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D. Vanderwel
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New Manitoba Records Of Coleoptera

Darren A. Pollock
Department of Entomology
University of Manitoba
Winnipeg, MB R3T 2N2

INTRODUCTION

Bousquet (1991) published a checklist of the beetles of Canada and Alaska. For each species, the distribution is given for each province/territory and also for Alaska. Pollock (1996) published a list of species of Melandryidae not included by LeSage (1991) in the Bousquet checklist. Since then, additional species of various families of beetle have been found in Manitoba, not previously recorded from the province. Many of these represent recent collections by the author, while others have been in collections for many years and simply not recorded previously. These new records are listed below, in the order presented in Bousquet (1991), with associated collection localities, dates of collection, and the context in which the specimens were collected (if known). Also, for each species, the previously documented range is given using standardized, 2-letter postal abbreviations, as given in Bousquet (1991). In the list that follows, the locality "Aweme" is used to denote the original Criddle homestead, located approximately 8 km N. Treesbank.

COLLECTIONS EXAMINED

Specimens were examined from and/or deposited into the following collections, indicated in the text by these acronyms: **DAPC**, Darren Pollock collection, Winnipeg; **JBWM**, J.B. Wallis Museum of Entomology, Department of Entomology, University of Manitoba, Winnipeg, MB; **NOFC**, Northern Forestry Centre, Edmonton, AB

New Manitoba Records

CARABIDAE (Lebiini)

Axinopalpus biplagiatus (Dejean) — Locality: Winnipeg, University of Manitoba campus, 31.vii.1998, from Berlese funnel sample of grassy litter from around building, D.A. & C.G. Pollock (1, DAPC). Previously known Canadian distribution: BC, AB, SK, ON, PQ.

LYMEXYLIDAE (Hylecoetinae)

Hylecoetus lugubris Say — Locality: Birds Hill Provincial Park, near East Beach, 16.v.1999, collected during daytime crawling on large, dead *Populus* log, D.A. Pollock (3, DAPC; 2, JBWM); same locality, 23.v.1999, dug out of sapwood of large, dead *Populus* log, D.A. Pollock (25, DAPC). Previously known Canadian distribution: AB, ON, PQ, NB, NS, NF.

SPHINDIDAE

Sphindus americanus LeConte — Locality: Winnipeg, University of Manitoba campus, forest along Red River, nr. apiary, suction trap, R.E. Roughley, on the following dates: 17-24.vi.1991 (7, JBWM), 8-15.vii.1991 (1, JBWM); 6-12.viii.1991 (2, JBWM). Previously known Canadian distribution: BC, AB, ON, PQ.

Sphindus trinifer Casey — Locality: Sandilands Provincial Forest, 17 km N. Woodridge on Prov. Rd. 210, 21-28.vi.1987, flight intercept trap, R.E. Roughley (1, JBWM); Winnipeg, University of Manitoba campus, forest along Red River, nr. apiary, suction trap, R.E. Roughley, on the following dates: 7-10.v.1985 (1, JBWM); 15-22.vii.1991 (2, JBWM). Previously known Canadian distribution: ON, PQ.

Eurysphindus hirtus LeConte — This species was not listed from Manitoba in Bousquet (1991), but was recorded from Aweme, 20.vii.1917, by McHugh (1993). It has been recollected recently, in the following localities: Aweme, 6-13.vii.1999, Malaise trap, D.A. Pollock (4, DAPC); Sandilands Prov. Forest, 17 km N. Woodridge on Prov. Rd. 210, 26.vii-2.viii.1987, flight intercept trap (1, JBWM); Winnipeg, University of Manitoba campus, forest along Red River, nr. apiary, 15-

22.vii.1991, suction trap, R.E. Roughley (1, JBWM). Previously known Canadian distribution: ON, PQ.

Odontosphindus denticollis LeConte — Locality: Aweme, 6-13.vii.1999, Malaise trap, D.A. Pollock (1, DAPC). Previously known Canadian distribution: ON, PQ.

EROTYLIDAE (Tritominae)

Ischyrus quadripunctatus quadripunctatus (Olivier) — Locality: Winnipeg, University of Manitoba campus, along Red River, 13.viii.1998, collected on thin white fungus on stump of *Acer negundo*, D.A. Pollock (3, DAPC); same locality, 19-20.vii.1999, D.A. Pollock (25, DAPC). Previously known Canadian distribution: ON, PQ.

Tritoma pulchra Say — Locality: Aweme, 6-13.vii.1999, Malaise trap, D.A. Pollock (3, DAPC); Bissett, 17.vii.1999, collected at night on fungus on log (3, DAPC); Sandilands Provincial Forest, 17 km N Woodridge on Prov. Rd. 210, 12-19.vii.1987, flight intercept trap, R.E. Roughley (2, JBWM). Previously known Canadian distribution: ON, PQ, NS.

TETRATOMIDAE (Tetratominae)

Tetratoma concolor LeConte — Locality: Cranberry Portage, 17.viii.1967, associated with *Pinus banksiana* (5, NOFC). Previously known Canadian distribution: YK, BC, AB, SK.

TETRATOMIDAE (Penthinae)

Penthe obliquata (Fabricius) — Locality: Denbeigh Point (Lake Winnipegosis), 16-17.v.1998, coll. at night in fungus on stump, D.A. Pollock (4, DAPC); Fisher Branch, 20.v.1951, C.F. Barrett (1, NOFC); Whiteshell Provincial Park, 23.vii.1997, C. Wytrykush, blacklight trap (1, JBWM). Previously known Canadian distribution: ON, PQ.

Penthe pimelia (Fabricius) — Locality: Whiteshell Provincial Park, 9.vii.1997, blacklight trap, C. Wytrykush (1, JBWM); Nopoming Provincial Park, Bird Lake, 3.vii.1997, blacklight trap, C. Wytrykush (1, JBWM). Previously known Canadian distribution: ON, PQ, NB.

MELANDRYIDAE (Hallomeninae)

Hallomenus debilis LeConte — Locality: Winnipeg, University of Manitoba campus, along Red River, 31.viii.1999, collected on thin white fungus on dead logs and stumps, D.A. Pollock (20, DAPC). Previously known Canadian distribution: PQ.

Hallomenus punctulatus LeConte — Locality: Winnipeg, Kings Park, 3.viii.1998, collected at night on fungus encrusted piece of lumber, D.A. Pollock (2, DAPC). Previously known Canadian distribution: BC, ON, PQ.

MELANDRYIDAE (Eustrophinae)

Eustrophinus bicolor (Fabricius) — Locality: Winnipeg, Kings Park, 13.viii.1998, sitting on piece of cut wood at night, D.A. Pollock (1, DAPC); Winnipeg, University of Manitoba campus, forest along Red River, 19-20.vii.1999, at night on white fungus on dead logs, D.A. Pollock (5, DAPC). Previously known Canadian distribution: ON, PQ.

Eustrophus tomentosus Say — Locality: Winnipeg, University of Manitoba campus, 5-8.vii.1985, ex suction trap along Red River, D.A. Pollock (1, DAPC). Previously known Canadian distribution: BC, ON, PQ.

RHIPIPHORIDAE (Pelecotominae)

Pelecotoma flavipes (Melsheimer): Aweme, 26.vii.1916, E. Criddle (4, JBWM); Aweme 25.vii.1924, N. Criddle (1, JBWM); Bissett, 10.vii.1999, beating live foliage of *Alnus*, D.A. and C.G. Pollock (1, DAPC); Douglas Lake, 20.viii.1924, E. Criddle (1, JBWM). Previously known Canadian distribution: ON, PQ.

COLYDIIDAE (Colydiinae)

Synchita fuliginosa Melsheimer — Locality: Winnipeg, University of Manitoba campus, 28.vi-5.vii.1999, collected in UV light trap in riverine forest (*Acer*, *Tilia*, *Ulmus*, *Fraxinus*), D.A. Pollock (1, DAPC). Previously known Canadian distribution: ON, PQ.

TENEBRIONIDAE (Coelometopinae)

Strongylium tenuicolle (Say) — Locality: Treesbank, vii.1923, T. Criddle (1, JBWM); Winnipeg, University of Manitoba campus, forest along red river, nr. apiary, 12-16.vii.1999, uv light trap, D.A. Pollock (1, DAPC); same locality, 16-19.vii.1999, D.A. Pollock (1, DAPC). Previously known Canadian distrubution: ON, PQ.

