled "Bugsters, all: the Entomological Society of Alberta through the prism of history 1953-1997", presented during the 2002 meetings of the Society, at Lethbridge, Alberta, October 25.

The proceedings of the entomological society of alberta

The Proceedings are records of the annual meetings, as well as reports of finances and of the business conducted by the Society Executive. The Proceedings document affairs, showing retrospectively where the Society has come from and the paths taken in development.

Components and their sequence of presentation in most of the 50 issues are as follows:

- Presidential report and commentary
- Scientific contributions

  Included are principally titles and abstracts of submitted talks and more recently, posters, as well as invitational papers and symposia.
- Pictorial aspects

  Photographs of members during the meetings were first published in the 1956 Proceedings, following which they became a regular feature.
- Organizational aspects

  Constitution -- first published in Proc. 21, 1973; it became a regular feature of the Proceedings from 1995 on.

In issues 1 to 5, business aspects were presented first, indicating that these were perceived as dominant matters in the formative years. Subsequently, priority of place was given to entomology, as reported in the abstracts of talks presented by the Society members. With an organization well established, the members were able to focus on the field itself.

Methods

The contents of the Proceedings were analyzed quantitatively as 10 intervals of 5 years each, beginning in 1953. These data were tabulated, and have been deposited in the Society archives, in Lethbridge. Information was recorded, and, as appropriate, averages determined (Tables 1-5, 7, and 9) for:

- number of members and finances
- Place of meetings
- Institutional sources of Presidents and Editors
- Number of scientific presentations by worker group
- Number of scientific presentations by field of endeavor
- Number of arthropod groups treated, according to economic sphere of activity
- Frequency of citation of orders of insects studied.

Frequency of presentations was used to seek patterns of change over the first 50 years of the Society's existence, with data for the period 1953-1957 being compared with similar data for the period 1998-2002 (Tables 6, 8, 10 and 11).

Organizational aspects

Number of members and finances (Table 1)

Membership. Beginning with 42 charter members in 1952, the numbers have increased to 149. Growth was relatively steady, except for the period 1963-1967. Much of the increase was the result of expansion in the educational sector of the Province, the employment of entomologists as Faculty members and technical staff, and the consequent. development of research programs to which interested graduate students were attracted. Most of these academicians joined the Society. The Provincial Government also expanded its entomological research capabilities, employing a number of entomologists, and the cities of Calgary and Edmonton also employed entomologists.

Over the years most Society members have been associated with governmental or educational institutions. In 1953, there were six such institutions[2] . Presently, Society members who are Alberta residents, are associated collectively with some 22 institutions, and regional divisions thereof[3] .
Finances. Associated with increasing membership and occasional increase of annual dues (which have risen to a whopping $15.00/year, about the price of a light lunch and beer at time of this writing), financial assets have increased from less than $200.00 to *c.* $25,000.00 These funds have been used to support various entomological publications, scholarships, and to bring in keynote speakers for the Society's annual meetings.

Place of meetings The organizational meeting of the Society (1952) was held in Lethbridge. Annual meetings have been held at 15 sites (Table 2), with six sites used more than once. The pattern reflects the geographical component to membership, with concentration in three zones: a southern zone, drawing most members from Lethbridge; a central zone, comprising mostly members from Calgary; and a northern zone, including members from Edmonton, Vegreville and elsewhere. A temporal component is reflected in that the sources of the original and early membership were Lethbridge, Calgary, and Edmonton. Also reflected is a central tendency, with 14 meetings having been held in Calgary + Banff + Kananaskis.

Single sites represent an effort to vary the venue, with: Athabasca, Vegreville and Jasper in the north; Canmore, Drumheller, and Olds, centrally; and Waterton and Medicine Hat in the South. The single sites of Saskatoon and Penticton are the result of joint annual meetings with sister societies: Entomological Society of Saskatchewan and the Entomological Society of British Columbia, respectively.

Institutional sources of Society officers A partial appreciation of the contribution of institutions to the Society may be illustrated by the sources of the members who have served in an official capacity. This was accomplished simply in terms of the institutional sources of Presidents, Editors, and Photographers (Table 3). Federal institutions have been predominant. This reflects, probably, the relative numbers of professional entomologists in relation to institutional membership. But it also reflects the willingness of the federal entomologists to serve the Society.

Few amateurs have served in the presidency, and none as editor. These low numbers may be viewed in the light of comments in their respective presidential addresses by Nicholas van Veen (1963: 2) and Marilyn Steiner (1985: 3) about the lack of appeal of the Society for amateurs.

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[2] . Agriculture Canada, Science Service Laboratories, Lethbridge (presently, Agriculture and Agri-Food Canada, Lethbridge Research Center); Agriculture Canada, Apiculture Laboratory , Beaverlodge (presently AAFC Beaverlodge Research Farm); Agriculture Canada, Suffield Research Station, Suffield (closed in 1956); Alberta Department of Agriculture, Edmonton (presently, Alberta Agriculture, Food and Rural Development); Canada Department of Forestry, Calgary (presently, Northern Forestry Center, Canadian Forest Service, Edmonton); Department of Entomology, University of Alberta (presently, Department of Biological Sciences, and Department of Renewable Resources).

[3] The institutions named in footnote 2, and the following: Alberta Provincial Museum, Natural History Section, Edmonton; Alberta Sustainable Resource Development, Land and Forest Service (offices in Edmonton, Hinton, Peace River, and Rocky Mountain House); Athabasca University, Centre for Natural and Human Science, Athabasca; Augustana University College, Camrose; Central Parks Services, City of Calgary Parks, Calgary; Grande Prairie Regional College, Grande Prairie; Lakeland College, Lloydminster; Medicine Hat College, Medicine Hat; Mount Royal College, Calgary; Northern Alberta Institute of Technology, Biosciences, Edmonton; Olds College, Olds; Pest Management Services, City of Edmonton, Edmonton; University of Calgary, Department of Biological Sciences, Calgary; and University of Lethbridge, Department of Biological Sciences, Lethbridge.

Pictorial aspects
A valuable part of Society history is the photographic record of members during the annual meetings. The Society was fortunate to have had among its members dedicated photographers (in particular, Evan T. Gushul) who, in the early years, formed the photographic unit of the Science Service Laboratory, at Lethbridge. Two others, the late, lamented William A. Nelson (Lethbridge), and Robin E. Leech, (Edmonton) carried on Evan's work, over eight or more years, each.

Scientific aspects
The stated objective of the Society is to foster advancement, exchange and dissemination of knowledge of insects. It has been accepted implicitly that the primary receivers of such knowledge are the members themselves. The information, based primarily on recent research conducted by each of the speakers, is provided during the meetings primarily by talks (mostly illustrated), and recently by posters, as well. The major points of each of these presentations are presented as abstracts in the Society Proceedings, and these serve as a historical record outlining the scope of entomological work in the province. The annual meetings are attended by small audiences (mostly about 60 or so members). Because the scientific program does not fracture into specialized concurrent sessions, all in attendance may hear all speakers, and as a result, come away with some appreciation of a broad cross section of entomology, as well as knowledge of the work of their colleagues. Such appreciation and knowledge lead to maintenance of understanding of the field as a whole.

Scientific presentations by worker group. Although the membership is classless (except for a small group of Honorary Members, distinguished principally by long years of association with the Society), it is convenient to recognize categories of members, or worker groups, based on experience and income source in relation to entomology, to wit: professionals (those paid to practice entomology); students (those who are in entomology programs in universities and colleges, and who intend to become professional entomologists); and amateurs (those who receive no financial benefit from entomology, but nonetheless, enjoy entomological pursuits). Retired professionals, although no longer receiving financial benefits from pursuit of entomology (and thus technically having achieved amateur status), are regarded as retaining their professional position for purposes of the following analysis.

Table 4 shows the relative number of contributions made by each worker group to the Society meetings. The substantial contributions by student members show the importance of this group to the Society. In turn, the data indicate the Society commitment to student training, for the annual meetings provide useful venues for presentation of information to small, friendly, sympathetic but critical, informed audiences. In such situations, individuals with limited experience find it relatively easy to venture into the arena of public speaking.

Scientific presentations by field of endeavor. Classified by subject, a count of the contributions reported in the Proceedings (Table 5) reveals the breadth of the collective interest, and as well, the foci of interest of Society members. Both the fields of entomological endeavor recognized and assignment of abstracts to each field are somewhat arbitrary. For example, most behavioral studies were included in "physiology", though many of them had substantial ecological ramifications. As well, much work on insect species regarded as pests were included in ecology. Abstracts included in the category "Pest species" were those concerned primarily with reporting on depredations, without a more general context.

The fields are listed in sequence (from high to low) of number of abstracts. The larger proportion (43%) of ecological and physiological abstracts reflects the major thrust of entomology in the prairies, which in turn is related to attempts to understand way of life and function of those insects whose activities have a pronounced negative effect on agricultural products, be they vegetable or animal.

Table 6 illustrates a temporal shift in entomological interest, as reflected in number of abstracts for each field. Compared are the time periods 1953-1957 and 1998-2002. A "change index", expressed as

difference in percent between the two time periods is calculated for each field of endeavor. A positive value indicates an increase in relative number of abstracts, with negative values indicating the reverse.

The index values range from + 15 to - 20, with a marked increase for ecology and decrease for physiology. During the 1950's and 1960's, answers to dealing with pestiferous insects were sought through detailed understanding of bodily function. Further, much effort by the entomological community focused on toxicology and the need to understand the physiological basis of mode of action of toxic organochemicals. But with the passage of time, insecticides were de-emphasized (as shown by a negative index value), and interest shifted to understanding relationships of insects to their environment, as well as to each other (positive change index value for systematics). In part, this was driven by developing interest in biological control, which is also reflected in an increased index value for that field.

Arthropod groups treated, according to economic sphere of activity. Overall, two thirds of the abstracts treated insects of demonstrated economic importance (economic position established), with nearly half treating pest insects of crops and livestock (Table 7). These numbers show clearly the emphasis placed by the Society collectively on insects whose economic importance is known. But substantial interest in insects whose economic importance has not been established is shown, also.

Table 8, using the same method of comparison as explained above for Table 6, provides data about change in emphasis of Society members on these various arthropod groups. Index values range from + 28 to - 20. Increases in study of insects in the unknown economic sphere reflect the freedom of choice available to graduate students in selecting thesis topics, and in turn, the contribution made by graduate students to the scientific programs of the annual meetings. This increase reflects also the increased number of graduate students studying entomology in Alberta institutions of higher learning.

Increase in forest entomology reflects marked activity in this subject in the universities (principally University of Alberta and University of Calgary), and in the Northern Forestry Centre. Decrease in emphasis on agriculturally important arthropods (change indices from - 1 to - 20) reflects a decrease, during the past half century, in support by the federal government for its own entomological units located in the various research centres in Alberta, and elsewhere in Canada.

Arthropods studied. Because entomology features the study of terrestrial arthropods ("bugs", according to Acorn [2000: 11]), it is reasonable to specify the arthropods that served as the basis for the abstracts in the Proceedings. Species provide the most detailed level of analysis, but with the devil lurking in the details, a different taxonomic level was chosen. Initially, the orders of arthropod species cited in the abstracts were counted. But even this count proved too complex for a simple presentation. So, a *post hoc* summary was made: orders with their members cited more than 70 times were counted as "major" and were listed by name; orders whose members were cited fewer than 41 times were counted as "other", and were lumped together (Table 9). Major orders were listed in sequence of number of citations. Temporal change is illustrated, using the change index, with Table 10 (frequency of citation of arthropod taxa) and Table 11 (number of arthropod orders cited and Annelida).

About four fifths of arthropods cited were members of the major orders, with less than one fifth belonging to the "others". Emphasis in the work of Society members was clearly on the major holometabolous insectan groups, but interest in other groups was substantial.

Within the major orders, the Diptera and Coleoptera are clearly in the lead positions, comprising together nearly half of the total. The leading position of the Diptera reflects the group's importance in both agricultural and medical-veterinary entomology, and the wide interest the group has attracted, accordingly (flies have been studied extensively by entomologists in Lethbridge, Calgary, and Edmonton). The high position of the Coleoptera reflects both the economic importance of the group (especially in forest entomology), as well as its aesthetic (for lack of a better word) appeal. The Order Lepidoptera is hardly of less economic importance than the Coleoptera, and its members have similar if not greater

aesthetic appeal. But, the Coleoptera received more university attention because of professorial predilection than did the Lepidoptera, and it is likely this latter factor that accounts for the difference.

The change indices for relative frequency of citation and for number of ordinal taxa noted show a similar pattern of increase from the period 1953-1957 to 1998-2002, with the major taxa receiving relatively less attention than the other orders. This is, again, probably, a reflection of the impact of academic work, which is associated with the freedom of choice available to graduate students and their professors.

Conclusions

1. The Proceedings provide consistent information about the scientific programs and business matters, and a photographic record of the membership. As such, the Proceedings are a useful historical record of the activities of a local, entomological segment of the Canadian scientific endeavor.
2. Records in the Proceedings show fostering by a committed, enthusiastic membership of advancement, exchange, and dissemination of entomological knowledge, concerning both pestiferous and non-pestiferous insects.
3. Records in the Proceedings show entomological research on a broad scale, but much of it devoted to protection of Albertans, and their food and fiber.

Epilogue

Then, let us celebrate our first 50 years, acknowledging the legacy that the founders of the Entomological Society of Alberta placed in our hands, and that we, in turn, will place in the hands of those who will follow us. I end with the concluding statement of one of our former Presidents, which begins with a quotation:

> "If we look, however, at entomology and its objects alone, we cannot fail to see at once that it is practically without limit - that there is work enough for thousands of investigators for almost innumerable generations to come." Thus wrote William Saunders, then President of the Entomological Society of Ontario, in 1874.

"So must a Society such as ours look to the future, beyond the graphs and environments of today to new horizons, where entomology is but one element in the scheme of all nature." Thus spoke that President's great granddaughter, Kathleen E. Ball (1974), 99 years later, in 1973.

FLOREAT ENTOMOLGIA!

Acknowledgments

The talk that provided the basis for this essay was received with patience, good will and a modicum of interest by the members of the audience who were in attendance during the 50th anniversary meetings. I am grateful for their attention and expression of appreciation at the end of the presentation. Two colleagues, at the University of Alberta, Douglas A. Craig, and John R. Spence, at my request read promptly one of the preliminary drafts of the manuscript, and offered useful comments which improved text and tables. I am pleased to thank them for their efforts, recognizing that any remaining defects are my responsibility. Finally, I thank the Organizing Committee, who, through Joe Shemanchuk, encouraged me to make both the oral and written presentations.

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TABLES

Table 1. Summary of average number of members and average financial assets of the Entomological Society of Alberta, during 5-year periods, 1953-2002.

	Avg. No. Members	Financial Assets ($CAN)
1953-1957	60	253
1958-1962	78	382
1963-1967	67	455
1968-1972	89	496
1973-1977	95	1813
1978-1982	109	7852
1983-1987	126	7210
1988-1992	116	9540
1993-1997	120	14351
1998-2002	142	24522

Table 2. Frequency of meeting sites of the Entomological Society of Alberta, 1953-2002.

Lethbridge	12	Drumheller	1
Edmonton	11	Jasper	1
Calgary	8	Medicine Hat	1
Banff	4	Olds	1
Kananaskis	4	Vegreville	1
Waterton	2	Penticton, B. C.	1
Athabasca	1	Saskatoon, Sask.	1
Canmore	1		

Table 3. Sources of presidents, editors, and photographers of the Entomological Society of Alberta, 1953-2002.

	Presidents	Editors	Photographers
Government			
Institutions			
Federal			
Agriculture	18	13	3
Forestry	7	8	0
Provincial	10	3	0
Municipal	1	0	0
Educational			
Institutions	12	8	1
Amateurs	2	0	0
Others	0	0	1
Total	**50**	***32**	****5**

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*Nine served multiple terms, of from 2 to 5 years, 18 years total

** Photographs for 45 meetings. Three photographers served multiple terms, of from 8 to 24 years, total, 43 years.

Table 4. Number of abstracts in the Proceedings of the Entomological Society of Alberta by worker group, 1953-2002.