ADERIDAE

Aderus populneus (Panzer) — Locality: Winnipeg, University of Manitoba campus, 28.vi-5.vii.1999, collected in UV light trap in riverine forest (*Acer*, *Tilia*, *Ulmus*, *Fraxinus*), D.A. Pollock (1, DAPC). Previously known Canadian distribution: BC, ON, PQ.

CERAMBYCIDAE (Cerambycinae)

Sarosesthes fulminans (Fabricius) — Locality: Winnipeg, Kings Park, 8-9.vii.1998, collected at night on dead oak tree, D.A. Pollock (2, JBWM; 8, DAPC). Previously known Canadian distribution: ON, PQ.

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Scientific Program Abstracts for the 1998 Annual Meeting of the Entomological Society of Manitoba

October 16–17, 1998
Freshwater Institute
Winnipeg, Manitoba

Keynote Address

BOTANICAL INSECTICIDES AND ANTIFEEDANTS -- POTENTIAL AS REDUCED-RISK CROP PROTECTION AGENTS. Murray B. Isman, Faculty of Agricultural Sciences, University of British Columbia, Vancouver, BC V6T 1Z4

The commercial development of insecticides based on seed kernel extracts of the Indian neem tree, *Azadirachta indica* (Meliaceae), created renewed interest in the discovery, development and use of botanical insecticides. The active principle in neem, the limonoid azadirachtin, has pronounced behavioural (antifeedant, oviposition deterrent?) and physiological (endocrine disruption) effects on a wide range of pest insects, but is generally soft on non-target organisms (nastural enemies, pollinators, wildlife) and safe to humans. In spite of these attributes though, it has yet to receive regulatory approval in Canada. At this point, the only botanicals approved for use in Canada are the traditional products pyrethrum and rotenone. However, their lack of residual action in the field, modest efficacy

and potential non-target effects (especially in the case of rotenone) ostensibly limit their use to organic food production.

A number of botanical preparations with potential for use as crop protectants will be reviewed. For the most part, moving these products into the marketplace will be challenging. Problems facing development of new botanical pesticides include (1) reliable and sustainable sourcing of the natural product, (2) standardization of chemically complex mixtures, and (3) regulatory approval of unique materials. In this light, recent efforts aimed at a development of insecticidds based on plant essential oils will be discussed.

The discovery (30 years ago) of the potent antifeedant effect of azadirachtin on the desert locust heralded the concept of antifeedants as "non-toxic" crop protectants. Unfortunately, there are specific problems with antifeedants (interspecific differences in susceptibility among pests, potential for desensitization) that likely mitigate their efficacy in "real-world" situations and will greatly limit their practical use. While most botanical preparations potentially useful for crop protection are environmentally non-persistent and relatively safe to users and consumers, their efficacy falls well short of contemporary conventional insecticides such as pyrethroids and neonicotinoids. On the other hand, growers are increasingly open to the concept of alternative pest management agents, including botanicals, and the arsenal of conventional products is diminishing. In the near future, botanicals (and possibly certain antifeedants) will find increasing use in organic and transitional food production in urban pest management, and in other contexts where a premium is placed on environmental and human safety.

Submitted Papers

THE EFFECTS OF TEMPERATURE AND SOIL MEDIA ON THE OVERWINTERING SURVIVAL OF THE ORANGE WHEAT BLOSSOM MIDGE. Ian L. Wise and Robert J. Lamb, Cereal Research Centre, Agriculture and AgriFood Canada, Winnipeg, Manitoba R3T 2M9.

The orange wheat blossom midge, *Sitodiplosis mosellana,* is a pest of spring wheat in all wheat growing areas of Manitoba. While midge populations historically have been most abundant in the clay based soils of the northern and eastern areas, the insect has recently become more common in the more sandier soils of the southwest areas of the province. Wheat midge larvae

overwinter in the soil at depths of 1 - 10 cm, where mean monthly temperatures in most areas range from -4.0 C to - 5.5 C during the coldest months of January and February and these soils on average remain frozen from November to early April (~135 to 150 days). Wheat midge larvae that were overwintered in clay loam, loam or very fine sandy soils at temperatures above -5 C were found to have a higher survival than larvae overwintered in vermiculite or activated clay. The survival of larvae in soil was not affected by exposure to -5 C for 160 days or to -10 C for 120 days. Parasitized larvae were more varied in their survival than unparasitized larvae, particularly for exposures to -10 C. The implications of the differences in survival for unparasitized and parasitized larvae on midge damage to wheat are discussed.

INDUCED PRODUCTION OF PHENOLOIC ACIDS: A RESISTANCE MECHANISM IN WHEAT AGAINST WHEAT MIDGE, *Sitodiplosis mosellana*. H. Ding, R. Lamb, and N. Ames, Cereal Research Centre, Agriculture & Agri-Food Canada, 195 Dafoe Road, Winnipeg, Manitoba, R3T 2M9.

Spring wheat lines with resistance to wheat midge have been developed. The resistance prevents larvae from growing on wheat seeds, but the physical or chemical basis of resistance is not known. To investigate a possible biochemical mechanism for resistance, the dynamics of phenolic acids were studied in developing wheat seeds resistant or susceptible to wheat midge. Wheat plants at the heading stage were exposed to wheat midge adults in the laboratory and dissected at intervals after anthesis to determine the number and stage of development of larvae. Phenolic acids in the seeds were extracted and then quantified by HPLC. Rapid induction of certain phenolic acids was associated with antibiotic resistance to wheat midge larvae. Susceptible wheat produced the same phenolic acids at a later growth stage, which also inhibited development of larvae, but not until it was too late to prevent seed damage and allow the larvae to complete development. The pattern of induction of the phenolic acids was confirmed in naturally infested wheat in the field. The evidence that induced production of phenolic acids is the mechanism of resistance is discussed.

SUSCEPTIBILITY OF CANADIAN SPRING WHEATS TO CEREAL APHIDS. S.M. Migui, Department of Entomology, University of Manitoba, Winnipeg, Manitoba R3T 2N2; and R.J. Lamb, Cereal Research Centre, 195 Dafoe Rd., Winnipeg, Manitoba R3T 2M9.

Each year, cereal aphids attack wheat in Canada and sometimes cause serious yield losses. Reliance on insecticides as the major method of control raises concerns about residues in the grain and contamination of the environment. Utilization of plant resistance for aphid management in wheat is desirable and the first step is to determine the level of interactions between wheat and aphids. The objective of this study was to determine baseline susceptibility of three Canadian spring wheats, i.e. Hard Red Spring, Canadian Prairie Spring and durum to three common cereal aphids in Manitoba, *Rhopalosiphum padi*, *Schizaphis graminum* and *Sitobion avenae*. A known biomass of aphids of each species were artificially infested on wheat in sleeve cages (single plants) and in 1X1 m cages (multiple plants) at boot stage in the field (one aphid species/cage, replicated 4-8 times). After feeding for three weeks, half of the replicates were taken down for assessment of aphid biomass gain and plant biomass loss. The other half was sprayed with an insecticide and the plants allowed to reach maturity for yield assessment. Results from 1996 and 1997 experiments show that all three aphid species caused significant yield losses in wheat ($P>0.05$). *Schizaphis graminum* and *Si. avenae* caused the highest yield reduction and there was no significant difference between the two species. Results from this study suggest that the three wheat types are about equally susceptible to aphids and *Sc. graminum* and *Si. avenae* may be the most damaging aphid pests of wheat in Manitoba.

EVALUATION OF AN INTEGRATED MANAGEMENT APPROACH FOR THE CONTROL OF PURPLE LOOSESTRIFE: BIOLOGICAL CONTROL AGENTS AND HERBICIDES. D. C. Henne[1], T.S. Gabor[2], C.J. Lindgren[3], R.E. Roughley[1], and H.R. Murkin.[2] [1] Department of Entomology, University of Manitoba, Winnipeg, Manitoba R3T 2N2. [2] Institute for Wetland and Waterfowl Research, Oak Hammock Marsh, Stonewall P.O. Box 1160, Stonewall, Manitoba. [3] Manitoba Purple Loosestrife Project, Stonewall P.O. Box 1160, Stonewall, Manitoba.

Purple loosestrife, *Lythrum salicaria* L., is an invasive emergent perennial dicot that forms large monotypic stands, primarily in wetlands. Herbicides such as glyphosate have traditionally been utilized to manage purple loosestrife infestations. However, repeated applications are necessary to prevent re-establishment from the soil seed bank. The use of herbicides together with the introduced biological control insect, *Galerucella calmariensis* (L.) (Coleoptera: Chrysomelidae), may potentially expedite purple loosestrife management efforts. This can be accomplished if the biocontrol agents can successfully manage loosestrife re-establishment without further herbicide applications. The herbicides that were evaluated were applied in 1996: the broad-spectrum glyphosate and the dicot-specific triclopyr amine. The biological control agents were released in 1997.

Field experiments have been conducted inside large cages in an established stand of purple loosestrife in the Netley-Libau marsh area of southern Manitoba. This was done to determine the effectiveness of single techniques (herbicides or beetles alone), and combinations of techniques (herbicides and beetles together), and an untreated control. Preliminary results from 1996 through 1998 suggest that using beetles alone and integrated with herbicides was effective in suppressing stem heights and flower development in existing and reestablishing purple loosestrife. Purple loosestrife reestablished by 1998 in the herbicide alone treatments. Other findings from 1996 to 1998 will be presented.

THE EFFICACY OF *BEAUVERIA BASSIANA* AGAINST THE FLEA BEETLE, *PHYLLOTRETA CRUCIFERAE* ON CANOLA. Denise L. Olson and Donald Cary, Department of Entomology, North Dakota State University, Fargo ND 58105.

The flea beetle, *Phyllotreta cruciferae* is the most destructive insect pest on canola grown in North Dakota. Overwintering populations of the crucifer flea beetle emerge during early spring and feed on the cotyledons of the canola plant, reducing seed quality and yield. An at-planting insecticide is necessary to prevent damage by the flea beetle. The purpose of this research was to determine if an entomopathogenic fungi could be used to reduce the reliance on preventative insecticides for flea beetle management. The efficacy of direct sprays and residues of the entomopathogenic fungi *Beauveria bassiana* were determined against *P. cruciferae* on canola in a laboratory study. Canola plants, in the 4 leaf stage, were treated with Naturalis® -L (0,

8.9, 15.9, or 29.6 ml/liter [*Beauveria bassiana,* JW-1, 2.3×10^7 viable spores per milliliter of product]) or Mycotrol™ ES (0.72, 1.45, or 2.91 ml/liter [*Beauveria bassiana,* strain GHA, 2×10^{10} viable spores per gram of product]). Adult flea beetles were exposed to the treated plants at 0, 24, 36, or 48 hr post applications for a duration of 7 d. Individual beetles were placed on moistened filter paper, inserted in a 2 dram vial, and placed in an environmental chamber to be observed for fungal mummification at 7 d. *Beauveria bassiana*, when used alone, may not be an effective tool against *P. cruciferae*. Fungal mummification ranged from 3-30% when the beetles were exposed to wet sprays or residues of either *Beauveria* formulation. No significant differences occurred among the treatment combinations.

SUNFLOWER MIDGE: HELP WANTED OR CURRENT STATE OF KNOWLEDGE. Gary J. Brewer, Department of Entomology, North Dakota State University, Fargo, North Dakota 58105 USA.

In recent years, sunflower production in the northern Great Plains region of North Dakota, South Dakota, Minnesota, and Manitoba has been plagued by a resurgent population of the sunflower midge, *Contarinia schulzi* Gagné. Traditionally, damage from the midge has been restricted to areas in and near the Red River Valley but for the last several years infestations have been more widespread. Reports of moderate to occasionally severe midge were widespread in 1995 and 1996 in the tri-state region of North Dakota, South Dakota, and Minnesota. In 1997, a severe outbreak of the sunflower midge occurred in east-central North Dakota. In 1998, heavy damage occurred in southern Manitoba. The larvae cause altered growth of sunflower heads that can result in few if any seeds or in severe cases, death of the floral bud. Sunflower midge emergence begins in late June to early July and although some data is available, the exact conditions for emergence are not known,. Sunflower midge are day fliers but other requirements for flight are unknown. Current control recommendations are designed to reduce midge infestation and damage. They include recommendations to use tolerant hybrids, stagger planting dates, plant away from areas damaged the previous season, and to not abandon the crop too early. Rescue treatments are not available. Projects to better understand midge biology and adult emergence, biological control, host-plant resistance, insecticide screening and treatment methodology, and cost/benefit ratios for midge treatment offer the greatest potential for successfully managing this cryptic pest.

HONEY BEES AS VECTORS OF *Bacillus thuringiensis* FOR CONTROL OF BANDED SUNFLOWER MOTH (LEPIDOPTERA: COCHYLIDAE). Jawahar L. J yoti and Gary J. Brewer, Department of Entomology, North Dakota State University, Fargo, ND 58105

A study was conducted in 1996 and 1997 to determine if honey bees, *Apis mellifera* L., could vector *Bacillus thuringiensis* Berliner var. *kurstaki* from hives equipped with a pathogen applicator to sunflower capitula and if the amount of *B. thuringiensis* deposited on capitula would be sufficient to control the banded sunflower moth, *Cochylis hospes* Walsingham. The study demonstrated that honey bees did become contaminated with *B. thuringiensis* as they exited hives equipped with filled pathogen applicators and deposited enough *B. thuringiensis* on the capitula to cause banded sunflower moth larval mortality. When two methods of applying *B. thuringiensis* were compared, the honey bee vectoring method gave better or equivalent control of the banded sunflower moth larvae than manual sprays, resulting in higher seed yields than manual sprays. The presence of honey bees also boosted seed set which contributed to increased yield.

PEST MANAGEMENT OF THE WHEAT MIDGE IN NORTH DAKOTA. Janet Knodel, North Central Research Extension Center, 5600 Highway 83 South, Minot, ND 58701; Phillip Glogoza, NDSU, Entomology Department, Fargo, ND 58105; and Michael Weiss, PSES Department, University of Idaho, Moscow, ID 83844.

The orange wheat blossom midge (Diptera: Cecidomyiidae: *Sitodiplosis mosellana*) is one of the economically important insect pests of wheat grown in the prairie states. Soil surveys are conducted after harvest to determine the relative population of midge present in an area and the relative risk factor for growing wheat next year. During the growing season, a degree day model is used as a guide for planting and a predictive tool for wheat midge emergence. A larval survey of wheat heads indicated that the timing of the crop development to midge emergence is important in predicting the level of infestation. Crops planted between the 200-600 DD period were more susceptible to wheat midge infestation than crops planted early (before 200 DD) or late (after 600 DD). The previous crop grown did not affect the level of infestation, as might be expected, due to the flight movements of adult

midge. Additional surveys will help us understand the how to better manage the wheat midge, and what other factors like dewpoint may affect local wheat midge populations. Educational outreach was an important factor in getting wheat midge flight information out to the growers.

USING GIS TO REFINE SCOUTING EFFORT. Ian V. MacRae, Department of Entomology, University of Minnesota, St. Paul, MN. 55108.

Geographic Information Systems (GIS) offer the potential to examine and evaluate historical population patterns over large areas. Environmental conditions which influence population dynamics can also be addressed. This may offer benefits in predicting regional pest populations. These tools have been used to examine the population dynamics of a variety of forest insect pests and recently have also been directed towards describing grasshopper outbreaks in Wyoming. The author will review similar investigations of historic grasshopper populations in Colorado and discuss how GIS is being used to evaluate the influence of soil moisture on sugarbeet root maggot development.

THE WING COUPLING MECHANISM IN HETEROPTERA. Paul P. Tinerella and D.A. Rider, Department of Entomology, North Dakota State University; 202 Hultz Hall, University Station, Fargo, ND 58105.

Results of an ongoing investigation of the heteropterous wing coupling device are reported. Utilizing scanning electron microscopy, the presence and morphology of this device is being assessed. This initial order-wide survey, with special emphasis among the infraorders has revealed distinct differences in the bauplan of the apparatus. Discussed is the basic morphology of the device, its function as inferred from its structure, and the implications of the presence of such a device within the order. Future studies will address the differences among heteropterous taxa for its possible use as an aid in taxonomic studies, as well as for phylogenetic reconstructions.

SPECIES DIVERSITY OF CARABID BEETLES IN FORESTS AFFECTED BY SPRUCE BUDWORM MANAGEMENT. Carla M. Wytrykush and N. J. Holliday, Department of Entomology, University of Manitoba, Winnipeg, Manitoba R3T 2N2.