	Number	%
Professional		
Federal	389	38
Provincial	91	9
University	182	17
Other	15	1
Total Professional	677	65
Students	359	34
Amateurs	16	1
Total	**1052**	

Table 5. Number of abstracts in the Proceedings of the Entomological Society of Alberta, by field of endeavor, 1953-2002.

Field of Endeavor	Number of Abstracts	%
Ecology	279	26
Physiology	178	17
Systematics	133	13
Pest Species	123	11
Methods	98	9
Bio-control, insects	69	7
Toxicology	48	5
Morphology	29	3
Bio-control, weeds	21	2
Cytology & Genetics	13	1
Miscellaneous	61	6
Total	**1052**	

Table 6. Changes in time in number of abstracts by field of endeavor, in the Proceedings of the Entomological Society of Alberta.

Field of Endeavor	1953-1957 No.	%	1998-2002 No.	%	Change Index	
Ecology	9	**16**	50	**31**	+	15
Systematics	3	**5**	17	**10**	+	5
Bio-control, weeds	0	**0**	6	**4**	+	4
Bio-control, insects	3	**5**	12	**8**	+	3
Methods	6	**6**	15	**9**	+	3
Miscellaneous	5	**9**	20	**12**	+	3
Cytology & Genetics	0	**0**	0	**0**	zero	
Pest Species	10	**18**	27	**17**	-	1
Morphology	1	**2**	1	**0**	-	2
Toxicology	4	**7**	5	**3**	-	4
Physiology	15	**26**	10	**6**	-	20
Total	**56**		**163**			

Table 7. Number of abstracts in the Proceedings of the Entomological Society of Alberta treating arthropod taxa according to their economic sphere of activity, 1953- 2002.

	Total Arthropod Taxa by Economic Sphere	
Economic Sphere	**No.**	**%**
Economic Position Established		
Crops & Greenhouse	251	27
Livestock & Human	174	18
Forest, Urban, Fruit	165	17
Pollinators	23	2
Apiculture	8	1
Stored grain	9	1
Total Economic Position Established	630	66%
Total Economic Position Not Established	321	34%
Total	**951**	

Table 8. Changes in time in number of abstracts in the Proceedings of the Entomological Society of Alberta treating arthropod groups according to their economic sphere of activity.

	1953-1957		1998-2002		Change
Economic Sphere	**No.**	**%**	**No.**	**%**	**Index**
Econ. Sphere Unknown	5	**10**	62	**39**	+ 29
Forest, Urban, Fruit	7	**14**	44	**28**	+ 14
Pollinators	1	**2**	2	**1**	- 1
Stored grain	1	**2**	1	**1**	- 1
Apiculture	1	**2**	0	**0**	- 2
Livestock & Human	13	**27**	12	**8**	- 19
Crop & Greenhouse	21	**43**	36	**23**	- 20
Total	**49**		**157**		

Table 9. Frequency of citation of ordinal arthropod taxa noted in abstracts in the Proceedings of the Entomological Society of Alberta, 1953-2002.

	Citations	
	No.	**%**
Major Orders[1]		
Diptera	233	24
Coleoptera	220	23
Lepidoptera	154	16
Hemiptera	95	10
Hymenoptera	95	10
Total Major Orders	797	81
Other Groups[2]	191	19
Total	**988**	

1. Taxa cited more than 70 times
2. 17 taxa, including insects, arachnids, crustaceans and annelids, each cited fewer than 41 times (range 1-40)

Table 10. Changes in time in frequency of citation of ordinal arthropod taxa noted in abstracts in the Proceedings of the Entomological Society of Alberta, 1953-2002

	1953-1957		1998-2002		Change
Taxa	**No.**	**%**	**No.**	**%**	**Index**
Other Orders[1]	2	**04**	29	**18**	+ 14
Total Major Orders[2]	47	**96**	128	**82**	- 14
TOTAL	**49**		**157**		

1. Taxa each of which was cited fewer than 41 times
2. Taxa cited more than 70 times

Table 11. Change in number of ordinal arthropod taxa noted in abstracts in the Proceedings of the Entomological Society of Alberta.

	1953-1957		1998-2002		Change
Taxa	**No.**	**%**	**No.**	**%**	**Index**
Other Groups[1]	2	**28**	7	**58**	+ 30
Total Major Orders[2]	5	**72**	5	**42**	- 30
Total	**7**		**12**		

1. Taxa each cited fewerthan 41 times

2. Taxa each cited more than 70 times

50 years of Alberta Aquatic Entomology.

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Abstract. Aquatic entomology is defined as the study of stages of insects that live in water and/or the study of insects in the pursuit of which the entomologist gets his or her feet wet. 136 or so papers have been presented at ESA meetings and 66 or so graduate theses have been written on the subject. These contributions are not discussed in detail. Rather, I present a series of personally selected highlights from the last 50 years. These include the first flush of graduate students at the U. of A. and the appointment of faculty members at the U. of A. and the U. of C. in the 1960s; the Aquatic Entomology Symposium in 1971; the 1983 International Symposium of Odonatology; the 1991 Waterton Resolution; and the discovery of a new genus and possibly new family of aquatic Diptera in Alberta in the 1990s.

'The River,' said the Rat in The Wind in the Willows, 'What it hasn't got is not worth having, and what it doesn't know is not worth knowing.' A great definition of aquatic entomology. In Brian Hocking's words - truly'The Ultimate Science'.

However, today I have adopted another definition: Aquatic Entomology is the study of stages of insects that live in water and/or is the study of insects in the pursuit of which the entomologist is likely to get his or her feet wet. This definition has two advantages: first I don't have to review all of the excellent work on adult biting flies, which is being covered by Doug Colwell anyway; and second it allows me to include workers who get their feet wet even though the insects they study don't.

In order to fulfill my mandate today, I first thought that I would analyse the 136 or so papers on aquatic entomology that have been presented at ESA meetings, or discuss the 66 or so graduate student theses that have been written at the Universities of Alberta and Calgary, including, at 622 pages, the longest thesis ever written in the Biological Sciences Department at the U. of C. - that by David Larson on dytiscid beetles. I even thought for one insane moment that I might go to the journal literature. However, these thoughts quickly passed and, instead, I decided that I would give you a few personally selected highlights.

As far as I can determine, aquatic entomology (by my definition) got off to a rather slow start during the early years of the Society's existence. Brian Hocking was working on the control and behaviour of blackflies and mosquitoes, and 'Mosquito Joe' was beginning his illustrious career, but, although they may have started with studies on larvae, their work was soon diverted towards adult biting flies. Ralph Nursall's limnological studies didn't have an entomological perspective, and Richard Hartland-Rowe, who had worked on mayflies in Uganda before he was appointed to the U. of A. at Calgary in 1958, worked primarily on fairy shrimps once he got out from under the burden of teaching and administration, which took him about 10 years. In fact, there is only a single presentation to an ESA Annual Meeting before 1959 that might just qualify – a paper in 1953 on "Rearing of Prairie Mosquitoes" by Ian Lindsay.

However, when I arrived at the University of Alberta in 1960 – a mere 8 years after the founding event that we are celebrating today – there were, I think, 8 graduate students. And 5 of them qualified as aquatic entomologists. Max McFadden was working on larval stratiomyiids, Mohammed Shamsuddin worked on larval tabanids, Amalia Pucat worked on larval mosquitoes, David Happold worked on larval and adult mosquitoes, and I worked on larval and adult dragonflies. David and I spent two summers working at Flatbush on the Hughes family farm. We moved an old army truck that I believe Brian Hocking commandeered from his DRB contacts up to Flatbush to use as a field laboratory. Neil Hughes ran the

farm, but the patriarch was his father, Colonel John Hughes, who had built a splendid log home in the 1930s that he called 'The Barracks'. And the main lake there, in which both David and I got our feet and more wet, was named after Col. Hughes' wife, Sara. Our accommodations were less salubrious than 'The Barracks.' We dined primarily on rabbit stew; the Hughes boys shot the rabbits and we removed the ticks, skinned them, and cooked them (the rabbits not the possibly more nutritious ticks). It was a wonderful place to do field work.

After this first flush of students graduated, Alberta aquatic entomology slowed down until Doug Craig and Hugh Clifford were appointed to the U. of A, and I was appointed to the newly autonomous U. of C. in the mid-1960s. Doug had worked on blephariceridsin New Zealand and turned to blackflies in Edmonton, working as part of Brian Hocking's WHO-funded investigations. He soon became interested in the functional morphology of filter feeding, which led to the acquisition of scanning electron microscopes in the 1970s. Doug modestly states on his Home Page: "Some of those SEM micrographs have been widely published." Of course, this is one of the great under-statements of the last century; they are some of the best insect micrographs ever taken.

Hugh Clifford's forte was the biology of mayflies. He published his fine review of mayfly life cycles in Quaestiones Entomologicae in 1982, and culminated his career with the book 'Aquatic Invertebrates of Alberta' in 1991. The pictorial keys that are a nice feature of this book were "made more professional-looking" by Heather Proctor, at that time an undergraduate student at the U. of A. Heather did an M.Sc. degree with me at the U. of C. and then did her Ph.D at Toronto, where she was co-supervised by Rob Baker, who had done his Ph.D. on dragonflies with Hugh, and I was his External Examiner. Of course, the final bit to this story, is that Heather was appointed to the U. of A. this year to take over Hugh's teaching. If this all sounds a bit incestuous, so be it. I look on it as a tribute to the excellence of Alberta aquatic entomology.

When I went to the U. of C. in 1967, I started to work on tipulids in beaver ponds at the newly established Kananaskis Field Station. This would be my major interest for most of the next 15 years or so, before I returned to odonates, studying them in hot springs throughout western North America and in the tropics.

With aquatic entomology in place, I took it upon myself to organize a symposium on the subject at the ESA Meeting in 1971, held at the field station at Kananaskis. We brought in Ken Cummins as a keynote speaker (a first for the ESA?), and had contributions from Dave Larson, Richard Hartland-Rowe, Kurt Depner, Hugh Clifford, Duane Radford, Mary Chance, Dave Rosenberg, Ted Leischner, and myself. I look on this symposium as being a truly major achievement because, except for a retirement lunch put on by his students at the NABS meeting in Calgary, it is the only scientific meeting that I know of that Hugh Clifford ever attended. Also, those of you who were present will remember the wonderful after-dinner entertainment by W.O. Mitchell, and the election to Honorary Membership of Larry Jacobson. However, there is no way I can make cut-worms into aquatic insects.

Presentations on aquatic entomology were prominent at ESA Meetings through the 1970s and 1980s. In fact they became too prominent for their own good because at the meeting in Waterton in 1991 the following resolution was made: "Whereas John Spence, his colleagues, students & minions dominated the seminars with their Spencian theories, be it resolved that there be no water-strider talks at next year's meeting." Although gerrids are only honorary aquatic insects because they don't get their feet wet, John Spence falls under my definition of an aquatic entomologist because I'm sure he has gotten his feet wet. I have no sure evidence of this, but I do know that Willy Matthey, who worked on gerrids in the Kananaskis beaver ponds, did get his feet wet. Besides, I need John in order to make the point that, of the four Albertans who have been awarded the Gold Medal of the Entomological Society of Canada, three of them – John, Dave Rosenberg, and I'm going to bring Brian Hocking back into the fold – have been aquatic entomologists. The only exception is George Ball, and I'm not going to even attempt to make him

into an aquatic entomologist, because I know what he'd tell me I'm full of, if I did.[2] The closest I will venture is to point out that Dave Kavinaugh, one of George's students at the time, presented a paper at the 1971 ESA meeting (the year of the Aquatic Symposium) entitled: "Up the falls – tarsal modifications in a carabid", which described a species of Nebria, "adults of which were seen to be at home under water, walking along rocky stream bottoms in swift current and even up small waterfalls as easily as on land." George's paper followed and, to his credit, he did not try to get in on the act but gave us a 'Tale of tails.' Bruce Heming, however, shamelessly did try to pretend to be an aquatic entomologist with a paper entitled 'Changing shoes in midstream.' Needless to say, it had nothing to do with aquatic entomology and fooled no one.

In 1983, the International Symposium of Odonatology was held in Calgary. The meeting that year was supposed to be held in Brazil, but that was given the heave-ho when it turned out that participants would not be allowed to collect. We had a potential problem there too. Rob Cannings told me that there was no way we would get a collecting permit for the National Parks. But as it happened, Parks Canada had just put in the boardwalk at the Cave & Basin and had diverted stream flow in the process. Word got back to Head Office, I think through a Biological Survey meeting, that we feared that they had wiped out the most northerly population of a tropical dragonfly, Argia vivida, which we had been working on at the site. Head Office got on Western Region Office's case, and when I applied for the permit to unleash the world's most rabid collectors in the National Parks, it went through without a hitch.

My final highlight begins at the ESA meeting in 1994, when Richard Casey, Lloyd Dosdall & Gary Byrtus presented a paper on "Aquatic invertebrates in groundwater wells of Kananaskis Country." One of these invertebrates was "a new genus of Athericidae". Later, I was presented with one of these larvae that had been collected in one of our field courses. I didn't know what it was so I passed it on to Jack Zloty. Jack didn't know what it was either, but was determined to find out. It turned out that several people had seen this larva, but nobody had been able to rear it. Greg Courtney, a former student of Doug Craig's, was one of these and he directed us to the Ram River, where the beast was present in some numbers. To cut a long story short, Jack reared larvae from the Ram River to adults and found pupae there and reared them too. It is indeed a new genus and, although the larval head and mouthparts are very similar to those of athericids and tabanids, the adults have a mixture of rhagionid, athericid, pelechorhynchid, and tabanid characters that exclude them from any currently described Family. You can read all about it in the poster at this meeting.

Jack's Ph.D. work revealed 3 new species of Ameletus mayflies from Alberta. Now we have a new genus and possibly a new family of flies from the province. I conclude with this example to point out that, as we embark on the next 50 years of entomology in Alberta, there are still many exciting discoveries to be made. I am sure that the current generation of Alberta entomologists is up to the challenge, and I wish them the same degree of enjoyment that I have had in working within the camaraderie that has been the hallmark of Alberta Entomology for the last 50 years. I will leave you with the image of Bob Mutch and a saying of his that has become something of a mantra for me. After a few hours of breaking through the ice of mountain streams to collect stonefly larvae in absolutely miserable weather, he would get into the truck, whose engine I had started some time before, get out his thermos of hot coffee, probably fortified with a dram or three of Glenlivet, and say: "Aye. This is the life." And indeed it was.

[2] Afterwards, George told me that he might, in fact, qualify. He is a co-author on a genus name for a fully aquatic carabid, discovered in Mexico, and he assures me that he got his feet very wet in the process of collecting.

David Happold and the Field Laboratory, Flatbush, 1962

The author and Brian Hocking at Lake Sara, 1962

The author and Max McFadden take the Monster Truck to Flatbush

History of forest entomology in Alberta

H.F. Cerezke

Early History

In the traditional sense, forest entomology has been concerned with problems of insect damages to forests and forest products. Within this context, forest entomology has consisted of detection, identification, forecasting, measurement of injurious insect populations, and insect-caused damages as well as analyses of causes of outbreaks and of the development and application of strategies to protect trees and forest products (Graham 1963). This broad definition provides the general framework in which I would like to present my interpretation of the history of forest entomology in Alberta.

In 1909, C.G. Hewitt was appointed as Dominion Entomologist for the Dominion Department of Agriculture (designated later as the Division of Entomology). As Head of this newly formed Division of Entomology, Hewitt was determined to expand federal entomological services to all parts of Canada (Rajala 2001; Riegert 1980). Prior to his appointment, outbreaks and damages caused by several forest insect species were well known, especially in eastern Canada and included the spruce budworm, larch sawfly, forest tent caterpillar and spruce bark beetle (Prebble 1951; Swaine 1928). Infestations of the forest tent caterpillar in Alberta had also been reported as early as 1890-1894, in 1902 and during 1908-1912 (Ives 1971). At the same time, there were numerous reports and information coming from the United States, and probably from British Columbia, of extensive bark beetle depredations in Douglas-fir, Engelmann spruce and pine forests (Swaine 1928). Many of these outbreaks were occurring in the north western regions of the U.S. and prompted Hewitt to write in 1912 (Hewitt 1912): *"What is true for the Rocky Mountain and Pacific Coast regions of the United States is also undoubtedly true for the corresponding regions in Canada and likewise for the northern forests of the Dominion"*. Thus, while there had not been any general surveys conducted in western Canada up to this point, there were strong suspicions that Canada's forests may be experiencing similar bark beetle-caused losses.