The eastern spruce budworm, *Choristoneura fumiferana* (Clem.) is an important forest pest, which often kills the majority of host trees in a stand. In Manitoba, two alternative management techniques are employed: (i)spray stands to protect the foliage, and (ii)no protection measures. This study was conducted to determine the long term effect of spruce budworm management on the species diversity of carabid beetles in the Manitoba boreal forest. Pitfall traps were used to collect carabid beetles in 13 one hectare plots in Eastern Manitoba during the summers of 1996 and 1997. There were ten paired plots in five different locations. Members of each pair had similar patterns of budworm infestation. One member of each pair was sprayed; the other was not. Spraying of sites occurred in 1990 or earlier. Three control plots were sampled that had not been infested with spruce budworm. In 1996, there were significantly fewer beetles in sprayed plots than in unsprayed sites. However, there were no significant differences in species composition or diversity between sprayed and unsprayed plots. Data from 1997 are still being analyzed and will be presented. Patterns of carabid occurrence and diversity will be discussed in relation to spray history and site characteristics.

SEASONAL ABUNDANCE AND GEOGRAPHICAL AFFINITIES OF GROUND BEETLES (COLEOPTERA: CARABIDAE) OF ST. CHARLES RIFLE RANGE. Darren A. Pollock and Robert E. Roughley, Department of Entomology, University of Manitoba, Winnipeg, Manitoba R3T 2N2.

The St. Charles Rifle Range (owned by Department of National Defence) includes a relatively large, undisturbed area of tallgrass prairie. In 1997, a study on the effect of seasonal, controlled burning on the prairie invertebrates was begun, with ground beetles (Carabidae) as the selected target insect group. An analysis of the 59 carabid species collected in pitfall traps in 1997 revealed a complex pattern of life histories, of obvious importance to prairie management. Some species, notably *Calosoma calidum* and *Syntomus americanus*, are spring specialists, while others such as *Cymindis planipennis* are fall species. Other species such as *Poecilus lucublandus* and

Pterostichus femoralis are abundant in the spring and fall, with a summer decline. Among the species collected in 1997, the most abundant are very widespread species, inhabiting much of North America. Several of the rarer species collected at St. Charles Rifle Range are more restricted in their distributions. There appears to be no tallgrass prairie specialist among the Carabidae collected in 1997.

Symposium:
Pest Control -
Prospects for Innovation, Pressures for Change

CROP RESISTANCE FOR WHEAT MIDGE IN SPRING WHEAT.

Robert J. Lamb, Cereal Research Centre, Agriculture & Agri-Food Canada, 195 Dafoe Road, Winnipeg, Manitoba, R3T 2M9.

The wheat midge, *Sitodiplosis mosellana*, became a serious pest of spring wheat in Manitoba and Saskatchewan in the early 1980's and the problem became widespread in this area in the early 1990's. Wheat midge is now the key pest of wheat on the eastern prairies. At present millions of acres of wheat are sprayed annually to protect the crop, and in spite of this chemical control substantial seed damage, crop downgrading and yield loss are reported. Insecticidal control has been integrated with biological control, and can be effective although improvements in monitoring methods are desirable. An additional approach to control this pest is crop resistance. Sources of resistance were first identified in winter wheats 5 years ago. This resistance has been transferred to spring wheats using the doubled haploid method and conventional breeding. At present lines are being developed to meet CPS, CWRS and CWESR requirements, and a CPS line is closest to registration. The resistance is antibiotic and prevents newly hatched larvae from growing. Some seed damage still occurs on resistant plants when the newly hatched larvae attack young developing seed. Although most larvae die a small proportion appear healthy and mature. Research is currently underway to determine if these survivors are virulent and threaten resistance. No resistance to wheat midge is available for durum wheat. The search continues

for new sources of resistance for all types of wheat grown in western Canada. Strategies for integrating crop resistance with chemical and biological control are needed.

SEEDLING VIGOUR AND FLEA BEETLE RESISTANCE IN *BRASSICA* SPECIES AND *SINAPIS ALBA*. Bob Elliott and Gerhard Rakow, Saskatoon Research Centre, Agriculture and Agri-Food Canada, 107 Science Place, Saskatoon, Saskatchewan, S7N 0X2

A three-year field study was conducted to evaluate the potential association between seedling vigour and flea beetle resistance in 35 lines of *Sinapis alba*, *Brassica carinata*, *B. juncea*, *B. rapa* and *B. napus*. Entries were first grown in the field in isolation tents to standardize seed quality. Seed was harvested and sieved to obtain uniform-sized seeds. Sized seeds were planted at identical rates without chemical protectants.

Flea beetle feeding damage ranged from 20% to 80% depending on the entry. Feeding damage was lowest in lines of *S. alba* and highest in lines of *B. juncea* and *B. rapa*. Seedling establishment ranged from 12% in a line of *B. rapa* to 60% in a line of *S. alba*. Rates of cotyledon/leaf growth ranged from 10 mm^2/day in a line of *B. napus* to 160 mm^2/day in a line of *S. alba*. Lines within species with the highest seedling establishment and highest growth rate were deemed most tolerant to feeding damage.

Tests were conducted to investigate the influence of seed size on seedling growth in mustard and canola. In each group, plants grown from large seed were superior to those grown from small seed in terms of establishment, growth and tolerance to feeding damage. Plants grown from large seed required less chemical protection than plants grown from small seed. Mustards with antixenotic resistance and superior seedling vigour required the least chemical protection.

HERBICIDE PERSISTENCE AND SORPTION IN SOILS. A. Farenhorst, Department of Soil Science, University of Manitoba, Winnipeg, Manitoba R3T 2N2.

The use of herbicides to control weeds continues to be an important strategy in North American agriculture, particularly with the increasing adaptation to low-till farming systems. This study argues that research on herbicide fate processes is needed. Understanding the behavior of herbicides in agricultural soils is important for maximizing yield potential, and minimizing the impact of agrochemicals use on surrounding environments and non-target organisms.

Focusing on conventional- versus zero-tillage systems in Ontario, the impact of earthworms on the persistence and movement of herbicides in soil was studied. The results indicated that preferential herbicide transport via burrow flow to groundwater may be less significant than is usually assumed. Earthworms decreased the concentration of herbicides in leachate due to feeding on herbicide-sprayed crop residues, reducing the concentration of atrazine in the surface soil and, therefore, its availability for preferential transport. Because earthworms increased the amount of nonextractable herbicides in the soil, the potential for herbicides transport through the soil profile was accordingly reduced since strongly sorbed herbicides are less likely to leach.

Future research directions for herbicide fate studies in Manitoba soils are also discussed.

HERBICIDE RESISTANCE IN MANITOBA: A DECADE IN THE MAKING. Bruce Murray. Rhone-Poulenc, Carmen, Manitoba.

Herbicide resistance was first detected in Manitoba in 1988. These first instances involved trifluralin resistance in green foxtail (*Setaria viridis).* Since this initial discovery the number of resistant weed species has grown to include wild oat (*Avena fatua*), chickweed (*Stelaria media*), hemp-nettle (*Galeopsis tetrahit*), kochia (*Kochia scoparia*), and wild mustard (*Brassica kaber*). Five of these weeds are among the 20 most abundant species in the

province. Currently there is resistance to 9 unique herbicide families (7 herbicide groups). 1992 marked the first occurrence of multiple resistance in the province. Since this time three multiple resistance patterns have evolved (1 in green foxtail, 2 in wild oat) with 27 populations being confirmed.

The evolution of herbicide resistance poses a serious threat to economic crop production in the province. Many of these resistances are evolving to very popular, highly effective, single site herbicides. Producers are aware of the problem, but seem unwilling or unable to rotate to less effective, alternate modes of action. The adoption of economic thresholds has been slow, due to difficulties in persuading farmers to allow weeds to set seed. Genetic and population studies have indicated that most of these resistances are due to single gene alterations in the target site that do not appear to have a cost to the plants. Unfortunately, once the resistance has evolved it appears as if it will remain within the population even with extended non-use of the offending herbicide.

The Entomological Society of Manitoba gratefully acknowledges the following organizations, which provided financial support for the 54th Annual Meeting:

AGrevo

Bayer Inc.

City Of Winnipeg –Insect Control

Dept. Of Natural Resources

Dow Agrosciences

Gustafson

Manitoba Agriculture

Mycogen Can. Ltd.

Novartis Crop Protection

Pine Falls Paper Company

Poulin Exterminators

Rohm And Hass Canada

Swat Team Pest Services Inc.

Tolko Mb. Inc.

Zeneca Agro (Bill Moons)

Minutes of the 54th Annual Meeting of the Entomological Society of Manitoba

12:10 h, October 17, 1998
Freshwater Institute
Winnipeg, Manitoba

The President J. Buth, presided. With a quorum being present, the President called the meeting to order.

Attendance

Executive: J. Buth, President
M. H. Smith, President-Elect
R. Lamb, Regional Director to the ESC
G. Gill, Member-at-Large

Executive Staff: R. Gadawski, Treasurer
B. Elliott, Editor - Newsletter
I. Wise, Secretary
D. Vanderwel, Editor - Proceedings

Executive members absent from the meeting were T. Galloway, Past-President.

Members:		
	R. Currie	S. Migui
	R. Ellis	W. Preston
	D. Henne	T. Rampersand
	N. Holliday	R. Roughley
	S. Humble	S. Stiege
	J. Jones	B. Timlick

1. Agenda (Appendix A).

Motion: Ellis/Lamb. That the proposed agenda of the 54th Annual General Meeting of the Entomological Society of Manitoba be accepted. CARRIED

2. Acceptance of the minutes.

Motion: Roughley/Henne. That the minutes of the 53rd Annual General Meeting of the Entomological Society of Manitoba be accepted. CARRIED

3. Business arising from the minutes.

None.

4. Executive Reports

Motion: Lamb/Holliday. That all Executive Reports be received. CARRIED

President (Appendix B). The Society thanked all those who contributed their time and effort to the operation of the ESM in the past year.

Treasurer (Appendix C). A surplus was generated this past fiscal year because of reduced spending by various committees.

Regional Director to ESC (Appendix D). Holliday expresses concern about the exclusivity of the ESC President reception meeting which is paid for by all members. Ellis inquires about financial arrangement with ESC with regards to sharing losses at joint meetings. Roughley mentions ESM joint meetings with the ESC have always generated a profit. Roughley states the ESC Presidential reception should not be funded in any way by the provincial society.

Motion: Holliday/Roughley. Separate ESC functions at joint Annual Meetings should be not be billed to the provincial society (Point one of Version 2 of recommendation). CARRIED

Elliott expresses support for the Students-meet-the-ESC board function. Roughley stateshe has no concern about the intent of the function but does not believe the ESM should be funding an ESC function.

Motion: Holliday/Lamb. That Version 2 of the recommendations be accepted with the changes noted in the previous motion also included. CARRIED

Editor of the Proceedings (Appendix E). The 1997 Proceedings will be available in November. Vandewel asks whether the Society would prefer the Pro-

ceedings to be available earlier in the year. Many inquiries have been received from members requesting copies before the AGM. Society expresses approval with having an earlier publication. Holliday inquires about the cost of funding two publications in one year. Gadawski indicates that sufficient funding is available for this year.

Endowment Fund Board (Appendix F). Roughley asks where the funding to increase the GIC certificates would come from. Gadawski states that funds in the T-bill and chequing accounts are sufficient to cover this amount. Holliday expresses concern about possible lack of available money to cover unforeseen losses. Gadawski indicates endowment fund certificates mature over various times and Society could vote on retrieval of funds from Endowment Fund if needed. Holliday inquires about using alternative to GIC's to invest money outside of endowment funds.

Motion. Lamb/Currie. That the cap on total funds in the Endowment Fund be increased to $40,000. CARRIED

Motion. Lamb/Ellis. That the Executive determine the amount of funds in general revenues, outside of the Endowment Fund, needed to support the operation of the Society. CARRIED

5. Committee Reports

Finance (Appendix G). Gadawski states that revenues and expenses are the amounts that were available before the meeting. Lamb, Smith and MacKay state that they do not support the Finance Committee recommendations 1 to 4. Gadawski states the Finance Committee has concerns about the deficit generated by the AGM and problems that will arise from continued losses. Roughley states that the projected losses and the resulting recommendations indicate the worst case scenario. Holliday mentions that the Executive is better informed to make decisions when approval is sought to pass the budget for the AGM. No motion is forwarded to support recommendations 1-4.

Motion: Holliday/Currie. That recommendation 5a in the Finance Committee report be accepted. CARRIED

Publicity/Newsletter (Appendix H). Elliott recommends members receive Newsletter by e-mail to reduce costs. Holliday asks if Newsletter can be placed on the WEB or if a premium should be charged to members who receive hard copies.

Gadawski states that members who have e-mail should be obligated to accept Newsletter by e-mail. Roughley states that the Committee Chair should pursue option with all members about how they wish to receive the Newsletter.

Social (Appendix I). Society expresses thanks to committee members for their support.

Education/Youth Encouragement (Appendix J). Wise states that all members who give entomology presentations through the Innovators in the Classroom program should inform Chair.

ESC Common Names/Archivist (Appendix K). Roughley states that the status of the ESC Common Names Committee is no longer known. Lamb states that he will investigate its status.

Student Awards (Appendix L).

ESM Scholarship (Appendix M). MacKay states that requests will be sent out next week.

Scientific Programme (Appendix N). MacKay reports that 54 registered for the AGM and 49 banquet tickets were sold. Mackay expresses appreciation to all members of the Committee and to the volunteers and the Society expresses thanks for their support.

Fund Raising (Appendix O).

Honourary Members. No report submitted.

Membership. No report submitted.

6. Election Results.

President Elect - P. A. MacKay

Member-at-large - both candidates, J. Gavloski and R. Lafreniere, received the same number of votes.

Motion: MacKay/ Henne. That all ballots to be destroyed. CARRIED

Wise informs members that there are no guidelines in the ESM bylaws to address this problem. The Society does have the opportunity to resolve the problem by either amending the bylaw that covers ESM elections through a mail ballot or by approving a rule passed by the members at the AGM. This rule will only be in effect until the next AGM, at which time it can either be discarded or passed with or without amendments to become a permanent Standing Rule.

Motion: Currie/MacKay. That the Standing Rule option be approved.

CARRIED

Motion: Migui/Ellis. That in Executive Committee elections where both candidates receive the same number of votes, each candidate would serve for one term, with the order of appointment determined alphabetically by surname.

CARRIED

7. Transfer of Office.

J. Buth calls upon M. H. Smith to assume the office of President.

8. Other Business.

Motion: Gadawski/MacKay: That D. Nicholson be reappointed as auditor for the Entomological Society of Manitoba. CARRIED

9. Adjournment.

Motion: Lamb/Gill. That the meeting be adjourned. CARRIED

APPENDICES

Appendix A: Agenda of the Entomological Society of Manitoba
53rd Annual Business Meeting

October 17, 1998

1. Acceptance of Agenda.

2. Acceptance of the minutes of the last Annual Meeting (November 8, 1997).

3. Business arising from the minutes.

4. Reports - Executive.

President	J. Buth
Treasurer	R. Gadawski
Regional Director to the ESC	R. Lamb
Editor of the Proceedings	D. Vanderwel
Endowment Fund Board	G. Gerber

5. Reports - Committees

Finance	G. Gerber
Publicity/Newsletter	B. Elliot
Social	C. and D. Wytrykush
Education/Youth Encouragement	D. Henne
Common Names/Archivist	R. Roughley
Student Awards	B. Gallaway
ESM Scholarship	P. McKay
Scientific Programme	P. McKay
Fund Raising	J. Gosslin

6. Election Results

7. Transfer of Office

8. Other Business

Appendix B: Report of the President

In 1998, the Society continued to adjust to changes in membership and fiscal challenges. The general trend in many organizations is to do more with less and people are stretched to the limit. Our Society is no different as our revenue continues to decline it becomes more difficult to fill committee and executive positions. This year several members agreed to take on responsibilities for committee chairs that they have held in the past and we also have several new faces around the table who have also taken on their duties with enthusiasm. The continued life of our Society will depend on the commitment and energy of all members.

Because of the changing faces on committees, the Executive invited committee chairs to a March meeting for a brainstorming session. Several creative ideas, including some field trips were suggested. The collecting trip to St. Malo happened this year and the others are still possibilities for the future.

This spring, the Society was informed that a piece of entomological heritage in Manitoba will be protected. The Criddle property, also known as Aweme, will be retained and managed by the provincial Department of Natural Resources as Crown Land and may be given some form of protected status. Although the buildings will be removed, we have the opportunity to develop a project to interpret the heritage of the Criddle and Vane families. This would be a good initiative for the Society in the future.

I would like to thank all the committee chairs and members for their hard work, especially Carla and Debra Wytrykush as Social Committee co-chairs. With the assistance of several members of the Social committee, they very creatively organized the Society's social functions, including a luncheon, ethnic pot luck dinner for the New Member's Social, a BBQ, and a field trip.

My thanks to Randy Gadawski as Treasurer for keeping track of the Society's funds, to George Gerber as Finance chair for keeping a keen eye on the finances, to Ian Wise who took over this year as Secretary and to Brent Elliott who was persistent, yet polite, in insisting on newsletter contributions.

Pat MacKay and the Scientific Program Committee put together an excellent program this year with the focus on Pest Control: Prospects for Innovation, Pressures for Change.