To emphasize the need for forest entomological investigations in Canada, Hewitt presented information on bark beetle control costs and apparent successes in Montana (Hewitt 1912), and later suggested that tree losses in Canada due to forest insects was greater in the aggregate than losses due to forest fires (cover letter by C.G. Hewitt; *In*: Swaine 1918). He subsequently appointed J.M. Swaine as Assistant Entomologist in charge of Forest Insect Investigations for all of Canada. This choice was a logical one at the time since Swaine was considered to be one of the two chief authorities on bark beetles in North America (Hewitt 1912).

J.M. Swaine was stationed in Ottawa and travelled extensively throughout Canada collecting and recording bark beetle infestation areas. The summers of 1913 and 1914 were devoted to bark beetle surveys in British Columbia and probably elsewhere (Rajala 2001; Van Sickle et al. 2001). This work culminated in his two part publication, "Canadian Bark Beetles" in 1918. A scan through this publication for distribution records indicated that many bark beetle species came from widely scattered locations in Alberta including Jasper and Banff parks, Peace River district, Lesser Slave Lake and along the east slopes of the Rocky Mountains. Listed under one of the spruce beetle species which was identified at the time as *Dendroctonus borealis* Hopk., Swaine noted that a large amount of timber had been killed by this beetle in northern Alberta. In another report Swaine (1916) described his investigation in 1915 of over two million feet of white spruce logs that had been decked along the north shore of Lesser Slave Lake. The logs had lain unprocessed for one and a half to two years and had become riddled with grub holes attributed to larvae of the sawyer beetle, *Monochamus* sp. The year 1915 therefore appears to represent

the earliest beginnings of forest entomology in Alberta and is attributed to the early collections and surveys conducted by Swaine.

Another event that was significant for forest entomology was the establishment in 1903 of the field station at Indian Head, Saskatchewan. This station was established under the Department of the Interior for the purpose of growing trees and shrubs for shelterbelt plantings across the southern prairies. A Forest Insect Laboratory was later added to the station for studies of the biology and control of shade-tree insects such as the forest tent caterpillar. J.J. de Gryse was hired as Assistant Entomologist under the Department of Agriculture in 1923 and was stationed at the Forest Insect Laboratory. Before his transfer to Ottawa in 1925, he assisted in preparing a number of circulars on major forest insects for wide distribution. One such circular that was in demand was: "The control of the forest tent caterpillar in the Prairie Provinces".

Severe bark beetle infestations were occurring in B.C. between 1915 and 1920 and prompted the Dominion government to establish an insect laboratory at Vernon, B.C. in 1922 (Hall et al. 2001; Van Sickle et al. 2001). This facility had a mandate to investigate forest insect problems within the interior of B.C. and also the east slopes in Alberta and the Rocky Mountain National Parks. Major bark beetle control and salvage projects were undertaken in B.C. during the years from 1920 to 1928 (Hall et al 2001; Rajala 2001; Richmond 1983; Van Sickle et al.2001). These depredations raised concerns that similar events may develop in Alberta and a survey primarily for bark beetle infestations was requested. This survey was conducted during the next three summers, 1927, 1928 and 1929 by H.A. Richmond who was stationed at the Vernon laboratory. He conducted the survey on horseback and packhorse and his travels extended along the entire east slopes from the U.S. border north to the Athabasca River and included Banff National Park and the Cypress Hills. Many insect collections were made including a first record of spruce beetle infestation near Nordegg (Richmond 1983).

A few years later, a mountain pine beetle outbreak was discovered in Kootenay National Park and spread northward and probably eastward into the Bow valley in Banff National Park in 1940. This infestation threatened to spread eastward, similarly as in the case with the current mountain pine beetle outbreak. A control program of sanitation cuttings directed by G.R. Hopping and W.B. Mathers from the Vernon laboratory, was launched in 1941 and extended into 1942 and 1943. Over 27,000 trees were cut and burned. A severe winter in 1943-44 is believed to have halted further development of the outbreak and no control work was undertaken in 1944 or in subsequent years (Hopping and Mathers 1945).

Establishment of the Forest Insect Survey

As early as 1911, Hewitt had recognized the need for cooperative efforts with forest industries and provinces to help monitor forest insects in Canada (McGugan 1958). During the following years as new and serious outbreaks became known, Swaine (1928) proposed the establishment of a "Forest Insect Intelligence Service" in 1928, the concept of which was strongly promoted by de Gryse (1938). Finally in 1936, a "Forest Insect Survey" (FIS) was successfully established in eastern Canada, based on the successful cooperative detection surveys undertaken to plot the distribution of the introduced European spruce sawfly (de Gryse 1938; McGugan 1958). In 1939, the Vernon Laboratory was designated as a western centre for the Forest Insect Survey and was to serve all of Alberta except the Cypress Hills, which were served from the Indian Head Forest Insect Laboratory (Rajala 2001). Another forest insect laboratory was established in Winnipeg in 1941, and from which some insect surveys in Alberta were conducted (McGugan 1958). Further expansion of the Forest Insect Survey was curtailed until after World War II. Then in 1948 following the opening of the Forest Zoology Laboratory in Calgary, all Forest Insect Survey functions in Alberta were organized and directed from this laboratory. The Forest Insect Surveys conducted for the prairie shelterbelt program at Indian Head were discontinued in 1954 and this responsibility was then shared between the Calgary and Winnipeg laboratories (McGugan 1958; Prebble and Bier 1954).

The staff who carried out the Forest Insect Survey were trained semi-professionals and were given the

title of “Forest Insect Rangers”. In Alberta, the province was divided into seven Ranger Districts that more or less coincided with provincial forest boundaries and the Rocky Mountain National Parks. Usually one Ranger was responsible for surveying, monitoring and reporting of forest insect conditions in each District. In 1962, forest disease survey responsibilities were added to the duties of the Ranger staff and the unit then became known as the Forest Insect and Disease Survey or FIDS. During the late 1970's and early 1980's, another trend that was developing was the requirement to report other forest health issues such as air pollutants and acid rain. This lead to the establishment of the “Acid Rain National Early Warning System” (ARNEWS) in 1984 to detect symptoms of acid rain to forests. This required establishing a nationwide network of permanent monitoring plots in which forest insects and diseases were a component in the data collection (Brandt 1994).

The FIDS functioned more or less successfully until 1995. Prior to 1995, and starting as early as 1974, there was a policy change at the provincial level (R.S. Miyagawa, personal comm.). As a result, the province assumed greater responsibility for the management of insects and diseases, especially for major pests such as the spruce budworm, spruce beetle and mountain pine beetle. A point that needs to be emphasized is that throughout the long period of FIDS operation, cooperation with provincial, industrial and other jurisdictions was credited as key to the success of the FIDS program.

Throughout its history, the FIDS unit functioned under a structured management with either a professional entomologist or pathologist as Head and additional technical and professional support staff who provided taxonomic identifications, processed field collections, directed special surveys, developed and tested new field monitoring techniques, contributed to data analyses, and provided various other support services. Supportive taxonomic services were also contributed by the Biosystematic unit in Ottawa.

During its functional tenure in the province, the FIDS made several important contributions to forest entomology. In summary, it provided an inventory (i.e., in the permanent collections) of insects causing injury to trees and their natural insect enemies, information about their life histories, behavior and development, insect distributions, pest outbreak patterns, and tree and wood product losses. This work culminated in estimates of losses to insects and diseases that allowed us to evaluate their impacts in terms of sustainable annual allowable cuts in Alberta, the region and Canada-wide. The data have also been used to predict new infestations and losses, and have provided supportive information for numerous scientific studies. The permanent collection of forest fauna materials are invaluable for forest biodiversity studies and generally for aspects of sustainable forestry.

Federal Forest Entomology Research in Alberta

A chronology of federal forest entomology staff who have contributed research in Alberta during the years 1947 to 2002 is summarized in Table 1.

Following World War II, there was considerable expansion of new federal forestry research centers and field stations across the country. The opening of the Forest Zoology Laboratory in Calgary with G.R. Hopping as Officer-in-Charge was accompanied by the early establishment of the Kananaskis Forest Experiment Station (Hopping 1959; Prebble and Bier 1954). This field station had been converted in 1947-48 from a former Prisoner of War Camp to provide insectory, accommodation and limited laboratory space (R.W. Reid, personal comm.). The other field station was in Banff National Park, temporarily for the first few years (1948-1954) at the “Silver City” location, then to a newly constructed facility in 1956, known as the Eisenhower Field Station or Castle Mountain Field Station. This station provided laboratory, insectory and accommodation facilities.

Initial research studies conducted from this station focussed on three insects: the lodgepole needle miner investigated primarily by R.W. Stark; the two-year cycle spruce budworm investigated by R.F. Shepherd who also had interests in the population dynamics of several other defoliators; and the mountain pine beetle with studies initiated by R.W. Reid. Another researcher, A.J, Cook contributed information on the

effects of defoliation on tree growth pattern (Laurenson 2001). While these studies were conducted within the national parks and adjacent B.C., the new information was influential in the advancement of forest entomology principles generally as well as of ultimate benefit in the landscape management of the national parks. The Eisenhower Field Station closed in 1970 and was taken over by Banff National Park. A fifth entomologist during the early years was C.W. McGuffin who specialized in the taxonomy of geometrids and worked primarily out of the Calgary Laboratory (R.W. Reid and R.F. Shepherd, personal comm.). In 1959, G.R. Hopping resigned as Officer-in-Charge in order to pursue his special interest in the taxonomy of bark beetles in the genus *Ips*.

Table 1. Chronology of federal forest entomologists working in Alberta from 1947 to 2002 listing their term of employment and general research interests.

NAME	TERM	RESEARCH INTERESTS
Hopping, G. R.	1947-1965	*Ips* bark beetle taxonomy
Stark, R.W.	1948-1959	Population dynamics and life tables of lodgepole needle miner
McGuffin, W.C.	1947-1962	Taxonomy of geometrid larvae
Cook, A.J.	1949-1960	Defoliation effects on tree growth
Reid, R.W.	1949-1980	Mountain pine beetle biology; host tree interactions & selection
Shepherd, R.F.	1952-1969	Defoliator spp. population dynamics, behavior and sampling design
Brown, C.E.	1954- 1968	FIDS Head and FIDS data management
Cumming, M.E.P.	1954-1970	Biology and life cycle development of Adelgid aphids
Cerezke, H.F.	1960-1995	FIDS Head; ecology, behavior and impact of rootcollar weevil
Stevenson, R.E.	1960-1980	FIDS and biology of white pine weevil
Lanier, G.N.	1965-1970	Biosystematics, genetics and behavior of genus *Ips* bark beetles
McGhehey, J.H.	1965-1968	Mountain pine beetle behavior and development
Raske, A.G.	1965-1970	Woodborer taxonomy, biology, damage and control
Safranyik, L.	1965-1972	Mountain pine beetle population dynamics, sampling methodologies and integrated pest management systems
Tripp, H.A.	1965-1970	FIDS Head and biology of seed and cone insects
Drouin, J.A.	1970-1986	Extension and efficacy tests of minor use pesticide registrations
Ives, W.G.H.	1970-1989	FIDS Head, FIDS data analysis, pest impacts in young stands, and book “Insects of trees & shrubs of prairie provinces”
Muldrew, J.A.	1970-1984	Biological control by parasite release of larch sawfly
Wong, H.R.	1970-1988	Insect identifications and taxonomy of forest defoliator sawflies
Moody, B.H.	1981-1986	FIDS Head and pest depletion loss estimates in Northwest Region
Amirault, P.	1985-1991	Young stand pest surveys and pest depletion loss estimates
Volney, W.J.A.	1986–	FIDS Head, population behavior of spruce and jack pine budworms, pest and tree interactions, pest impacts, and Integrated Pest Management
Langor, D.W.	1988–	Biology and biosystematics of bark beetles/weevils and forest insect biodiversity, and Field Guide of forest insects
Williams, D.J.M.	1991–	Taxonomy of braconid parasitoids and bark-feeding weevils
Brandt, J.P.	1992–	Pest depletion loss estimates and forest health surveys
Weber, J	1996 –	Spruce budworm life histories and introduced pest monitoring
Pohl, G.	1997–	Insect identifications, insect biodiversity and ecology
Hammond, J.	1999--	Forest insect biodiversity and ecological relationships

In 1954, the Forest Insect Laboratory at Indian Head closed and two of its entomology staff transferred to the Calgary Laboratory. C.E. Brown became Head of the Forest Insect Survey and had special interests in streamlining the process of analysing and recording of the FIS collection data. The other entomologist, M.E.P. Cumming contributed to the understanding of the complex life histories of Adelgid aphids species. Two additional entomologists were hired in 1960: R.E Stevenson assisted with the Forest Insect Survey and had special interests in the biology of terminal-feeding weevils and H.F. Cerezke was assigned a

project to investigate the ecology of Warrens rootcollar weevil. He later joined the FIDS and conducted studies on spruce and jack pine budworms, woodborers and bark beetles.

The mid-sixties marked another period of entomology staff increases that included G.N. Lanier, A.G. Raske, J.H. McGhehey, L. Safranyik and H.A. Tripp. Three of these staff had special interests in bark beetles: G.N. Lanier investigated the biosystematics of *Ips* species, complementing the work of G.R. Hopping; J.H. McGhehey studied the behavior and development of the mountain pine beetle; and L. Safranyik began an intensive study of the population dynamics of the mountain pine beetle, a project that evolved into a team of researchers that was later transferred to the Pacific Forestry Centre in Victoria. A. G. Raske had special interests in the taxonomy of woodborer species and conducted studies of the genus *Monochamus* and *Tetropium*. H.A. Tripp became Head of FIDS and had interests in seed and cone insects.

Dramatic changes occurred in 1969 when the federal austerity program was launched and resulted in down-sizing of staff, staff transfers and closure of the Forest Biology Laboratories in Calgary and Winnipeg. In the following year, a new Laboratory, the Northern Forest Research Centre, was completed in Edmonton and all forest research and survey staff were re-located in this new building. This Centre then became regional headquarters serving the Northwest Region; i.e., the three prairie provinces, Northwest Territories and Rocky Mountain National Parks. At the same time, satellite offices were retained at Prince Albert and Winnipeg to better serve these two provinces.

Following the closure of the Winnipeg Laboratory, four entomology staff were transferred to the Northern Forestry Research Centre and included W.G.H. Ives, H.R. Wong, J.A. Muldrew and J.A. Drouin. W.G.H. Ives became Head of the FIDS for the expanded region and had special interests in analysis of FIDS historical data. Two significant contributions were the co-authoring of a book with H.R. Wong: "Insects of Trees and Shrubs of the Prairie Provinces" and in co-editing the publication "Forest Insect Pests in Canada". H.R. Wong pursued his special interest in sawfly taxonomy while J.A. Muldrew expanded his research in the biological control of the larch sawfly and J.A. Drouin conducted efficacy tests of minor use pesticides in support of new label registrations.

New staff were hired in the 1980's: B.H. Moody was appointed as Head of FIDS in 1981, and he and P.A Amirault (arrived in 1985) collaborated to develop pest depletion loss estimates for the Northwest Region. These estimates were updated by J.P Brandt (arrived in1992), who also took over as Head of FIDS in 1995. In 1986, W.J.A. Volney joined the forest entomology staff and two years later D.W. Langor, followed by D.J.M. Williams in 1991, J.Weber in 1996, J. Hammond in 1999, and G. Pohl in1997. W.J.A. Volney has investigated the population behavior and impact of the jack pine and spruce budworms with interests aimed at developing forest pest management systems in sustainable managed forests. D. Langor with assistance and support from D. Williams, J. Hammond, and G. Pohl have contributed in bark beetle and bark weevil research and in boreal forest arthropod diversity studies. Currently, J. Volney, D. Langor, along with J.R. Spence (University of Alberta) maintain research projects in the large "Ecosystem Management Emulating Natural Disturbances" (EMEND) project aimed at understanding ecosystem function, productivity, biodiversity, and sustainability of the boreal forest. All three assist several graduate student projects on forest arthropod diversity within EMEND and forest entomological topics.

Forest Entomology at the Provincial Level

Prior to about 1974, forest insect surveys were conducted routinely by the FIDS, including surveys requested by the province, industry or parks. However, additional funding or staff from these agencies were often provided to assist in carrying out the task. With a change in policy in about 1974, the province began to coordinate surveys and assessments of important insect infestations such as the spruce budworm and spruce beetle with the Canadian Forestry Service. Responsibility for coordinating such surveys was given to R.S. Miyagawa, who held the position as Head of Liaison and Analysis Section of the Alberta Forest Service.

During the next decade (1976 to 1986), an outbreak of the mountain pine beetle developed in southwestern Alberta that required aerial and ground surveys, sanitation cuttings and salvage harvesting of beetle-killed trees. At this time, R.S. Miyagawa became Manager of the Insect and Disease Program, a new designation under the Forest Protection Branch. His responsibilities included coordination of all surveys, distribution of funds for the mountain pine beetle program and participation in various other survey requirements. G.J. Smith carried out much of the aerial and ground surveys and monitoring of the mountain pine beetle. R. Miyagawa retired in 1988 and his position was taken over by H. Ono who currently heads the position as Manager of Forest Health Section within the Alberta Sustainable Resource Development. He is assisted by S. Ranasinghe as Provincial Forest Entomologist, six Forest Health Officers (T. Hutchison, C. Kominek, D. Lux, M. Maximchuk, E. Mueller and M. Undershultz) and two Support Staff (C. Crocker and L. Joy). Four of the Forest Health Officers are regionally stationed and two are headquartered in Edmonton. They are responsible for carrying out extension services, conducting all survey requirements, mapping outbreak areas of insect infestation, reporting pest conditions, and supervising and assessing control operations. Current insect problems of prime concern in the province are focussed on the spruce budworm, mountain pine beetle, aspen defoliators, and wood borers in fire-killed timber.

Forest entomology consultants working for the province or industry have conducted aerial and ground surveys of mountain pine beetle, forest tent caterpillar and other defoliators, assisted with wood borer surveys and sampling, and monitored insect-caused seed losses in conifer seed orchards.

Forest Entomology Teaching and Research at Academic Institutions

The teaching of basic entomology courses is included in the curriculums of at least three major universities in Alberta within the biological and environmental sciences. At the University of Alberta, a course covering forest entomology content is specifically tailored to students in forest science and was originally developed by W.G. Evans in1971. Upon G. Evan's retirement in 1988, this teaching responsibility was taken over by J.R. Spence. Other courses may include issues in forest ecology and forest pest management. As current Head of the Department of Renewable Resources and Project Coordinator of EMEND, J.R. Spence supervises several graduate students training in forest entomology and has interests in forest ecology, forest pest management, and impact of forestry practices on non-target arthropods. Graduate students from the Universities of Alberta, Calgary, and Lethbridge conduct insect research in the EMEND project.

At the University of Calgary, M.L. Reid teaches entomology courses and has research interests in bark beetle behavior and habitat selection as well as supervises graduate students investigating forest entomology topics. During 1982 to 1989, E.A. Dixon and H. Wieser (Dept. of Chemistry, U.of C.) collaborated with H. Cerezke to conduct field bioassays tests of semiochemical baits for manipulating populations of bark beetle (*Dendroctonus* spp.) species . The Northern Alberta Institute of Technology in Edmonton offers, since 1964, a two year diploma in Forest Technology that includes instruction in forest entomology.

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ABSTRACTS OF SUBMITTED PAPERS

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Bugsters, All: the Entomological Society of Alberta through the prism of history

George E. Ball

A frigid caterpillar hunter

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Caterpillar hunters in the genus *Calosoma* (Coleoptera: Carabidae) have been determined as potential biological control agents during severe outbreaks of forest Lepidoptera in Western Europe, North America, and Japan. Increases in one nearctic species, *Calosoma frigidum* Kirby, have been documented during defoliator outbreaks in the Great Lakes region of Michigan and Ontario, and the White Mountains of Northeastern United States. Population size and phenological development of defoliating Lepidoptera are important factors affecting *Calosoma* populations. At the EMEND (Ecosystem Management Emulating Natural Disturbance) site in northwestern Alberta, light trap and pitfall trap results show considerable increases for large aspen tortrix (*Choristoneura conflictana* (Wlk.)) and frigid Calosoma (*C. frigidum*) populations from 1998 to 2001. In fact, trembling aspen (*Populus tremuloides*) was subject to severe defoliation from large aspen tortrix larvae during the summer of 2001 and 2002. However, field observations suggest a large decrease in adult *C.conflictana* populations from 2001 to 2002 whereas the adult beetle population apparently increased for the same period. Does *C.frigidum* predation has a significant impact on *C.conflictana* populations and what are the implications for biological control?

Post-hoc assessment of knapweed biological control: a lot of weeds, a lot of insects..

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Competitive interactions can be an important component affecting the success of biological control. Spotted knapweed has been the target of an aggressive operational biological control program dating back to the late 1960's that has resulted in the establishment of 9 insects attacking knapweed in BC. Population densities and species interactions were assessed for 4 seed-heed feeding and 2 root-feeding biocontrol agents at 38 biocontrol release sites. Attack rates were assessed relative to competing species, plant characteristics and history of the releases site to improve the future redistribution of established knapweed biocontrol agents and assess requirements for additional biocontrol agents.

A brief history of crop entomology in Alberta.

Bob Byers

Agriculture and Agri-Food Canada, Lethbridge

The first crop entomologist in Alberta was Edgar E. Strickland, who was hired in 1913 to establish a western Dominion Entomological Laboratory at Lethbridge in response to a severe outbreak of pale western cutworm. His mandate was to solve the cutworm problem, as many other problems as possible and to carry out extension work. Subsequently several generations of crop entomologists have laboured to achieve those goals. Some of the main pest problems encountered during the last 50 years and the research achievements attained will be briefly discussed.

At home on the range: evaluating the quality of a biocontrol weevil following its establishment on Dalmatian toadflax

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The relationship between host resource availability and population quality of an endophagous insect is examined using the weed, Dalmatian toadflax, and its biocontrol agent, *Mecinus janthinus*, as a model. Insect fitness, measured by progeny survival, adult size and fecundity, is assessed against shoot vigour and across levels of intraspecific weevil competition.

Risk-sensitive bumble bees don't change their tune with three foraging choices

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By definition, risk-averse foragers prefer the less variable (i.e., less risky) of alternative prey types, when mean reward is the same. Recent empirical work with foraging rufus hummingbirds (Selasphorus rufus) has found a surprising result: preferences expressed in a 2-prey type context are not preserved in a 3-prey type context. Hummingbirds were risk-averse in choices involving 2 prey types, but when faced with three prey types of equal mean reward-Constant (C), Low Variation (L), and High Variation (H)- they preferred the intermediate, L type. Here, we ask whether bumble bees (Bombus flavifrons), also known to be risk-averse in choices between 2 prey types, behave like hummingbirds when faced with 3 prey types. We measured the foraging choices of 17 bees, selected from 5 colonies, over an average of 233 flower visits in 10 foraging trips in a flight cage. In the cage, bees faced three separate patches of flowers that differed in colour (white, blue, and yellow). Each patch was a different treatment: C (3 µl of nectar in each flower), L (2 µl in half of flowers, 4 µl in the rest), and H (1 µl in half of flowers, 5 µl in the rest). Colour-prey type combinations differed between bees. After statistically controlling for bee differences and colour preferences, bees showed significant preference for the C type over the H type, with the L type intermediate between (but not significantly different from) the C and H types. Hence, there is no evidence that bumble bees are irregular in their foraging preferences between 2 prey type and 3 prey type situations. They are consistently risk averse, and more averse to the option with greater risk. However, the strength of risk-sensitivity was weak; average differences from random visitation were +5.7% for C types, -1.1% for L types, and -4.6% for H types.

Veterinary Medical Entomology in Alberta: 50 years and beyond

Doug Colwell

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Entomologists involved in the development of knowledge and devising management strategies for insects affecting animals and man in Alberta have contributed largely to the world literature and the impact of their work has extended around the globe. Daunted by the volume and afraid that someone might be left out, inadvertently, I have chosen to present, what are to me, highlights and some colourful individuals who have left their impressions. The highlights extend back before the establishment of the Society to include the early cattle grub control work as well as the later work with the Sterile Insect Technique. Also featured are the people involved in the development of systemic control products that later became the foundation of insect management in cattle. As well, some of the key people and projects focusing on biting fly biology and ecology are presented.

Bugs that eat don't sleep: a surprising reversal of reproductive diapause in adult gerrids

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Previous work suggests that waterstrider adults from northern populations enter an irreversible reproductive diapause, given photoperiod signals perceived in the 4th or 5th juvenile instar. With this study we demonstrate that diapause is reversible in some adults exposed to high food levels and apparently induced in some adults with the reproductive pathway open but exposed to low food levels. Reproductive strategies for dealing with low food levels are also discussed and compared among 3 *Gerris* species.

When weed biocontrol works; impact of *Mogulones cruciger* (Coleoptera: Curculionidae) on houndstongue

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The European root weevil, *Mogulones cruciger* Herbst., was initially released in Canada in 1997, after 9 years of testing, to control the rangeland weed, houndstongue (*Cynoglossum officinale* (L.)). The weevil has successfully established at the majority of release sites throughout the interior of British Columbia (BC) where houndstongue is a problem. By 2000, there was a significant reduction in houndstongue density at two 1997 release sites in the E. Kootenay of BC. Using laboratory-reared weevils, an experiment was initiated in 1999 in the E. Kootenay to determine the optimum number of weevils to release to achieve predictable and rapid weed control. Within two years, complete, patch-level control of houndstongue was achieved using initial release numbers of 200-400 weevils. The plants remaining at sites where 100 weevils were released were stunted, chlorotic and in poor vigor. Although drought also contributed to reductions in houndstongue density at all experimental sites in 2001, it was evident that *M. cruciger* attack was an important factor in the weed's control.

Root maggots and weed control in canola: making pest management strategies compatible

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Early weed removal in canola gives the crop a competitive advantage over weeds and therefore is widely recommended for optimal crop production, but no previous studies have been undertaken to determine the impact of this practice on insect pest infestations. Four field experiments were conducted at Lacombe and Beaverlodge, AB in 1999 to 2001 to determine the effect of time of weed removal on root maggot (Delia spp.) (Diptera: Anthomyiidae) egg deposition and larval damage to taproots. Damage to taproots and oviposition declined by approximately 6 and 23%, respectively, with a delay in weed removal from the two- to six-leaf stages of canola development. The most plausible explanation for this effect relates to the behavioral sequence of events that precedes oviposition in mated, gravid female flies. Heterogeneous environments, like weedy backgrounds in canola plantings, minimize opportunities for females of Delia spp. to complete the behavioral sequence required for oviposition, leading to reduced infestation levels in weedy systems. However, yield improvements achieved with early weed removal exceeded the yield benefit derived by lowered root maggot pressure when weeds were removed later. Nevertheless, current efforts to reduce pesticide use in agriculture may promote broader adoption of cultural control strategies for weed and root maggot management. In some situations it may then be appropriate to ameliorate root maggot damage by maintaining some weedy background.

Are mountain pine beetles attracted to fire-damaged lodgepole pine trees?

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Controlled burning has been proposed as a method for disturbing natural systems to modify the risk and magnitude of infestation by mountain pine beetles, *Dendroctonus ponderosae*. High intensity fires are known to kill adult and larval beetles, but it is unclear how mountain pine beetles respond to trees that have been damaged by a low intensity fire, as may occur at the periphery of a prescribed burn. Previous researchers have suggested that mountain pine beetle may be attracted to fire damaged trees because the trees possess a weakened defence system. Beetle attraction to fire weakened trees may be particularly pertinent in low density beetle populations, where low population numbers restrict beetles to attacking trees with decreased defences. We conducted an experiment to determine whether mountain pine beetles preferentially attack trees that have been damaged by fire, and to determine how fire damage affects beetles reproductive success. We investigated the effect of fire damage by artificially burning 0/3, 1/3, 2/3, and 3/3 of a tree's bole. Beetles did not preferentially attack fire weakened trees. Beetle attack density, and rate of attack, were also independent of fire damage. Notably, beetle attacks on fire damaged trees were more likely to overcome the trees defences and produce successful egg galleries. However, increased attack success on fire damaged trees was only found in low density beetle populations. In high density beetle populations there were enough beetles to overwhelm the trees defences in all burn treatments. Beetles produced more offspring when reproducing in fire damaged

trees, but the condition of the offspring produced did not differ between burn treatments. Therefore, in low density beetle populations, increased attack success on fire damaged trees, and increased offspring production, may serve to maintain the beetle population. In low density populations, localised increased attack success could potentially facilitate the transition from an endemic to an outbreak population, by concentrating beetle attacks.

Response of gall-forming arthropods to hybridization of cottonwood species (*Populus* spp.) in the Oldman River drainage

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Three species of cottonwoods (*Populus* spp.) overlap and naturally hybridize in southern Alberta. These hybrid trees present novel environments to gall-forming arthropods. Given the high specificity of gall-formers to one or a few closely related plant species, one would expect that hybrids, containing portions of both host and non-host genomes, would be high resistant. However, a significant portion of these hybrids are actually much more highly susceptible to attack than are the parental host species. Furthermore, hybrid trees highly susceptible to one species of gall-former may be highly resistant to another species of gall-former. The current study reviews the extent and nature of cottonwood hybridization in the drainage of the Oldman River, describes patterns of hybrid susceptibility, and presents a hypothesis that explains differences in the response of a leaf-galling aphid and a bud-galling mite to the hybridization of their cottonwood hosts.

Effects of forest harvest on saproxylic beetle assemblages

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Saproxylic insects, a functional group dominated by beetles, are dependant on dead or moribund trees. Little is known about saproxylic insects in North America. Studies in Europe have shown forest harvest to be responsible for a biologically significant decrease in saproxylic beetle diversity and extirpation of some species. The objective of this study is to determine the effect of harvest intensity on saproxylic beetle assemblages at the EMEND (Ecosystem Management Emulating Natural Disturbance) research site in northern Alberta. Collections from window traps have shown that saproxylic beetle assemblages change with any harvest intensity. This change is greater with increase harvesting. We must fully understand the effect of harvesting on this important functional group in order to adapt forest management plans for conservation of these species and to promote future healthy forests.

Lygus bug feeding induces increased productivity in canola

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Yield and other components of plant compensation were tested by manipulating lygus bug density during the bud through bloom period of canola. *Brassica napus* cv. Q2 was planted in a randomized design of four complete blocks per site at Lethbridge, Ellerslie and Beaverlodge. After emergence, five plants per plot were randomly selected. Individual plants were caged and insect density treatments (0, 2, 4, 6 or 10 bugs per cage) applied at bud. Upon completion of experiments, cages were removed. At harvest, treatment plants were retrieved for measures of plant architecture, biomass, and feeding damage (aborted buds, flowers, and pods). Yields were measured by raceme and seed size category.

Analyses of covariance of stem diameter data showed stem diameter increased with increasing lygus density. As well, lygus-treated plants had stem diameters significantly greater than the controls. Analyses of covariance of aboveground, vegetative biomass data showed lygus treatments significantly increased biomass. For example, at Beaverlodge in 2000 lygus-treated plants were significantly larger (by about 27%) than the controls, while the high-density lygus treatment plants at Ellerslie in 2001 were significantly larger (by 40%) than the low-density. Similarly, lygus treatments significantly increased branching at Ellerslie in 2000 and 2001.

Total seed weight increased significantly due to treatments at Beaverlodge in 2000: seed production in high-density treatment plants more than doubled (221%) relative to the controls. No other treatment effect or significant reduction in seed weight, either in total or by size class, was found.

These induced changes were the result of lygus feeding. Untreated plants had fewer abscised and aborted structures than did plants in any of the lygus-treated plots. Significantly more reproductive structures were lost in 2000 in the high-density treatment at Ellerslie, more than twice the loss of the low-density. In both years, damage at Ellerslie increased with increasing lygus density while in 2001, numbers of lost structures increased by 48% on average in lygus-treated plants compared with controls. Multiple-site analyses of 2000 data showed lygus treatments significantly increased this damage, with significantly more damage occurring at Beaverlodge than at Ellerslie. The same model run on the 2001 data showed significant site differences, but no treatment differences.