I would like to thank the members of the Executive for their assistance and guidance this year and all the committee chairs for keeping the society running smoothly.

Jo Anne Buth, President

Appendix C: Report of the Treasurer

Entomological Society of Manitoba, Inc. Financial Statements

August 31, 1998

auditor's rept

balance sheet

statement of income

notes to fin stmts

Appendix D: Report of the ESC Regional Director

Annual Report Submitted to the Entomological Society of Canada

September 30, 1998

Since my appointment in November 1997, my activities on behalf of the ESC have consisted of: reporting on the disbursements of funds after the last joint ESC/ESM meeting; providing Dave Langor with ESM members who might be prospects for ESC membership; providing an interim report to the Governing Board on March 26. I will represent the President, ESC, at the upcoming Annual Meeting of the ESM., emphasizing links between the societies and encouraging membership in both. In the current year, I have not expended any funds on behalf of ESC. I recommend the budget for travel be left intact for the next budget year, but I anticipate finding alternate sources of funding to attend the AGM.

The current Executive of the ESM includes: President - Jo-Anne Buth; Past-President - Terry Galloway; President-Elect - Marjorie Smith; Member-at-large - Ginger Gill; and myself as Regional Director. Marjorie Smith will become President at the Annual General Meeting on October 17, and a new President-Elect will be named. The Executive Staff are: Secretary- Ian Wise; Treasurer - Randy Gadawski; Proceedings Editor - D. Vanderwel. The ESM produces a Newsletter, Editor B. Elliott (Belliott@agr.gov.mb.ca), and Volume 25 Number 2 was published in September. Members of ESM continue to provide a series of talks throughout the year as part of our Public Education programme. The main activities of the ESM to date have been a New Members Social in the spring, a collecting weekend in southeastern Manitoba in summer, and a September supper at Fort Whyte Nature Reserve which included a slide presentation by R. Roughley on biodiversity studies in Costa Rica. The Annual Meeting of the ESM will be held On October 16-17, timed to precede the meeting of the Western Committee on Crop Protection which begins on October 18 in Winnipeg. The theme of the ESM meeting is "Pest Control: Prospects for Innovation, Pressures for Change", and includes a Keynote Address by Murray Isman, U.B.C., 5 invited papers in the Symposium, and 12 submitted papers. The Scientific Programme Committee is chaired by Patricia MacKay.

Matters arising for the Entomological Society of Manitoba from activities of the Entomological Society of Canada

1) The ESC is mounting a membership drive through its Membership Committee chaired by Dave Langor, Edmonton. I cross referenced names on the ESM and ESC membership lists and provided a list of ESM members who are not members of the ESC. ESM members who are not members of the ESC can expect to receive a letter inviting them to join ESC and surveying their views on what ESC might do to encourage membership. ESC also encourages the ESM to promote membership in the ESC. This duty falls primarily to the Regional Director.

2) The Finance Committee of the Entomological Society of Canada has been asked

to provide a recommendation to the ESC Governing Board regarding Annual Meeting revenue-sharing/ loss-sharing between the ESC and a host Affiliated Society. The purpose of this letter is to outline the issues involved and options available, and to solicit the opinion of your Society on this subject. This letter is being sent to each of the Affiliated Societies. The Finance Committee will consider the responses received and prepare a recommendation to the ESC Governing Board. The Governing Board will in turn develop an ESC recommendation to the Affiliated Societies concerning the sharing of revenues from Joint Annual Meetings.

The current Standing Rules of the Entomological Society of Canada state the following (including paragraph in italic) with respect to an Annual Meeting held in conjunction with an Affiliated Society:

> "The Society [ESC] shall provide financial support specifically for the scientific program of the Annual Meeting in the amount of: (i) Twenty-five hundred dollars ($2,500.00) to assist with arranging the scientific program, such as notices of meeting, printing of programs, rental of conference halls, etc. (ii) Up to fifteen hundred dollars ($1,500.00) to pay expenses and honoraria for special speakers who, in general, would be other than Society members. The twenty-five hundred dollars ($2,500.00) shall be paid as an unaccountable advance to the Affiliate hosting the meeting (or to the Program Committee) and the remainder paid as requested and shall be accounted for by the recipient. [A clause here will contain a recommendation from the ESC about other financial matters to do with meetings (e.g. the recommended nature of repayments if a meeting is profitable). These items have been referred to the Finance Committee, in light of discussions at the 1996 Board meeting.]"

In developing a recommendation for the Governing Board to replace the paragraph in italic, the Finance Committee will take into account the following recommendation from the ESC Subcommittee which reported on the "Role and Impact of the ESC in Relation to the Affiliated Societies":

> "3.1. That revenue-sharing between the ESC and a host Affiliated Society be an operating principle, subject to working out details of shared effort and monetary contributions, such as seed money provided by the ESC and assumption of responsibility for debts incurred by the Affiliated Society as a result of hosting a joint annual meeting."

The Finance Committee will be guided in its recommendation on revenue-sharing by the above considerations, the views of Affiliated Societies, and the benefits to both the ESC and a host Affiliated Society in holding a joint annual meeting. The latter are:

> Benefits to ESC of Joint Annual Meeting: 1) Meeting organized by Affiliated Society. 2) Scientifically sound meeting for members. 3) Arrangements made for administrative meetings (AGM, Governing Board) and informal contacts (Students meet the Board; President's Reception) as well as Gold Medal address, etc.
>
> Benefits to Affiliated Society of Joint Annual Meeting: 1) Much larger registration because of participation of ESC members. 2) Higher profile for local

fundraising from an association with the national society. 3) Greater profit possible. 4) Advances (up to $4000) from the ESC to begin organizing the joint meeting and to book special speakers.

The Finance Committee met in April 1998 and reviewed all of the above with the aim of preparing a draft recommendation on the issue of revenue-sharing which could be sent to Affiliated Societies for comment. We have since developed two draft recommendations and would like your Society to review them. Please inform us as to which of the two is the more acceptable to your society, and include any other comments you wish to make on this subject.

The Finance Committee recognizes that the net monetary worth of the ESC has dropped substantially in recent years and that the Society must now practice more financial restraint than in the past. Regarding loss-sharing, there is an expectation on the part of most Affiliated Societies that the ESC will help cover losses if a joint meeting loses money. In the eyes of the Finance Committee, the assumption of debt in the event of an unprofitable meeting should be balanced against the expectation of some monetary return if a meeting is profitable. The Finance Committee also recognizes that a joint meeting with the ESC is one of the few opportunities for a regional society to raise funds.

Two alternative draft recommendations are presented for your comments as follows:

VERSION 1 OF RECOMMENDATION: With respect to the balance-sheet of joint annual meetings, the ESC makes the following recommendations to Affiliated Societies: i. ESC functions should be costed as part of the meeting package, and not billed separately to the ESC. ii. If a meeting is profitable then the monetary advances from the ESC should be returned in full (or to the extent of the profit if it is less than the amount of the advances), but any additional profit should accrue to the host Affiliated Society. iii. If a meeting loses money, the ESC will cover 50% of the loss.

VERSION 2 OF RECOMMENDATION: With respect to the balance-sheet of joint annual meetings, the ESC makes the following recommendations to Affiliated Societies: i. ESC functions should be costed as part of the meeting package, and not billed separately to the ESC. ii. If a meeting is profitable then the monetary advances from the ESC should be returned in full (or to the extent of the profit if it is less than the amount of the advances), but any additional profit up to the amount of the advances should accrue in full to the host Affiliated Society. iii. Additional profits beyond the amount of the advances should be shared between the societies in the ratio of 25% for the ESC and 75% for the Affiliated Society. iv. If a meeting loses money, the ESC will cover 75% of the loss.

Please give the above draft recommendations your careful consideration. I look forward to hearing from you on this matter, and thank you in advance for helping the Finance Committee develop a recommendation to the ESC on revenue-sharing/ loss-sharing.

Robert J. Lamb
Regional Director

Appendix E: Report of the Editor of the *Proceedings*

Volume 53 (1997) of the *Proceedings of the Entomological Society of Manitoba* is currently in preparation. Production was delayed this year, in part due to my sabbatical leave which took me to Tuscon, AZ, and in part due to health reasons. Volume 53 should be printed and mailed out in November. The format will be the same as Volume 52 (1996), and production and mailing costs should be comparable.