The observed pattern of vegetative and reproductive changes induced by lygus bug feeding in canola prior to pod stage indicates a generally positive agronomic response that should be considered when making pest management decisions at early growth stages.

Susceptibility of Brassicaceae species to infestation by the cabbage seedpod weevil (Coleoptera: Curculionidae)

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The cabbage seedpod weevil (*Ceutorhynchus obstrictus* (Marsham)) was first discovered infesting canola crops in southern Alberta in 1995 and since then, it has spread to central Alberta and is expected to move north into the Peace River region. Host plants of the weevil belong to Brassicaceae and include canola (*Brassica rapa* and *Brassica napus*) and brown mustard (*B. juncea*); yellow mustard (*Sinapis alba*) is resistant. Integrated pest management strategies for the weevil that are currently being investigated include chemical and biological control. Another strategy for consideration is the relative susceptibility of Brassicaceae species. Studies were conducted to determine the susceptibilities of several species and genotypes to *C. obstrictus*, including species such as *B. tournefortii* and *B. nigra*, whose susceptibilities in Alberta were unknown. The criteria evaluated to determine susceptibility included weevil 1) abundance, 2) feeding preferences, 3) development and 4) damage. In the field, weevils tended to be found on the most mature plants. Weevils preferred to feed and lay eggs on pods of *B. rapa* and *B. napus*. Damage to the aforementioned species also tended to be the greatest as confirmed by exit hole counts. *Brassica tournefortii*, *B. juncea* and *B. napus X S. alba* hybrids were intermediate in their susceptibilities. There were significant differences in susceptibility between genotypes of the brassica species. Adult weevils occasionally fed on *B. nigra* and *S. alba* but these species are not highly susceptible to the weevil since the weevils did not reproduce within their pods. In conclusion, integrated pest management of the cabbage seedpod weevil should include choosing a less susceptible Brassicaceae species and genotype.

Oribatid mite diversity in Alberta grasslands: a single family affair?

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Oribatid mites are an extremely diverse group of animals but they have not been extensively studied in Alberta. Presently only around 70 species are known from Alberta although the total richness is likely to be several times greater than this. We present data on the diversity of oribatid mites from 5 areas in southern Alberta, predominantly from grasslands. The species list generated from these samples adds 24 new genera, 11 new families and 8 superfamilies to the records for Alberta. There were at least 28 species identified in each of the areas sampled. Species from the Brachychthoniidae dominated in all of the grassland sites, constituting approximately one third of the total richness. The richness of the Brachychthoniidae at the study sites was amongst the highest recorded from any site in the world. Our studies highlight the limited understanding of the distribution of soil fauna in Alberta and the habitat preferences of whole suites of species.

A short history of wheat midge in Canada and prognosis for this pest in Alberta.

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The wheat midge, *Sitodiplosis mosellana* (Géhin), has become a serious pest of spring wheat across Manitoba and Saskatchewan since about 1992, but is so far a less serious problem in Alberta. This European gall midge first came to Eastern North America in the late 1600's or early 1700's and subsequently became a devastating pest of wheat in the north-eastern USA, Nova Scotia and Quebec in the 1800's. The pattern of infestation on the Canadian Prairies can be interpreted in two ways: 1) a westward migration of the pest from an introduction to southern Manitoba in the 1950's, leading to an outbreak in Saskatchewan in the 1980's, and a subsequent dispersal to the east-central Alberta; 2) a rapid spread of the pest across Canada with the early settlers, and a recent change in spring weather conditions that allowed the pest populations to expand dramatically from low densities. The latter possibility is supported by reports from Criddle of wheat midge in western Manitoba in 1900, and the recent discovery of the pest at low densities in the Peace River. Infestations in Alberta will likely depend more on the occurrence of suitable moisture conditions in early summer than on the dispersal abilities of the wheat midge.

Undergraduate entomological experiences in Costa Rica in the Augustana University College Tropical Biodiversity Field Course

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A fragmented tropical forest area in the Guanacoste Province is the site of Rapid Ecological Assessment types of surveys conducted over 10 days in mid-February every two years by fourth-year Biology and Environmental Science students. Ants, butterflies and bats are being used as the biodiversity indicator species in tropical forest, thorn forest, regrowth forest, plantation and pasture habitats. Benefits to an undergraduate student program are explored.

The effects of environmental, density and temporal factors on the duration of tandem oviposition in dragonflies

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Tandem oviposition was observed in *Sympetrum internum* in order to examine the role of environmental, temporal and density factors on the duration of this form of mate guarding. Males guarding ovipositing females spent significantly more time in tandem oviposition when there were conspecific males or pairs within the area. Wind speed, temperature, time of day, and time of season had no effect on the duration of tandem oviposition. It is believed that this behaviour represents a trade off between energetic/predation costs and increased guarding success.

Headlines from the frontline of the Mountain Pine Beetle battle in Alberta (is it time to conscript?)

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The mountain pine beetle (MPB) populations are increasing in southern Alberta. In Banff National Park (BNP), the number of red- attacked trees has increased exponentially from 12 in 1997 to over 2500 in 2001. The MPB populations are expected to double in 2002. The beetle infestation in this park has been advancing 5-10 kilometres per year east through the Bow Valley during the past couple of years. The current infestation can be attributed to a large number of beetles immigrating from BC, mild winters since 1997, and an overabundance of susceptible pine in BNP and along the eastern slopes of Alberta. To manage these insects, the Alberta government and BNP are considering large scale prescribe burns to remove MPB habitats, individual tree treatments, and use of antiaggregation pheromones. We have initiated several research projects to study the MPB impacts and effectiveness of the management tactics. This paper describes two of these projects.

Fire Stressed Trees and Host Selection.
We examined the effect of bole scorching on mountain pine beetle attack and gallery characteristics across a range of beetle population densities. The effect of fire damage was investigated by artificially burning 0/3, 1/3, 2/3, and 3/3 of the circumference of a tree's bole. Beetles did not preferentially attack fire-weakened trees. Beetle attack density, and rate of attack, were also independent of fire damage. In trees that were successfully attacked, egg gallery length varied with burn treatment; longer galleries were found in 0/3 and 3/3 burn treatments. Notably, beetle attacks on fire-damaged trees were less likely to be pitched out by the trees defensive resin response. However, increased attack success on fire-damaged trees was only found in low-density beetle populations. In high-density beetle populations there were enough beetles to overwhelm the tree's defences in all burn treatments. Therefore, in low-density beetle populations, increased attack success on fire-damaged trees may serve to maintain the beetle population. Secondly, in low-density populations, localized increased attack success due to fire damage, in conjunction with other factors, could facilitate the transition from an endemic to an outbreak population.

Using Antiaggregation Chemicals to Protect Lodgepole Pine Stands. Using the antiaggregation pheromone Verbenone, we attempted to inhibit beetles from attacking three one-hectare blocks of lodgepole pine in Banff National Park. Commercially available Verbenone baits (Pherotech Inc., BC) were placed in the blocks at a rate of 100 baits/hectare. The MPB attack frequency in the treated blocks will be compared to the beetle attack in check plots. Results are expected by October 1, 2002.

Beetle diversity in central Veracruz, Mexico: response to land use mosaics on an altitudinal gradient.

Enrique Montes de Oca

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Anthropogenic activities modify the landscape, producing land use mosaics consisting of patches of vegetation, open areas, and cultivated areas, all interspersed around human settlements. This increase in heterogeneity affects the fauna and flora. In this study I present the changes in species richness and

abundance occurring in two groups of beetles: ground beetles (Carabidae) and dung beetles (Scarabaeidae) according to land use type over an altitudinal gradient on the Cofre de Perote. Management that ensures maintenance of all elements of the landscape mosaic will help to conserve beetle diversity.

Effects of ultraviolet radiation of the survival, growth, and development of the waterstriders *Gerris buenoi* and *G. comatus* (Hemiptera: Gerridae)

Laura Muis

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I studied the effects of UV radiation on the survival, growth, and development of the waterstriders *Gerris buenoi* and *G. comatus*, using a field experiment that altered levels of UV radiation from the sun. Gerrids were reared throughout juvenile development in tubs with UV-blocking Plexiglas, UV-transmitting Plexiglas, and that allowed only penetration of UV-B. I floated the tubs in a pond just west of Edmonton, and placed 25 first instar nymphs in each tub: *G. buenoi* in 3 tubs of each treatment and *G. comatus* in 3 tubs of each treatment. I checked and fed the gerrids daily, and recorded the surviving number of each instar every through three censuses weekly. As the gerrids reached the adult stage, they were removed from the tubs (date and treatment recorded), killed, dried, and weighed. I also recorded the sex of each gerrid. Body length, thorax width, and hind femur length of each gerrid was measured. From a total of 450 nymphs in the 18 tubs, 337 were recovered as adults (75% overall survival).

Do ants play favorites?

Jason Peterson and Bernard Roitberg

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This project aims to determine how different suites of life history traits in the aphid, Aphis fabae (Homoptera: Aphididae) will affect and be affected by ants during the life of the aphid colony. Results from behavioural observation and competition between aphid strains will be discussed.

The distribution of carabid beetle assemblages (Coleoptera: Carabidae) along a salvaged-unsalvaged gradient in Alberta's mixedwood forests

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Understanding how ecosystems such as boreal forests respond to anthropogenic perturbation is crucial to sustainable resource management as our demand for timber resources increases. Post-fire salvage logging is now a commonly employed practice in Alberta, but little is known about the impacts of this practice on wildlife. More specifically, the effect of habitat fragmentation and the creation of edge habitat resulting from salvage logging on the distribution, composition, and abundance of species have been insufficiently studied. We examined the distribution of carabid beetle assemblages along a disturbance gradient ranging from salvages (burned and then harvested) to unsalvaged (naturally burned and then left standing) to examine the influence of the edge created between these two disturbances. Three linear

transects of pitfall traps were established along this gradient 40 m from the edge into both disturbances, and then sampled through a six-week period in the summer of 2002. A total of 3433 carabid beetles representing 28 species were collected and identified during this study. Preliminary analyses suggest that abundance is greatest in the interior of the salvaged area, and that the edge has a unique species composition. In addition to providing insight into the impacts of post fire salvage logging, our results also suggest that attention be given to the amount of edge habitat created by salvaging in the development of ecologically sensitive guidelines for the management of this practice in Alberta.

Alberta's Lepidoptera fauna: the last 100 years

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The first published checklist of Alberta Lepidoptera was compiled approximately 100 years ago, by Frederic Hova Wolley Dod, an independently wealthy Englishman who lived southwest of Calgary. It included 94 butterfly species, 512 macromoth species, and 7 of the larger micromoth species. His list was subsequently updated and expanded by Kenneth Bowman, a chartered accountant who lived in Edmonton and collected throughout the province. His 1951 list was among the most comprehensive regional checklists of the time. It contained 140 butterfly species, 857 macromoth species, and 638 micromoth species. Since that time, species concepts have changed, many new species have been described, and many more species have been collected for the first time in Alberta. The authors (Pohl and Schmidt) are compiling a new Alberta species list incorporating all this information. At present, it contains 176 butterfly species, 1036 macromoth species, and 1047 micromoth species, for a total of 2259 species in 56 families. This is estimated to be just over half the 3500 to 4000 species expected to occur in the province. Numbers of taxa are compared across the three lists, and some noteworthy new records are discussed.

Fifty years of Alberta aquatic entomology

Gordon Pritchard

Department of Biological Sciences, University of Calgary, Calgary

Aquatic entomology is defined as the study of stages of insects that live in water and/or the study of insects in the pursuit of which the entomologist gets his or her feet wet. 136 or so papers have been presented at ESA meetings and 66 or so graduate theses have been written on the subject. These contributions are not discussed in detail. Rather, I present a series of personally-selected highlights from the last 50 years. These include the first flush of graduate students at the U. of A. and the appointment of faculty members at the U. of A. and the U. of C. in the 1960s; the Aquatic Entomology Symposium in 1971; the 1983 International Symposium of Odonatology; the 1991 Waterton Resolution; and the discovery of a new genus and possibly new family of aquatic Diptera in Alberta in the 1990s.

Persistence and significance of *Escherichia coli* in flies

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The persistence of *Escherichia coli* in the larval gut was examined for both house flies (*Musca domestica* L.) and stable flies (*Stomoxys calcitrans* L.) up to 48 hours after ingestion. *E. coli* abundance declined over time in immature house flies, but remained constant in immature stable flies, suggesting house flies digest *E.coli* but stable flies do not. Development and survival of flies on egg yolk media (EYM) inoculated with *E. coli* was also evaluated. Both house flies and stable flies had reduced survivals on an *E. coli* only diet compared with larvae fed *Empedobacter* and *Flavobacterium*. However, survival of house fly larvae on *E. coli* averaged 62 % while survival of stable flies averaged 25 %. This shows house flies could use *E. coli* as a source of nutrients where stable flies do not. Trends in *E. coli* persistence could be explained by this hypothesis.

A journey down the Thelon: insect collecting in the Canadian Barrenlands

Amanda Roe

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During the summer of 2002 an insect survey was conducted in the Canadian Barrens, located north of Saskatchewan and Manitoba, spanning both the NWT and Nunuvat. This expedition was organized through the Biological Survey of Canada, whose initivative it is to identify and coordinate faunal surveys of areas in Canada which, historically, have been poorly sampled. Surveys of aquatic and terrestrial invertebrates was conducted along the Thelon River, starting at the junction of the Thelon and Hanbury River and ending at Beverly Lake. This transect provided a broad sampling of a variety of habitats, ranging from thickly wooded 'oasis' to wide sweeps of treeless tundra. The faunal surveys focused on aquatic insects (in particular blackflies, Ephemeroptera, Tricoptera and Plecotera) and Lepidoptera. The priminary results showed most aquatic orders being well-represented and a high diveristy fo simulid species. Lepidoptera collecting was more sporadic due to weather variation, but an excellent species diveristy was found. This trip as well as several other suggest the need for additional surveys of the Canadian Arctic insect fauna.

Strategies in selecting research components necessary to develop a pest management system for Douglas-fir Tussock Moth

Roy F. Shepherd, retired

Canadian Forest Service, Victoria, BC

This insect periodically defoliates and kills patches of Douglas-fir in the main hot dry valleys of interior British Columbia. Susceptible forests were delineated showing the close relationship between these mapped ecological zones and defoliated areas of seven previous outbreaks. Defoliation lasts 2 to 4 years in any one stand, but most of the morality was the result of defoliation in the first year. Any control actions, therefore, had to take place the previous year, i.e. we had to prevent the outbreak. A strong pheromone system was utilized to provide a monitoring program which followed populations and enabled the prediction of outbreaks 2 years before the appearance of defoliation.

Disappearance of the population after 2 to 4 years is usually the result of a virus epizootic. This virus was

propagated and sprayed from the ground and air to control the populations. A chemical was also successfully tested, as was a confusion technique utilizing pheromone. The choice of the type and timing of the control system to be selected was related to the condition of the trees' expected defoliation the following year, management objectives for the stand, and human health considerations.

Dr. Spence's lonely hearts club band: dealing with singletons and doubletons

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The familiar collector's curve has plagued appropriate analyses of large-scale invertebrate biodiversity data. To date, there have been few adequate analytical methods to deal with infrequently captured or seemingly rare specimens, i.e. those species in a collection represented by only one or two specimens. Those concerned with estimating the planet's total species richness are particularly troubled by the large numbers of singletons and doubletons collected via tropical canopy knock-down insecticides. However, the prevalence of singletons and doubletons are not exclusive to warm, exotic climates. We demonstrate this phenomenon with large-scale and voluminous collections of boreal forest spiders and beetles, illustrate the ensuing analytical problems, and provide potential solutions.

Thinning the boreal forest: do bark beetles benefit?