It would be clearly advantageous to have the *Proceedings* distributed to members and subscribers well in advance of the AGM: I apologize to the members for the delay this year. If the membership does not object, I would like to move the publication date for future Volumes (Volumes 54 and later) up considerably from this year, and in fact up from those of recent years past, to late May or June. This would mean that authors that would like to submit manuscripts for publication in the *Proceedings* would have to do so in late March or early April at the latest.

Désirée Vanderwel
Proceedings Editor

Appendix F: Report of the Endowment Fund Board

The Endowment Fund provides a basis for funding the Student Scholarship ($1,000.00) and the publication of the Proceedings ($850.00). Also, the Fund contributes approximately $500.00 toward the costs associated with the Annual General Meeting of the Society. Therefore, the Endowment Fund is committed to about $2,350.00 annually.

During the last three fiscal years, the investment income from the Endowment Fund has been: (i) 1995-96, $2,175.68; (ii) 1996-97, $2161.38; and (iii) 1997-98, $2,103.88. In the next fiscal year (1998-1999), the investment income from the Fund will be $2,031.15. Therefore, the investment income from the Fund has not been sufficient to meet the commitments for **four successive fiscal years**. In 1999, the two certificates with the highest interest rates (7.25% and 8.0%) will mature; these certificates will likely be re-invested at rates near 5.0%, if interest rates do not go up. This will result in the investment income from the Fund dropping **well below $2,000.00.**

In the 1997-1998 fiscal year, additional interest income was earned from our chequing-savings account (approx. $8.00) and Royal Trust T-Bill Money Market Mutual Fund (approx. $140.00). This income still left the Society about $100.00 short of meeting its commitments for the Endowment Fund. **Therefore, it will be necessary to cover a greater part of the Society's expenses from Membership Fees in the future.**

Certificate No. 25723434 matured on 31 October 1997 and was re-invested for five years as new Certificate No. 960006276-1. Certificate Nos. 25723412, 25723148, and 25723379 matured on 19 and 15 December 1997 and 26 January 1998; they were combined and re-invested for five years on 10 February 1998 as new Certifi-

cate No. 960006276-2. Certificate No. 25723368 matured on 16 September 1998; this certificate was increased to $4,000.00 and re-invested for five years as new Certificate No. 960006276-3. This action increased the Endowment Fund to $35,000.00, the current approved cap. **In light of decreasing investment income from the Endowment Fund in the future, the Endowment Fund Board recommends that the Members of the Society increase the cap for the Fund to $40,000.00.** This action will allow the Endowment Fund Board to purchase new Guaranteed Investment Certificates for the Society in the future, if there are sufficient funds in general revenue to do so.

5 October 1998
George H. Gerber, Chair
Randy Gadawski

GUARANTEED INVESTMENT CERTIFICATES WITH ROYAL TRUST

Appendix G: Report of the Finance Committee

The Finance Committee reviewed the audited financial statements for the fiscal year 1997-1998. Revenues exceeded expenses by $2,104.00. Revenues were close to those projected in the budget for 1997-1998 ($7,428.00 vs. $7,293.00), but actual expenses ($5,324.00) were much less than those ($7,570.00) projected in the budget. The expenses for nine of ten line items of the budget were less than expected, and this accounted for the reduced spending. The Finance Committee was pleased with the reductions in spending, but hopes this dose not indicate that the activities of the Society were reduced accordingly. As far as the revenues of the Society are concerned, the Finance Committee was concerned over the reduction in income from Membership Dues; this income was 12.5% ($271.00) less than in 1996-97. **If income from Membership Dues continues to drop along with income from the Endowment Fund (see Annual Report of the Endowment Board), the Society could find itself in serious financial difficulties within a few years.** The Society needs to address these problems as soon as possible. The Finance Committee was pleased to see that the Fundraising Committee obtained $1,000.00 in donations for the Annual Meeting; this resulted in the revenues for this meeting exceeding expenses.

The Finance Committee prepared the budgets for the fiscal years of 1998-1999 and 1999-2000. A deficit of $1,552.00 is projected for fiscal year 1998-1999. For the most part, this deficit results from a large deficit ($1,412.00), approved by the Executive, for the 1998 Annual Meeting. **In its 1997 Annual Report, the Finance Committee recommended that Annual Meeting no longer have a deficit; the Finance Committee recommends again that for the long-term financial health of the Society it is essential that the Annual Meeting has a balanced budget each year.** The expenses for the Proceedings may be than normal in 1998-1999, because the Editor hopes to publish the volumes for both 1997 and 1998 this fiscal year.

The Finance Committee feels that in light of reduced revenues from the Endowment Fund and Membership Dues, there is a continuing need to reduce expenses. The Finance Committee asks the Members of the Society at the Annual Meeting to approve the following recommendations, which should reduce expenses and result in balanced budgets:

(1) The budget for the Annual Meeting should be balanced each year.

(2) The Executive should establish a cap for the expenses of the Annual Meeting each year before the meeting is organized.

(3) The Registration Fees for the Annual Meeting have not been raised for over ten years. These fees should be increased to $40.00 for Regular Members and $20.00 for Student Members in time for the 1999 Annual Meeting.

(4) The Society should not cover any of the expenses during the Annual Meeting of Members of the Society who organize the meeting or participate as guest speakers at the meeting.

(5) The Society should reduce printing and mailing expenses by using e-mail. The following should be sending notices, etc., by e-mail to the Members where possible: Social Committee, Annual Meeting Committee and Newsletter.

The Executive asked the Finance Committee to propose the following recommendations for approval of the Members at the Annual Meeting:

(a) In the future, Life Membership Dues be twenty-five (25) times greater than those for Regular Members.

(b) Life Membership Dues be $625.00, effective 1 November 1998.

5 October 1998
George H. Gerber, Chair
Randy Gadawski

budget items

Appendix H: Report of the Publicity/Newsletter Committee

Three issues of the newsletter have been produced so far in 1998. One in January, one in April and one in September. The major change for the newsletter has been a change from four issues per year to three. The change was made in part to reduce costs and due to a lack of submissions for the newsletter. It was agreed that three issues per year would serve the needs of the society. The newsletter will now be produced in April, August and December.

Exact costs for the production are not available as a result of change in editors (estimated cost per newsletter is approximately $100-150 per issue). The production costs for the newsletter are expected to be under budget for the year as a result of the reduced number of issues, a change in format, reduced copying costs and a reduction in mailing costs. Relatively few members have expressed interest in receiving the newsletter electronically (<10%).

Brent G. Elliott (Chair)
Rhéal Lafréniere
Jason Diehl

Appendix I: Report of the Social Committee

The social events for this year started with a luncheon on Saturday February 21st, at Oceana Restaurant. Darren Pollock gave a terrific seminar titled "Madagascar, the magic and the madness".

The New Member's Social was an ethnic potluck dinner hosted at the home of Mr. and Mrs. Wytrykush. Members brought along food representing their ethnic background, or a culinary tradition from their past. There was a lot of wonderful food to eat. Who knew those entomologists could be such good cooks! Several new members attended: Mr. Brent Poole, Gavin Law, and Lydia Stepanovic.

On Sunday evening, September 20th, a luncheon/bbq dinner was held at the Fort Whyte Nature Centre. Dr. Roughley gave a fascinating talk titled "Costa Rica, INBio and a bold experiment in conservation". The evening was a great success; good food, an interesting talk with lots of great slides, and a fabulous atmosphere. I think that we should try to expand the use of this beautiful facility. A BBQ, or corn roast earlier in the fall would be a nice way to spend an ESM evening. In all, each event was a success. For all events there were always close to 40 members in attendance, as well as many new members.

The Annual General Meeting Banquet was held on Friday October 16th 1998. Dinner was at the Irish Club, and flowing dinner, the Celtic band "Buy Us a Guinness" entertained. All 49 people in attendance had a good time (I think), drinking some Guinness, playing pool and darts, socializing, or tapping their toes along with the band. Rumour has it that the lively music (or may-be the flowing Guinness) even

inspired some entomologists to dance. I am sure that is something we won't see every day. Debra and I would like to thank the other members of the social committee; Ginger Gill and Stacie Stiege for all of their help at these events.

Social Committee Total Expenses

1998 New Member's Social	$ 0.00
Luncheon Saturday February 21	$13.64 (Lunch for Speaker)
Luncheon Sunday September 20	$32.51
Photocopying and mailing	??
Total Expenses	(46.51)

Carla Wytrykush
Debra Wytrykush
Social Committee co-chairs

Appendix J: Report of the Youth Encouragement and Public Awareness Committee

The mandate of the YEPAC is to foster and encourage interest in entomology, no only at the grade school level, but to the general public at large as well. This is achieved primarily through the use of classroom presentations, field trips, and loans of YEPAC materials. In addition, extension activities within the Department of Entomology have helped reach hundreds of members of the general public. Funding is provided by the Entomological Society of Manitoba.