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Forest thinning is an intensive management practice for which the ecological consequences remain largely unknown. Thinning is expected to have two main effects that may influence plant-insect interactions. First, stand structure is immediately changed and stand microclimate is altered. Second, the growth and vigour of trees remaining in the stand is modified over subsequent growth seasons. We studied how these dual effects of thinning affect reproduction in pine engravers (*Ips pini*); a bark beetle that breeds in the phloem of freshly dead lodgepole pine (*Pinus contorta*). We designed an experiment which allowed us to examine how tree condition and stand microclimate affect beetle reproduction both alone and in combination. Thinned stands tended to be warmer, and trees growing in thinned stands had larger diameters, but did not differ significantly in nitrogen content, as compared to their unthinned counterparts. Logs located in thinned stands attracted significantly greater densities of male *Ips pini* than those located in unthinned stands. Within thinned stands, logs *originating* from thinned stands were colonized earlier, males that settled in these logs attracted significantly more females, and consequently had larger clutches than males breeding in logs from unthinned stands. Females breeding in logs from thinned stands laid their first egg sooner. Overall, both stand and tree level effects of thinning favour bark beetle reproduction in freshly dead wood. This suggests that stand thinning may create conditions that encourage bark beetle outbreaks in boreal forests. To address this we implanted live male pine engravers in trees within both stand types. Beetles were less likely to attempt to colonize live trees in thinned stands. Thus at the level of the tree, forest thinning has both positive and negative effects on bark beetle reproduction while at the stand level forest thinning has positive consequences for bark beetles.

Impact of six intensities of forest harvest on rove beetle (Coleoptera: Staphylinidae) communities in Western boreal forests

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In Western Canada, anthropogenic disturbances such as forest harvesting have become a predominant feature that shape biotic communities. Under the coarse filter approach to maintaining biodiversity, habitat features such as vegetation composition and stand structure are managed to sustain ecological communities. Evaluating the success of this approach requires clear understanding of species-specific response patterns to both natural and anthropogenic disturbance events. Here we identify the relative importance of four Western boreal forest cover-type and their interaction with six different levels of forest harvesting on rove beetle (Coleoptera: Staphylinidae) community composition. Rove beetles were collected one-year post harvest at the EMEND (Ecosystem Management Emulating Natural Disturbance) experiment near Dixonville, AB. The four cover-types examined were chosen to represent a successional chronosequence within Western Boreal forests and can be broadly characterized as a shift from deciduous to coniferous overstories. Within each cover-type, 10 ha compartments were harvested leaving, 2%, 10%, 20%, 50%, 75%, and 100% dispersed retention. The 100 experimental compartments were sampled using pitfall traps. Over 15,000 individuals representing 60 species were collected between 5/24/1999 and 7/30/1999. Eleven species showed strong habitat affinity for early successional overstories dominated by *Populus sp*. Both abundance and species richness declined with the relative amount of deciduous trees within the overstory. Only one species, *Mycetoporus americanus,* showed strong affinity for late successional conifer-dominated stands. Significant species responses were observed for all six-levels of forest harvest.

POSTER ABSTRACTS

(In alphabetical order of first author)

The wheat stem sawfly - a nursery tale

Brian L. Beres and J. Robert Byers

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The wheat stem sawfly *Cephus cinctus* Norton (Hymenoptera: Cephidae), has historically been a major pest of spring wheat in the southern prairies and the adjoining parts of the USA. In the 1960's an agreement was reached between colleagues at AAFC Swift Current and AAFC Lethbridge whereby a wheat stem sawfly nursery was established at Lethbridge to assess the levels of resistance to the sawfly in wheat breeding lines. The sawfly population in the nursery remained high until 1992 when a late seeding date was followed by heavy precipitation which destroyed the population. In response to the recent resurgence of the wheat stem sawfly and the subsequent initiation of sawfly projects, efforts have been undertaken to rebuild the population. The first attempt was the importation of live adults from infested fields. In July of 1999 about 10,000 adults were captured at Vulcan, AB with sweep nets, transferred to plastic bags and transported in coolers to the nursery where they were released the same day. However, only low levels of cutting were observed that fall or again in 2000 - obviously the attempt to repopulate had failed. Therefore, another method was tried. In April of 2001 infested wheat stubble containing overwintered larvae was removed from a heavily infested field at Skiff, AB and replanted in the nursery. When the wheat lines, grown in single rows arranged in a randomized complete block design with four replicates, were rated for cutting by sawfly at crop maturity it was apparent that this method of repopulation had been successful. The mean level of cutting was 19% in 2001 and 47% in 2002. The Lethbridge nursery is again a core site for several wheat stem sawfly projects.

Preliminary investigation into developing DNA fingerprints for geographically distinct populations of the mountain pine beetle *Dendroctonus ponderosae* (Coleoptera: Scolytidae)

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The genetic relatedness of twelve populations of mountain pine beetle *(Dendroctonus ponderosae* Hopkins) representing five broadly defined geographic areas was assessed using RAPD-PCR. There was dissimilarity between the populations of *D. ponderosae* although no evidence to suggest the dissimilarity was based on geographic location. There was also no evidence to conclude that the populations were distinctly different. This is not to say that distinguishing genetic characters do not exist.

Effect of cultivar on population dynamics of the wheat stem sawfly *Cephus cinctus* v Norton (Hymenoptera, Cephidae)

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Agriculture and Agri-Food Canada, Research Branch, [1] Lethbridge, AB;
[2] Swift Current, SK

The wheat stem sawfly has historically been a major pest of wheat in the northern Great Plains of North America. Yield losses occur from larval mining inside the pith and subsequent cutting of the stem at maturity. From 1999 to 2002, this insect has caused substantial damage in southern Alberta and Saskatchewan. Our objective was to determine effects of selected wheat cultivars on weights and fecundity of the wheat stem sawfly.

In 2000 the study site was located about 100 km SE of Lethbridge near Skiff. In 2001 we repeated the study at Skiff and obtained samples from Coalhurst, 10 km W of Lethbridge and Swift Current. We collected wheat stubble in the spring to rear adults to assess fecundity and in late summer or early fall to obtain larval weights. Cultivars sampled at each site were currently grown durum (AC Navigator, AC Avonlea, Kyle), solid (AC Abbey, AC Eatonia) and hollow stemmed (AC Barrie, AC Cadillac, AC Intrepid, CDC Teal, Katepwa, McKenzie) hard red spring wheats.

Our study confirmed that AC Abbey and AC Eatonia, two solid-stemmed hard red spring wheat cultivars bred for sawfly resistance, will reduce populations of this pest by reducing larval size and female fecundity. McKenzie, a cultivar with inconsistent pith expression in Alberta, produced variable larval sizes across sites; however, females developed at Skiff and Coalhurst, from this cultivar had low fecundity and similar to those produced by AC Abbey at the same sites. Furthermore, we showed that hollow-stemmed cultivars and durum wheats, such as Kyle, can sustain high levels of cutting and produce large larvae that will develop into very fecund females. These cultivars should be avoided in areas of high sawfly infestation and replaced by solid stemmed varieties.

Canadian winters not cold enough for the cabbage seedpod weevil

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The cabbage seedpod weevil (CSW) (*Ceutorhynchus obstrictus* Marsham), a recent pest introduction in southern Alberta, is a serious pest of canola and may expand its range throughout the canola-production region of western Canada. Climatic factors, such as overwintering conditions, often limit the geographic distribution of several exotic organisms. The objectives of this study were to determine the overwintering habitats of CSW, quantify its field survivorship and cold hardiness in the lab. In southern Alberta weevils overwinter primarily in tree shelters around farm buildings and to a lesser extent in grassy/weedy field margins; very few weevils were collected in emergence cages or pitfall traps placed in alfalfa fields. Pan trap collections at tree shelters showed that weevils fly to these sites from late summer until the end of October. Peak emergence from overwintering sites in the spring took place in mid to late May but a few weevils continued to emerge in June. From 2000 - 2002, 30 - 60 % of weevils survived in microcosms buried at a tree shelter near Lethbridge. Most weevils can be found in the top 5 cm within or just beneath the decomposing leaf litter layer. Temperature probes in this microhabitat showed that weevils seldom experienced temperatures below –5°C. Laboratory assays determined that the supercooling points for CSW are –5 to –7 °C and few weevils survive exposure to –5°C for 8 weeks but will withstand long periods, at least 18 weeks, at + 5°C. Further studies are in progress to determine sublethal temperature effects on the reproductive potential of these weevils. Results from these studies will aid in predicting the potential range expansion of the weevil, forecasting pest outbreaks and developing integrated pest management strategies.

This poster is dedicated to Dr. Reg W. Salt, a Charter Member of the Entomological Society of Alberta who pioneered the research on insect cold hardiness during his career as a Research Scientist at the Lethbridge Research Centre of Agriculture and Agri-Food Canada

Is there a relationship between earthworm populations and selected indices of soil quality?

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The objective of this study was to determine if increased earthworm populations were positively associated with selected indices of soil quality. The field experiment we sampled was established in 1990 as a field bioassay to measure the effects of various indices of soil quality on the growth of cereal crops. In all, 36 soils were deposited onto 5 x 6 m plots in a randomised complete block design with 3 replicates. Each of the main plots was then further split into two fertiliser treatments (added N, and no N) and all plots were cropped to wheat. All the soils were originally developed under grassland and classified as Chernozems (Borolls). We compared earthworm populations and biomass in 11 of the 36 soils (with and without N fertiliser), representing the widest range of variability in terms of soil quality. The results showed that earthworm population and biomass varied significantly with each soil but not with any of the individual soil properties. Therefore, we used principal component analysis to examine the relationship between eight soil quality variables for each soil and earthworm population. Factor 1 was positively correlated with soil moisture and total C, total N, light fraction N, light fraction C, N mineralisation, and C mineralisation. Factor 2 reflected the contrast between inorganic C, LFC, LFN, TC, TN and soil moisture, and Factor 3 was a negative correlation between IC and soil moisture, and a total of 81.6 percent of the variance was explained by Factors 1 and 2. The grouping of the soil quality variables with respect to Factors 1 and 2 was distinct. The carbon and nitrogen analysis pairs grouped, soil moisture grouped with TC and TN, and IC remained separated from the others. A similar pattern of soil grouping was also shown with respect to relationship between PC1 and the total weight and number of earthworms in each soil. There was a linear relationship between PC1 and earthworm weight and abundance when one soil that had a particularly high concentration of inorganic carbon was removed from the data set. Earthworm weight had the tightest relationship with PC1, likely reflecting a positive relationship between earthworm reproductive biology, soil organic matter quality, and soil moisture. Increased inorganic carbon in the soil clearly altered the relationship between soil moisture and soil organic matter dynamics and was associated with reduced earthworm populations. We concluded that it was probably the interrelationship between soil moisture and organic matter properties in the different soils that most influenced earthworm populations. These results further support the argument for considering relationships between soil chemical, physical and biological properties in creating indices of soil health.

Interspecific competition between two phytophagous insects released as weed biocontrol agents

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Knowledge of how biocontrol agents interact with each other is fundamental for an effective biological control program. A gall-fly, *Urophora affinis*, and a seedhead weevil, *Larinus minutus*, are two introduced biocontrol agents released against spotted knapweed, *Centaurea maculosa.* The weevil was recently introduced and is the more desirable of the two agents as it destroys more seeds and, at high densities, will defoliate the plant. Short-term competitive interactions between the two species were assessed using separate and combined releases of both species into enclosure cages. Attack and survivorship rates indicate that the two species compete asymmetrically. The weevil interfered with the fly via direct

larval contact, resulting in lower fly attack rates and reduced survivorship, particularly as fly densities increased. The long-term equilibrium of these two species is uncertain. Based on these studies, however, competition will likely be an important factor for the structure of the seedhead community.

Parasitoids of filth-breeding flies (Diptera: Muscidae) on dairies near Ottawa, Ontario and Hull, Quebec

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A 2-yr. survey on eight dairies near Ottawa, Ontario and Hull, Quebec, identified a parasitoid fauna (Hymenoptera: Braconidae, Ichneumonidae, Pteromalidae) of filth flies (Diptera: Muscidae) more similar to that reported for dairies in New York state than that reported for Alberta and Manitoba. Use of freeze-killed sentinal house fly pupae provided lower estimates of both species diversity and parasitism relative to collections of naturally-occuring pupae. Year 1 of the survey identified all but very rare species in the fauna, but did not accurately predict the relative abundances of species recovered in Year 2. Fifteen species were recovered with more than 60% of individuals in the genus *Spalangia*. The recovery of *S. endius* Walker and *S. nigroaenea* Curtis are the first such reports for Canada.

Initiation of an amateur grasshopper-watching network

Dan L. Johnson

Lethbridge Research Centre, Lethbridge, AB, JohnsonDL>agr.gc.ca; & University of Lethbridge, Lethbridge, AB

After years of watching and learning the species of grasshoppers on the Prairies, I am proposing a network of amateurs, students, naturalists, farmers, ecologists, writers and others to work together to understand the place of species such as these in ecosystems (natural and managed), and to prepare an atlas of grasshoppers. Typically up to 50 species, mainly non-pests, can be found at a given site over the course of a year. So far, a small group of teachers, naturalists, students and others have expressed enthusiasm. Experiences in giving several recent workshops and over a dozen talks in schools have indicated to me that establishment of such a network is likely to be successful.

In some years, such as 2000-2002, species vary dramatically among regions and across the nation, and differ from the patterns of species prevalence in previous years. Various grasshopper species come and go in numbers in response to weather and other environmental variables, such as the presence of natural enemies and preferred food plants. Learning how to tell them apart, seeing how they live, learning their life cycles, and observing regional differences among ecological assemblages will help students, amateur entomologists and other participants to understand biodiversity and some of the linkages in the natural world.

The members of the proposed larger network could play a significant role in developing an atlas on species diversity and changes over time, by providing records, observations and voucher specimens. Participants will experience the unexpected extent of the biodiversity of this example group and their levels of adaptation to the grassland, parkland, montane and forest ecosystems.

I have written three color brochures on the short-horned grasshoppers of grassland (example attached) that can provide introductory training for amateurs, and more guides are coming. I have prepared a

draft handbook on montane and alpine grasshoppers for Parks Canada. Specialists and enthusiasts interested in other families within the Orthoptera have indicated an interest in participating in handbooks of broader scope.

Examples shown are from:

Johnson, D.L. 2001. Band-winged grasshoppers of the Canadian Prairies. Arthropods of Canadian Grasslands 7: 5-12; published by the Biological Survey of Canada, Ottawa.

Johnson, D.L. 2002. Spur-throated grasshoppers of the Canadian Prairies. Arthropods of Canadian Grasslands 8: 16--25; published by the Biological Survey of Canada, Ottawa.

Attempts to introduce *Wolbachia* into uninfected parasitoids via rearing on a *Wolbachia*-infected host: false positives and ultimate failure

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Wolbachia, cytoplasmically inherited parasitic bacteria that affect the reproductive system of many arthropods inducing a variety of fitness consequences including cytoplasmic incompatibility, parthenogenesis, male-killing and feminization. While maternally transmitted, *Wolbachia* are suspected to transmit horizontally between phylogenetically distance arthropods as reported in the associations between parasitic wasps and host flies. We attempted to transfer *Wolbachia* interspecifically to previously uninfected arthropods by rearing *Wolbachia*-free parasitic wasps, *Muscidifurax raptor*, *Muscidifurax zaraptor* and *Muscidifurax raptollerus* on *Wolbachia*-infected horn fly, *Haematobia irritans* (Diptera: Muscidae) for 10 consecutive generations. Based on PCR assay *Wolbachia* was detected in one of the wasps *M. raptor* when tested at generation seven but not in subsequent generations. Reasons for positive *Wolbachia* detection in *M. raptor* but unstable establishment will be discussed.

Influence of antibiotic and heat treatments on progeny production *of Wolbachia*-infected *Urolepis rufipes* (Ashmead) (Hymenoptera: Pteromalidae): implications for host reproduction

George Kyei-Poku, Kevin D. Floate, Berni Benkel and Mark. S. Goettel

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

Wolbachia are a group of cytoplasmically inherited bacteria that induce a variety of reproductive changes in their arthropod hosts. Such changes may include cytoplasmic incompatibility, parthenogenesis, male-killing and feminization. A PCR-based method was used to detect *Wolbachia* in laboratory colonies and field populations of *Urolepis rufipes* (Hymenoptera: Pteromalidae) from southern Alberta. This wasp harbours *Wolbachia* type-A with respect to *Wolbachia ftsZ* A and B genes. Cytoplasmic incompatibility is expressed through embryonic abortion, a male-biased sex ratio and a low hatchability. We eliminated *Wolbachia* infections from *U. rufipes* using both antibiotic and heat treatments. We then compared the effect of *Wolbachia* on the fitness of *U. rufipes* using experimental crosses. We discuss the effect of infections on sex ratios, number of progeny and embryonic abortion and biological control implications of our result.

Insects of the Lethbridge Research Centre

S.M. Little[1] and B. Lee[1]

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

Several scanning electron micrographs will be displayed representing the diversity of insects currently being researched at the Lethbridge Research Centre.

Feasibility of establishing a tri-trophic system in the greenhouse industry: a synergistic approach to utilizaton of pathogenic fungi, parasitoids and predators for control of greenhouse pest insects

J. Litwinowich[1], K. Fry[2], and B. A. Keddie[1]

[1]Dept. of Biological Sciences, University of Alberta, Edmonton, AB T6G 2E3, joshual>ualberta.ca
[2]Alberta Research Council, Bag 4000, Vegreville, AB T9C 1T4

This research project will evaluate the effects of fungal pathogens on predators and parasitoids deployed in an integrated pest management program, for gerbera/poinsettia and tomatoes. We will test the effects of *B. bassiana* on (i) the biocontrol agents of western flower thrips, including predaceous mites, such as *Neoseiulus cucumeris* and predaceous anthocorid bugs, such as *Orius tristicolor*, (ii) the biocontrol agents of greenhouse whitefly, including parasitic wasps, *Encarsia formosa*, and *Eretmocerus* spp., and the predaceous bug *Dicyphus hesperus* and, if time permits, (iii) on several biocontrol agents of aphids, including the parasitic wasps, *Aphidius* spp., *Aphelinus abdominalis,* the larvae of the cecidomyiid fly: *Aphidoletes aphidimyza*; and the predaceous beetle, *Hippodamia convergens*. Small cage studies will be used to examine the interaction of *B. bassiana* in tritrophic systems on pest populations. A variety of parameters will be addressed including survivorship, longevity, and fecundity, of predators and parasitoids exposed to fungi. Other parameters examined may include time spent grooming, searching for prey, and number of prey/hosts utilized.

In vivo and *in vitro* evaluation of *Beauveria bassiana* isolates for greenhouse pest management

S. Rajput[1], K. Fry[2] and B.A. Keddie[1]

[1]Dept. of Biological Sciences, Univ. of Alberta, Edmonton, AB T6G 2E9
[2]Alberta Research Council, Bag 4000, Vegreville AB T9C 1T4

Thrips and whiteflies are two of the world's major pests in the greenhouse ornamental and vegetable industries. In this research project, the viability of *Beauveria bassiana* will be assessed as a control measure in an integrated pest management strategy in greenhouse crops particularly, gerbera (*Gerbera jamesonii*). One objective is to evaluate the efficacy of conidial infection and mycotoxins produced by *Beauveria bassiana* isolated from different host insects against the pest species, western flower thrips, *Frankliniella occidentalis* (Pergande) and silverleaf whitefly, *Bemisia argentifolii*. Whole insects (*in vivo*) and cell lines (*in vitro*) will be used to identify isolate(s) exhibiting significant pathogenicity/virulence. Any isolates identified will be compared to a commercially available isolate, GHA, not yet registered in Canada. We hope to develop a rapid screening process for *Beauveria bassiana* using an *in vitro* system instead of the conventional *in vivo* approach. To meet this objective we will try to establish a western flower thrips cell line; currently we have acquired a whitefly cell line. Mycotoxins from the strains with increased pathogenicity/virulence will be characterised using SDS-PAGE and HPLC techniques. If

appropriate analysis with randomly amplified polymorphic DNA-polymerase chain reaction (RAPD-PCR) techniques will be used to assess the inter- and intrastrain variability of Alberta isolates of *Beauveria bassiana* and possible relationship to infection and mycotoxin production.

A new genus and species of an unknown family from the Rocky Mountains of North America (Diptera, Tabanomorpha)

Zloty, J.[1], B.J. Sinclair[2], and G. Pritchard[1]

[1]Department of Biological Sciences, University of Calgary, 2500 University Dr. NW Calgary, AB, Canada T2N 1N4
[2]Zoologisches Forschungsinstitut und Museum Alexander Koenig, Adenauerallee 160, 53113 Bonn, Germany

Several collections of an aberrant fly larva have previously been made from fast-flowing streams in the northern Rocky Mountains of western North America. These larvae are uniquely defined by two pairs of very long, ventro-lateral, crocheted prolegs on abdominal segments 2-7, and a short, dorsal pair on segments 6-7. The larval head and mouthparts are very similar to those of athericids and tabanids. The mandibular hook has an internal duct, the basal mandibular sclerite is compressed with both condyles coming together and articulating on the tentorial phragma; the mandibular brush is located on a vertical rod; and the salivary pump is greatly enlarged. We have now reared adults from these larvae, and are able to provide descriptions of all stages of this fly. It appears that, apart from being an undescribed species and genus, it is neither athericid nor tabanid as these two families are currently recognized. The adults have a mixture of rhagionid, athericid, pelechorhynchid, and tabanid characters.

The male genitalia have aedeagal tines similar to athericids, tabanids and Bolbomyia Loew, the hypandrium is fused with the gonocoxites, the epandrium is subrectangular, lying flat on the gonocoxites and tergite 10 is present (a mixture of advanced and primitive features). The endoaedeagal process is absent (as in athericids only) and the gonocoxal apodemes are long and slender, an advanced condition shared by athericids and tabanids. The female has a long, extrusible postabdomen and ovipositor, two-segmented cerci, and the basal cercal segment has a prominent postero-ventral lobe, typical of rhagionids and pelecorhynchids. The wing venation, lack of the postmetacoxal bridge, undivided first tergite and lack of the metathoracic post-spiracular scale excludes this taxon from the Athericidae and Tabanidae.

ENTOMOLOGICAL SOCIETY OF ALBERTA - CHARTER MEMBERS - 1952

E.H. Strickland	x	C. W. Farstad	x
R.H. Painter	x	G.A. Hobbs	x
L.A. Jacobson	x	R. W. Salt	*
W.C. McGuffin	x	H. Hurtig	x
Thos. Kilduff	x	Geo. R. Hopping	x
P.E. Blakely	*	Ian S. Lindsay	*
R.F. Shepherd	*	R.W. Stark	x
R.P. Stogryn	*	P.W. Riegert	x
Margaret R. MacKay (Rowland)?		L.K. Peterson	*
Ruby I. Larson	*	C.O.M. Thompson	?
C. E. Lilly	x	N.D. Holmes	x
A.C. Rayner	?	F. Owen	x
D.N. McKay	?	B. Hocking	x
K. R. Depner	x	W.A. Nelson	x
R.V. Beamish	x	W.W. Hopewell	x
Omar Broughton	x	N.S. Church	x
M. D. MacDonald	*	Arthur G. Hewitt	*
D.S. Smith	x	G.E. Swailes	*
Alex M. Harper	*	W.C. Broadfoot	x
Joyce M. Hepburn	?	R.D. McMullen	*
Stanley L.W. Mann	?	C.F. Green	?

x indicates deceased
* " alive
? " status unknown to me (Byers)

Current addresses of those charter members still alive (updated 1 Nov.2002)

Blakeley, Phil E.	2313 11th Ave. S., Lethbridge, AB T1K 0K6	403-327-6657
Harper, Alex M.	1654 Scenic Heights S., Lethbridge, AB T1K 1N5	403-328-1909
Hewitt, Art G.	1423 30th St. S., Lethbridge, AB T1K 2Z3	403-327-2476
Larson, Ruby, I.	410 20 3rd St. S., Lethbridge, AB T1J 4P1	403-327-2089
Lindsay, Ian S.	1707 Mayneview Terrace, North Saanich, BC V8L 4L5	250-656-6380
MacDonald, Mac D.	1733 Ash Grove Rd. S., Lethbridge, AB T1K 3M1	403-327-3829
McMullen, R.D.	1704 Wharf St., R.R. #4, Summerland, BC V0H 1Z0	250-494-8306
Peterson, Lloyd K.	11619 - 46th Ave., Edmonton, AB T6H 0A6	780-434-8904
Salt, Reg W.	108-500 Midpark Way SE Calgary, AB T2X 3S3	403-873-2675
Shepherd, Roy F.	1287 Queensbury Ave., Victoria, BC V8P 2E1	250-385-1019
Stogryn, R.P.	13230 Amble Green Court, White Rock, B.C. V4A 6H1	604-536-4086
Swailes, G. Ed	2011 13th Ave. S., Lethbridge, AB T1K 0S4	403-328-2212

Members attending the organizational meeting, November 27, 1952

Name	Institution
H. Hurtig	D. R. B. Suffield Exp. Stn. Ralston
R. H. Painter	Livestock Insect Lab., Lethbridge
N. D. Holmes	Field Crop Insect Lab., Lethbridge
P. E. Blakeley	Field Crop Insect Lab., Lethbridge
P. W. Riegert	Field Crop Insect Lab., Lethbridge
Ian P. Lindsay	Field Crop Insect Lab., Lethbridge
R. P. Stogryn	Plant Protection, Lethbridge
Margaret R. Mackay	Field Crop Insect Lab., Lethbridge
Ruby I. Larson	Field Crop Insect Lab., Lethbridge
K. R. Depnner	Livestock Insect Lab., Lethbridge
B. Hocking	University of Alberta, Edmonton
W. A. Nelson	Livestock Insect lab., Lethbridge
C. O. M. Thompson	Livestock Insect lab., Lethbridge
Charles E. Lilly	Field Crop Insect Lab., Lethbridge
Lloyd K. Peterson	Field Crop Insect Lab., Lethbridge
Norman S. Church	Field Crop Insect Lab., Lethbridge
L. A. Jacobson	Field Crop Insect Lab., Lethbridge
G. A. Hobbs	Field Crop Insect Lab., Lethbridge
W. C. McGuffin	Forest Zoology Lab., Calgary
Geo. R. Hopping	Forest Zoology Lab., Calgary
R. F. Shepherd	Forest Zoology Lab., Calgary
F. Owen	D. R. B. Suffield Exp. Stn., Ralston
W. W. Hopewell	D. R. B. Suffield Exp. Stn., Ralston
R. W. Stark	Forest Zoology Lab., Calgary
D. N. McKay	D. R. B. Suffield Exp. Stn., Ralston
A. C. Rayner	D. R. B. Suffield Exp. Stn., Ralston
R. V. Beamish	Lethbridge Herald, Lethbridge
E. H. Strickland	University of Alberta, Edmonton
C. W. Farstad	Field Crop Insect Lab., Lethbridge

Pheromone Poem

by Tom Hutchison (read at the 2002 banquet)

Why do I do the things I do?
Because the pheromones tell me to.

Why do I go the way I go?
Because the pheromones draw me so.
Why do I fly the way I fly?
Because the pheromones wafted by.

For fitness I don't need a gym,
Don't need a walk, don't need a swim.
I need to mate, assure my line,
And then eternity will be mine.

A sweet perfume, a promise given,
Leads me to the way I'm driven.
I search the way that it grows stronger,
I can't wait any longer.

It's close, it's near, oh I can tell,
I must , I will pursue the smell.
Alas, it seems I've gone astray,
A pheromone trap is where I lay.

Oh why did I fly the way I flew?
Because the pheromones told me to.

50TH ANNIVERSARY MEMENTOS FOR SALE

Spare mementos from the 50th Annual General Meeting of the ESA (Lethbridge; October 24-26, 2002) are now available for sale! If you registered for the meeting, but did not receive a memento, please contact Troy Danyk to claim your souvenir.

The mementos feature the Society's logo reproduced stunningly as a key chain and lapel pin, both items hand-crafted from solid pewter. If you attended the meeting and wanted both mementos, now is your chance to have the companion souvenir! If you could not make it to the meeting, order your mementos now to have a timeless reminder of this historic event. These eye-catching keepsakes also make excellent gifts for colleagues, students and family members! The cost of the key chain and lapel pin is only Can$8.00 (postage and GST included) each.

Place your order for mementos ASAP-- only a limited number of each are available. For more information and photos of the mementos, go to www.biology.ualberta.ca/courses.hp/esa/memento.htm.

To order, please print on a piece of paper your name, postal and e-mail addresses, and indicate how many of which memento(s) you want (feel free to state a second choice if your first choice is not available). Mail this information and a cheque (payable to the Entomological Society of Alberta) in the amount of the total cost of your order to: Dr. Troy Danyk, Lethbridge Research Centre, Agriculture and Agri-Food Canada, PO Box 3000, 5403 1st Avenue South, Lethbridge, Alberta, Canada, T1J 4B1.

Entomological Society of Alberta
FALL EXECUTIVE MEETING

24 October 2002
Ramada Hotel & Suites, Lethbridge

Present: Carcamo, Erb, Hindmarch, Kanashiro, Longair, Pohl, Sperling, Danyk, and Undershultz.
Regrets: Wilkins, Kirkpatrick

Commenced meeting at 7:00 PM.

Additions to agenda: See items 6.1 – 6.4

1.0 Approval of Agenda

1.1 That the agenda be approved.

Carcamo/Pohl CARRIED

2.0 Approval of minutes for the 2002 spring executive meeting

2.1 That the minutes be approved.

Carcamo/Pohl CARRIED

3.0 Reports

3.1 Financial Report – Trevor Hindmarch

3.1.1 Full report and figures submitted on disk to secretary. See attachments to 2002 AGM Meeting Minutes.

3.1.2 Special thanks to Greg for making it a smooth transition.

3.1.3 Books have been audited.

3.1.4 Need to collect money loaned out for the tick conference.

3.1.5 Trevor will look at short-term investment options for the Society's balance. Will keep $5000 accessible in the account.

3.2 Southern Director Report – Erb

3.2.1 Conference attendance is up (104 for conference, 135 for banquet).

3.2.2 Registered for the conference are 8 charter members, 5 honorary members, 25 students and 22 new members.

3.3 Central Director Report – Longair

3.3.1 Received dollars to start on collection database.

3.3.2 U of C has a limited-term position; it is hoped it will turn into a longer-term position.

3.3.3 Rob is looking for anyone researching nutritional value of insects for humans.

3.4 Northern Director – Sperling

3.4.1 Two positions have recently been filled at the U of A (Mike Cohen and Heather Proctor – both associate professors).

3.4.2 Alberta Lep. Guild Meeting on July 24-27, 2003.

3.4.3 ESA 2003 meeting is underway. Meeting will be held in Athabasca, Oct. 2-4.

3.5 ESC Director Report – Pohl

3.5.1 A fine ESC meeting was held in Winnipeg, Oct. 5 to 9, 2002. Dr. Bob Lamb was presented with the gold medal, and the Criddle award went to Robyn Underwood, an enthusiastic young volunteer who has done much for the ESM's "Youth Encouragement and Public Education" committee. There was no Hewitt award given this year. The theme of the scientific meeting was "Insects and Humans: Confrontation and Coexistence?" As well, Dan Johnson gave a fine heritage lecture on the history of grasshopper outbreaks and control in western Canada. The latter was highly entertaining, and a good preview of some of the historical content lined up for the ESAB meeting.

3.5.2 Several items came up at the ESC governing board meeting which are of interest to ESAB:

3.5.2.1 The ESC would like to send the president or a representative from out of province, to the regional annual meetings, as had been done in the past up until several years ago. We extended an invitation for this meeting, and are delighted to see Dr. Bob Lamb here representing the ESC.

3.5.2.2 Canadian Entomologist and the Bulletin of the ESC are going online. 2003 will be a trial year for Can Ent, where members can choose one or the other format, or both, at no extra cost. For 2004, we will be asked to choose one, or pay extra to receive both versions. The Bulletin will also go online, likely password protected for members only. Details to follow from ESC.

3.5.2.3 The ESC may be willing to provide some money to catalogue and curate the regional societies' archives and libraries. At this point they just want information on what resources we have and the state they are in; I will provide this to the ESC, and keep ESAB informed of updates.

3.5.2.4 As always, the ESC is trying to boost membership. I encourage any ESAB members who are not ESC members, to consider the benefits of membership in the national society.

3.5.2.5 The next ESC meeting will be in Kelowna BC, Nov. 1-5 2003. In 2004 the meeting will be in PEI.

3.5.2.6 The ESC is compiling a collection of digital images, to be made available to members. If any ESC members own images they are willing to donate, please send them to the ESC science policy and education committee chair, Charles Vincent (vincentch>em.agr.ca). The ESC is looking into a blanket "permission to use copyrighted material" which would apply to any federal employees and their work-related images.