Approximately 40 presentations were given by myself and other members of this committee. I would like to acknowledge the contributions of Ginger Gill, Stacie Steige, Carla Wytrykush, and many others that assisted me during the past year. I believe that this vehicle for interacting with the public about insects has been enormously successful. This committee will face a challenge in the coming years to keep up with the demand for presentations.

Donald C. Henne, Chair

Appendix K: Report of the ESC Common Names Committee/Archivist

There have been no applications from ESM members during the past year for new common names, nor have there been any requests for changes in old common names. Therefore there are no local activities to report.

Rob E. Roughley, Chair

Appendix L: Report of the ESM Student Awards Committee

The Committee reviewed the nominations received for the Student Achievement Award and the SWAT Student Award. Amy Hawkins-Bowman was selected as the recipient of the Student Achievement Award. This is a book award valued at $150.00. Gavin Law was selected for the SWAT Student Award of $100.00.

B. Gallaway (Chair)
J. Conroy
D. Currey
J. Hare

Appendix M: Report of the ESM Scholarship Committee

The Entomological Society of Manitoba Scholarship Committee reviewed three applications for the ESM postgraduate award. The ESM Scholarship Committee unanimously recommends that the ESM postgraduate award be made to Ms Carla Wytrykush, Department of Entomology, University of Manitoba. Ms Wytrykush is currently working on her M.Sc. degree under the supervision of Dr. Neil Holliday in the Department of Entomology at U. of M. Her thesis is on insect species diversity in forests as it is affected by spruce budworm management.

Patricia A. MacKay (Chair)
Désirée Vanderwel
Noel White

Appendix N: Report of the Scientific Programme Committee

The 54th Annual Meeting of the Entomological Society of Manitoba was held on 16 and 17 October 1998 at the Freshwater Institute. The theme of the meeting was "Pest Control: Prospects for Innovation, Pressures for Change". There were a total of 38 regular registrants, 1 non-member registrant, and 15 student registrants.

On the morning of Friday, 16 October, Dr. Murray B. Isman, Faculty of Agricultural Sciences, University of British Columbia, gave the keynote address "Botanical Insecticides and Antifeedants - Potential as Reduced-Risk Crop Protection Agents". Dr. Isman's talk was attended by 42 people.

The submitted paper session beginning in the morning and continuing through the afternoon of Friday, 16 October, was chaired by Dr. R.E. Roughley, Department of Entomology, University of Manitoba, and consisted of 12 papers, four of which were entered in the student paper competition, and six of which were by visitors to the

province. The judges of the student paper competition were Dr. John Gavloski, Manitoba Department of Agriculture, Carman, Manitoba, Dr. Marj Smith, Agriculture and Agri-Food Canada, Winnipeg, Manitoba, and Dr. Gary Brewer Entomology Department, North Dakota State University. The winner was Mr. Paul Tinerella. The submitted paper sessions were attended by 38-42 people.

A symposium continuing the theme of "Pest Control: Prospects for Innovation, Pressures for Change" was held on the morning of Saturday, 17 October, moderated by Dr. Darren Pollock, Department of Entomology, University of Manitoba. The four speakers were Dr. Bob Lamb, Cereal Research Centre, Agriculture & Agri-Food Canada, Winnipeg, Dr. Bob Elliott, Saskatoon Research Centre, Agriculture and Agri-Food Canada, Saskatoon, Dr. Annemieke Farenhorst, Department of Soil Science, University of Manitoba, Winnipeg, and Dr. Bruce Murray, Rhone-Poulenc, Carman, Manitoba. The symposium was attended by 47 people.

The annual banquet was organized by Carla and Debra Wytrykush (Social Committee co-chairs) and took place at the Irish Club on Friday night. Entertainment was provided by Buy-us-a-Guiness, a Celtic music group. A total of 49 attended, including the keynote speaker. An informal mixer was held in the evening of 17 October at the home of Bob Lamb and Pat MacKay. About 40 people attended including three of the symposium speakers.

The committee wishes to thank all the speakers for their excellent contributions to the meeting. Special thanks go to Dave Rosenberg for arrangements at the Freshwater Institute, to treasurer Randy Gadawski and the others who staffed the registration desk, and to those who operated the projection equipment.

The organizing committee consisted of Paul Fields, who brought experience to the table as the chair of the previous year's committee; John Gavloski who helped the committee liase with WCCP whose members contributed significantly to our meetings; Ginger Gill, who acted as secretary for the committee; Joel Gosselin, who was our fund raiser extraordinaire; Dave Rosenberg who coordinated building arrangements for the meetings; and Carla Wytrykush who organized an outstanding social program. Thanks are due to all.

Patricia A. MacKay, Chair

Appendix O: Report of the ESM Fundraising Committee

Donations in the amount of $950.00 were received for the Annual General Meeting. The sale of items in stock, such as ESM Pins and Aphid Shirts provided additional revenues of $107.00.

Joel Gosselin, Chair

Notice to Contributors

Research papers in the *Proceedings of the Entomological Society of Manitoba* are fully refereed. The *Proceedings* are published once a year and manuscripts are welcome any time. The research papers section of the *Proceedings* is primarily intended to highlight entomological research of local (Manitoba) or regional (prairie provinces) interest. The following guidelines should be followed in writing and preparation of manuscripts. Guidelines are adapted from *The Proceedings of the Entomological Society of Ontario*, Volume 117, 1986.

General. Articles are normally in English and should not be offered for prior or simultaneous publication elsewhere. The Editor should be informed if manuscripts have been refused elsewhere. Authors need not be members of the Entomology Society of Manitoba to submit articles.

Text. Articles should be typed, double spaced and on one side of the paper. Margins be 25 mm on all sides. One original and two copies of text should be submitted to the Editor. Spelling should conform to usage recommended in either the Oxford or Webster's New International dictionary. Except in tables, figures, or quotations, dates should be written in the form of 15 July, 1992, etc. Reference to illustrations should be in the form 'Figure 2' or 'Fig. 2', and references to tables should be in the form 'Table 2', etc. Citation references in the text should be in the form 'Wilson (1992) stated', '(Smith 1990)', '(Brown 1985, 1990a,b)' or '(Wilson and Brown 1984; Smith 1990)' in chronological order for multiple citations within one set of parentheses. Footnotes should be kept to a minimum and typed at the bottom of the page to which they apply. Abbreviations should be kept to a minimum and only those that are generally recognized, or defined within the text for the sake of brevity, should be used. Units of measurement should be metric and abbreviated according to the Canadian national standards.

Manuscript Submission and Review. Typed manuscripts must be submitted for review purposes. After final acceptance all manuscripts should be submitted in both typed form and on floppy disk. The name(s) of the file(s) on the disk, name of the word processing language, and the type of computer used must also be included. All manuscripts are reviewed by at least two reviewers. The Editor selects those reviewers and does not disclose their names. The Editor decides to accept, reject or return for revision, manuscripts after reviewer evaluation

Abstract. Articles greater than two typewritten pages, except scientific notes, must preceded by a brief but informative abstract.

Acknowledgements. Acknowledgements should be short and placed in a paragraph at the end of the text.

References. All references should be listed alphabetical order of authors at the end of the article. References not directly consulted by the author should be preceded by an asterisk. The full title for each reference must be given, plus pagination for all items, including books. The names of serials and periodicals should be written out in full.

Layout. The general layout of articles should follow the format for those appearing in recent Volumes (e.g. use of italics, use of bolding and capitals for wording etc.). Tables and figures should also follow the format for those articles appearing in recent Volumes. Two copies of each illustration for each reviewer should be submitted. Captions should be numbered consecutively and must be attached to each illustration.

Publication. There are no page charges for publication of articles in the *Proceedings of the Entomological Society of Manitoba.* Charges are applicable to article reprints on a cost recovery basis

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Entomological Society of Manitoba

The *Entomological Society of Manitoba* was formed in 1945 “to foster the advancement exchange and dissemination of Entomological knowledge”. This is a professional society that invites any person interested in entomology to become a member by application in writing to the secretary. The society produces a quarterly newsletter, the *Proceedings*, and has a variety of meetings, seminars and social activities. Persons interested in joining the society should contact:

The Secretary
Entomological Society of Manitoba
c/o Agriculture and Agri-Food Canada
Cereal Research Station
195 Dafoe Road
Winnipeg, Manitoba,
CANADA. R3T 2M9.

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