3.5.2.7 The ESC makes available a small amount of money to regional societies to foster educational activities. ESAB has not requested any of this money in the past; I will do so on behalf of ESAB in 2003, in discussion with our newly formed education and outreach committee.

3.6 Proceedings Editor Report – Kirkpatrick absent

3.6.1 Thanks to Cara for completing most of work.

3.6.2 Need to be sure next time to get abstracts before the AGM, as it is very difficulty to do it after the conference.

3.7 Webmaster Report – Danyk

3.7.1 During 42 week period homepage had 1602 visits. Use of homepage has increased steadily.

3.7.2 Overall appearance of homepage has remained unchanged.

3.7.3 Service on the U of A Dept. of Biological Sciences server has been good. Thanks again to the Department for hosting the site for free.

3.7.4 No progress on developing a searchable database of abstracts.

3.7.5 With regards to outreach, possibly the site could provide references to existing educational material. Will call at AGM to strike up a Outreach/Education committee consisting of Erb, Kanashiro, Danyk and Pohl.

3.8 That all reports be accepted.

Longair/Erb CARRIED

4.0 Old Business

4.1 Provincial Insect Designation

4.1.1 There was concern in spring that there had been a submission – this in not true.

4.1.2 Need to solicit suggestions, and let this one ride.

4.2 50th Anniversary activities and cost estimates

4.2.1 Will not need the entire $6000 for commemorative trinkets.

4.2.2 Charter member fees and travel grants amounted to $600.

5.0 New Business

5.1 Carr Award

5.1.1 Nomination presented by Pohl, that John and Bertha Carr are getting on and it would be appropriate to honour them while they are still alive.

5.1.2 Nomination presented by Sperling, that John Acorn be considered for his contributions.

5.1.3 That John and Bertha Carr be awarded the Carr award in 2002.

Carcamo/Kanashiro CARRIED

5.2 Undergraduate Awards

5.2.1 Two applications received this year.

5.2.2 Unanimous decision by the awards committee to award Laura Muis.

5.2.3 Next year's submission deadline set for the end of the third week of classes.

5.3 Student Travel Grant

5.3.1 Only one application. $50 travel grant will be awarded to David Shorthouse.

5.3.2 Next year's deadline set for the end of the third week of classes.

5.4 Elections

5.4.1 VP position needs filling.

5.4.2 Treasurer (Hindmarch), Secretary (Undershultz) and S. Director (Erb) will remain in current positions.

5.4.3 Longair will step down as C. Director after over 3 years acting in that position; need to fill position.

5.5 Charter Members/Honorary Members/ Students

5.5.1 Need to highlight the availability of travel grants to get more participation.

5.5.2 That next year, 5 - $100 travel grants travel grants are awarded.

Carcamo/Kanashiro CARRIED

5.5.3 Those charter members attend conferences for free.

Carcamo/Pohl CARRIED

5.5.4 Those honorary members attend conferences at student rates.

Sperling/Kanashiro CARRIED

5.6 2003 Annual General Meeting

5.6.1 Robert Holmberg has been doing a fine job so far making preparations for the meeting.

6.0 Additional Agenda Items

6.1 Accounts

6.1.1 Desire to move account to a more accessible bank throughout AB.

6.1.2 Hindmarch to make decision on where to move the money – Undershultz to co-sign transfer.

6.1.3 Will keep all but $5000 in something like a 1-year term deposit, or in the money market.

6.2 ESA Grants for Public Service

6.2.1 Parks are putting together reference material for education curriculum to be used for field trips. Is there money available from ESA to publish the info for the public?

6.2.2 Project co-ordinator to draft proposal for ESA executive review. May utilize an email vote.

6.3 ESC Grant for Education

6.3.1 2 - $300 grants/year are available for education purposes.

6.3.2 Greg suggests the Education committee go after some of that money in the future.

Meeting adjourned at 10:00 PM.

Entomological Society of Alberta
ANNUAL GENERAL MEETING

26 October 2002
Ramada Hotel & Suites, Lethbridge

Executive Present: Carcamo, Erb, Hindmarch, Kanashiro, Longair, Pohl, Danyk, and Undershultz.
Executive Regrets: Sperling, Wilkins, and Kirkpatrick

1.0 Approval of Agenda

1.1 That the agenda be approved.

Spence/Macaulay CARRIED

2.0 Approval of minutes for the 2001 Annual General Meeting

2.1 That the minutes be approved.

Floate/Spence CARRIED

3.0 Outgoing President's Report - Carcamo

3.1 In 1989 I attended my first entomology meeting in Athabasca and ever since, I look forward with great anticipation to this friendly get together to share our entomological experiences during the year. If someone had mentioned to me back in 1989 that I would have the honour to serve as president of the society during the 50th anniversary year, I would have thought that they had a bit too much to drink at the social. It has been a real privilege and honour to be your president during such an important historical year. The members of the executive all did a wonderful job in running the society while we concentrated on organizing the meeting. I wish to acknowledge the hard work of our new Treasurer Trevor Hindmarch who has the one position that entails a lot of arduous work. Greg Pohl is another member that I wish to thank for his constant mentoring to the rest of us in the executive. Ever since I have been attending these meetings, Greg has been an active servant of the Society and it is thanks to people like him that we can boast about our successes and be confident about our future.

It has been a very enjoyable task to help co-ordinate the organization of the meeting as it gave me a chance to interact more closely with many of my colleagues in Lethbridge. It was a treat to meet our Charter Members. I must confess that I have done rather little real work in organizing the meeting. The hard work was done by other people and there are far too many to name individually but they are listed in the program and to all of them I extend my sincere gratitude. I do want to point out a few people that deserve special thanks because of the enormous effort they have invested. First of all, Stephanie Erb as Local Arrangements Chair, has devoted many, many hours working tirelessly, to ensure everything ran smoothly. Dan Johnson, as Chair of the Scientific Program did a great job promoting the meeting and should be credited for what may be a record number of scientific presentations. Kevin Float and Al Alexander did a superb job running the audio-visual equipment. Joe Shemanchuk and Bob Byers did an excellent job organizing the Heritage Symposium. Rose DeClerck-Floate did a terrific job as MC of the evening program. Derrick Kanashiro took over as interim editor from Cara Fitzpatrick and ensured the Proceeding from 2001 were published and ready for this meeting.

Since this is a historical year for our society I would like to include in my report a bit of a historical reflection and to that end I went back to the Proceedings of our first meeting. In

1953 at the First Annual Meeting held in Calgary, Strickland, in his presidential address, made mention to the disappearance of “true amateur entomologists”, i.e. those that were not formally trained or employed in entomology but contributed to the science. It is of interest that fifty years after the foundation of our society, our local organizing committee decided against having a speaker to review 50 years of amateur entomology in Alberta. We felt that there had not been a great deal of activity in this area with the notable exception of a few well-known individuals such as Berth and John Carr. Does this mean that the society has not done enough to fulfill one of its mandates as set out by Strickland? I would like to think that our society has in fact been very successful at fostering entomology in our province and perhaps the reason we have not had many “true amateur” entomologists is that the majority of people who have developed interest in entomology take advantage of the formal training opportunities available and are successful at turning professional. At this meeting we heard of many examples of how our members have been instrumental in developing and nurturing the budding interests of young entomologists; an excellent example is Ruby Larson’s early entomology club in Lethbridge. More recently, the birth of the Alberta Lepidopterists Guild, with input from some of our members and the contributions of the “King Bugster” himself, our own John Acorn the Nature Nut, will no doubt pay high dividends in inspiring even greater numbers of bright minds to turn to six or eighth legged science.

Our society has more than doubled in membership over the past 50 years and I have no doubt that a bright future lies ahead and our young members who will live to attend the 100th anniversary in 2052 will need a room at least twice the size of the one used this year. Happy 50th to all of us! *Que viva la Entomologia*!

3.2 That the outgoing President’s report be accepted.

Carcamo/Kanashiro CARRIED

4.0 Treasurer Report - Hindmarch

4.1 That the Treasurer’s report be accepted.

Hindmarch/Spence CARRIED

4.2 See attached financial report and financial statements.

5.0 Webmaster Report - Danyk

5.1 That the Webmaster’s report be accepted.

Danyk/Erb CARRIED

5.2 See attached webmaster report.

6.0 ESC Director Report - Pohl

6.1 That the ESC Director’s Report be accepted.

Pohl/Dosdall CARRIED

6.2 See attached ESC director report.

7.0 50th Anniversary Meeting Summary - Erb

7.1 112 people registered for the conference, and 132 attended the banquet.

7.2 26 students registered for the conference.

7.3 12 new members this year.

7.4 28 papers presented, 5 heritage talks, 15 posters, 4 photo displays and 1 video.

7.5 Thanks to all!

8.0 2003 Annual General Meeting – Robert Holmberg

8.1 Scheduled for October 2-4 in Athabasca.

8.2 Theme of the meeting will be educating the public in entomology.

8.3 Robert is looking for info from past organizers, such as the logo and checklist etc.

9.0 Education Committee - Danyk

9.1 An education committee has been formed to encourage entomology at a multi-grade level.

9.2 Committee will provide links to information sources for educational activities/ideas/resources related to entomology.

9.3 Initial committee members are Troy Danyk, Derek Kanashiro, Stephanie Erb and Elsa Cade.

9.4 All known information sources and suggestions are welcome.

10.0 Elections - Kanashiro

10.1 No other nominations were made for the vacant positions.

10.2 The proposed candidates for the 3 vacant positions are:

Editor: Andrea Kalischuk
Central Director: Zoe Lindo
Vice President: Heather Proctor

10.3 That the members accept the candidates.

Kanashiro/Undershultz CARRIED

11.0 Resolutions Committee - Kevin Floate and Doug Colwell

11.1 WHEREAS the 50th Annual Meeting of the Entomological Society of Alberta was an overwhelming success, and
WHEREAS the success of this meeting can be attributed to the diligent efforts of the organizing committee and meeting volunteers, and to the accommodating and friendly staff of the Ramada Hotel and Suites, and
WHEREAS the meeting success was further enhanced by an excellent banquet and the very entertaining and informative after-dinner presentation by Bill and Elsa Cade,

BE IT RESOLVED that the Secretary of the ESA write letters of appreciation and thanks to the members of the organizing committee c/o Hector Carcamo, Chair of the Organizing

Committee, to Jackie Nelson, manager of the Ramada Hotel and Suites, and to the Cades.

BE IT FURTHER RESOLVED that a round of applause be given to Dan Johnson for his efforts in obtaining and providing abstracts of presentations to meeting attendees before the actual presentation and that this practice be continued in future meetings.

11.2 That the resolutions be accepted.

Floate/Kanashiro CARRIED

12.0 That the 2002 Annual General Meeting be adjourned.

Carcamo/Longair CARRIED

ANNUAL REPORT OF THE WEBMASTER

I am pleased to report that the homepage of the ESA is used frequently, and appears to be a helpful resource for members and others. During the 42-week period starting December 31, 2001 and ending October 20, 2002, the homepage received 1,602 visits (mean = 38.1 hits/week, SE = 2.9). Use of the homepage has increased steadily since its inception in 2000. The mean number of visits per week increased by 36% from 2000 to 2001 and by 45% from 2001 to 2002. I expect that the use of the homepage will expand once planned additions are activated.

The overall appearance of the homepage remained largely unchanged since the 2001 AGM. The revisions that were made concerned updating the information in a number of pages.

The quality of service we received from the server in the Department of Biological Sciences at the University of Alberta is excellent, and the Department should be thanked again for hosting our homepage free of charge. In October 2002, my access to the server was interrupted briefly and this delayed the posting of undated information concerning the 2002 AGM. However, access was restored soon after the problem was brought to the attention of the person responsible for maintenance of the server.

No progress has been made concerning the searchable database of abstracts form past ESA meetings because of time constraints and an expected low to negligible benefit to cost ratio. As a result, I do not anticipate that I will devote any time to this project unless there is a significant expression of desire from the members to see it completed.

Suggestions for improvement of the homepage are always welcome, and I encourage members to pass along to me their comments.

Troy Danyk
ESA Webmaster
October 24, 2002

Entomological Society of Alberta

ANNUAL FINANCIAL REPORT - OCTOBER 24, 2002

1. Thank You
A very special thank you to Greg Pohl, the former treasurer of the society, for his continued support in the transition to the new treasurer, Trevor Hindmarch.

2. Spring Executive Meeting
Letter from executive committee authorizing transfer of signing authority from Greg Pohl to Trevor Hindmarch

3. Transition
Traveled to Edmonton on September 15, 2002 to transfer signing authority.

4. Current Bank Balance
As of October 1, 2002, our accounts are as follows:

Account	Amount
Chequing	20,224.71
Common Shares	254.67
Investments	5,000.00
TOTAL	25,479.38

Executive agreed to spend up to $6,000 for the 50th Annual General Meeting. Disbursements for the Annual General Meeting will be made in the near future.

5. Membership

Account	Amount
Honourary	7
Regular	105
Student	28
Paid Library	4
Unpaid Library	20
TOTAL	164

This is the largest the society has ever been!

6. 2001 Financial Statement from Annual General Meeting
See below

7. 2001 Financial Statement
See below

8. 2001 Finances
The 2001 finances were audited, and determined to be accurate, by Che Elkin and Colleen Simpson, student members from the University of Calgary.

Respectfully submitted,
Trevor Hindmarch, Treasurer

2001 Financial Statement from Annual General Meeting

Revenue

Registration		$$	Number	Total
	Regular	x100	28	$2,800.00
	Student	x35	16	$560.00
	Extra banquet tickets	x30	4	$120.00
	Other	Half-day admission		$50.00
	Subtotal			$3,530.00
Sponsorships				
	Alberta Research Council			$250.00
	Westgro			$750.00
	Dow Agro			$500.00
	Subtotal			$1,500.00
Total				$5,030.00

Expenditures

Meals and room rental		
	Thursday Social	$705.27
	Friday breakfast and coffee	$776.04
	Friday banquet and wine	$1,592.32
	Saturday breakfast	$515.18
	Subtotal	$3,588.81
Invited Speaker costs		
	Hotel room	$221.76
	Transportation	$13.00
	Flight	$193.67
	Subtotal	$428.43
Miscellaneous		
	Dinner speaker gratuity	$100.00
	Stationery	$7.35
	Subtotal	$107.35
Total		$4,124.59

Net gain (loss): **$905.41**

2001 Financial Statement

OPENING BALANCE (Jan. 1, 2001):	
chequing acount	1,007.05
term deposit #2 - 4 yrs. at 5.4% (matures Aug. 16, 2004)	5,000.00
term deposit #5 - 30 day autorenewing, floating %	1,141.39
term deposit #7 - 1yr autorenewing, 3.95%	16,376.36
credit union shares	213.70
total opening bank balance	23,738.50
opening cash on hand	56.94
total opening assets	**23,795.44**

CREDITS	
membership dues	790.50
2001 meeting revenues	5,030.00
term deposit interest	1,106.08
bank dividends	40.97
total credits	**6,967.55**

DEBITS	
bank service charges	16.20
student travel grants	50.00
undergrad award	500.00
2001 meeting expenses	4,124.59
postage and courier	27.40
loan to U of A for TTP4	1,000.00
exec meeting travel	220.02
total debits	**5,938.21**

CLOSING BALANCE (Dec. 31, 2001):	
chequing acount	2,955.40
term deposit #2 - 4 yrs. at 5.4% (matures Aug. 16, 2004)	5,000.00
term deposit #7 - 1 yr at 3.2% (matures 25 June 2002)	17,195.17
credit union shares	254.67
total closing bank balance	25,405.24
closing cash on hand	19.54
total closing assets	**25,424.78**

BALANCE SHEET:	
total opening assets	23,795.44
total credits	6,967.55
total debits	5,938.21
closing balance	**24,824.78**
outstanding payables (see below)	***600.00***
outstanding loan to TTP4	***1,000.00***

NOTES:

1. A $100 dinner speaker honorarium was not cashed until 2002.
2. The undergrad award to A. Row remains undeposited as of March 31, 2002.

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Updated April 2003

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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."