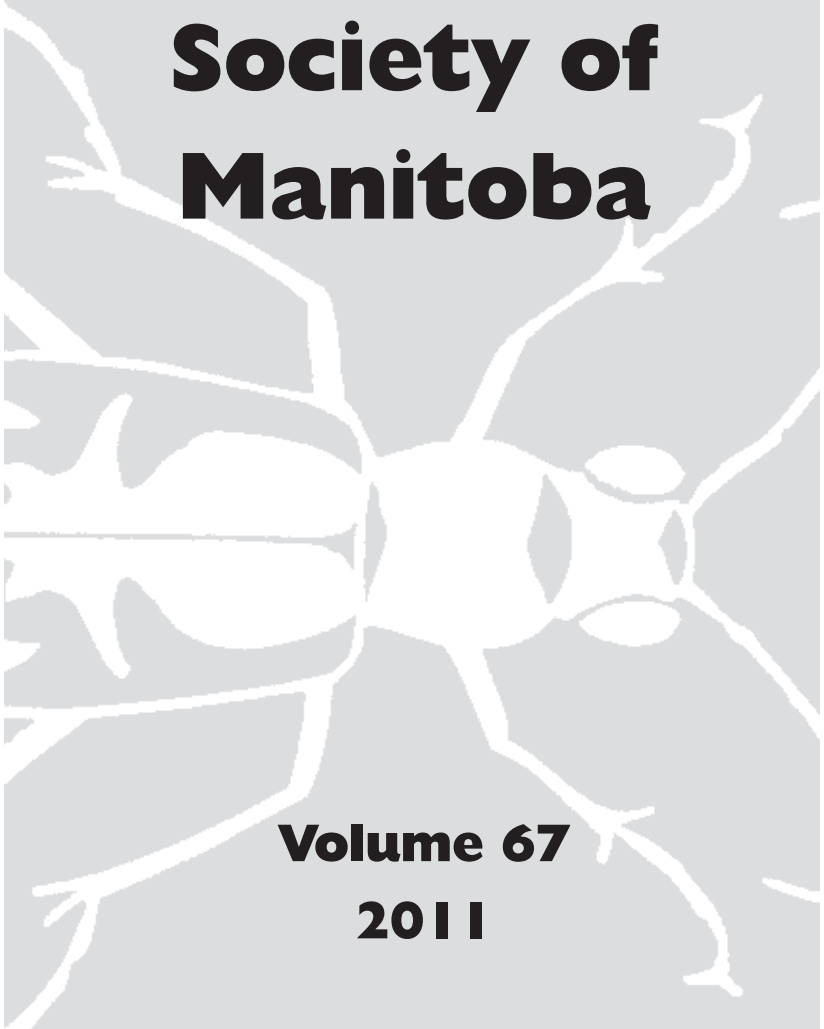


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**Volume 67**  
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T.D. Galloway  
Editor

**Winnipeg, Manitoba**

# Entomological Society of Manitoba

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# The *Aleochara* (Coleoptera: Staphylinidae) attractant in mustard seed meal is not dimethyl disulphide

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**Abstract** — The cabbage maggot, *Delia radicum* (Diptera: Anthomyiidae), is an important pest of brassicaceous vegetables and field crops. In canola, management options for root maggots are restricted to cultural and biological methods. A European natural enemy of *D. radicum* is the staphylinid beetle *Aleochara bipustulata*, larvae of which parasitize *D. radicum* pupae, and adults eat eggs and larvae of the pest; *A. bipustulata* is being assessed for introduction to Canada as a classical biological control agent of *D. radicum*. Volatiles given off by mustard seed meal attract *A. bipustulata*, and field applications of meal have successfully enhanced mortality of *D. radicum*. Dimethyl disulphide (DMDS) also attracts *A. bipustulata*, as well as its Holarctic congener, *A. bilineata*. Solid phase microextraction of mustard seed meal volatiles, followed by gas chromatography-mass spectrometry, reveals that the attractive volatile from the meal is not dimethyl disulphide. Implications for the chemical bases of host- and prey-finding, and for chemical manipulation of *D. radicum* mortality due to *Aleochara* species, are discussed.

## Introduction

The cabbage maggot, *Delia radicum* (L.) (Diptera: Anthomyiidae) is an important pest of brassicaceous vegetables in Europe and North America (Finch 1989), and of canola (*B. napus* L. and *B. rapaoleifera* (DeCandolle) Metzger (Brassicaceae)) in prairie Canada (Soroka and Dossdall 2011). Female *D. radicum* oviposit near the base of host plants, and the larvae feed externally on the roots causing direct injury and facilitating root rot infections; pupation occurs in the root or in nearby soil (Griffiths 1986). In canola, management of root maggots currently relies on cultural and biological approaches (Soroka and Dossdall 2011). In canola in the Prairie Provinces and in Europe, *Aleochara bilineata* Gyllenhal (Coleoptera: Staphylinidae) is a major pupal parasitoid of *D. radicum* (Hemachandra *et al.* 2007). In Europe,

but not in North America, a second staphylinid, *A. bipustulata* (L.), also attacks *D. radicum* (Hemachandra *et al.* 2005, 2007); it is being evaluated for introduction for classical biological control in North America (Andreassen *et al.* 2009).

Females of both *A. bilineata* and *A. bipustulata* lay eggs near dipterous host puparia, which the newly-hatched larvae seek and then enter (Fuldner 1960). Larval and pupal development occurs within host puparia, where the *Aleochara* larva is ectoparasitic on the host pupa; adults are active predators on eggs and larvae of *D. radicum* (Fuldner 1960). Chemical cues play a considerable role in the biology of the two *Aleochara*. Plants attacked by *D. radicum* give off volatiles that are attractive to adults of *A. bilineata* and *A. bipustulata* (Ferry *et al.* 2007). In addition to volatiles from infested plants, adult *A. bilineata* are also attracted to odours from *D. radicum* larvae and their frass (Royer and Boivin 1999). Larvae of *A. bilineata* use chemical cues during assessment of the suitability of host puparia (Royer *et al.* 1999; Lizé *et al.* 2010).

The chemical ecology of the two *Aleochara* species may be manipulated to enhance biological control of *D. radicum*. Mustard seed meal, the defatted residue left after crushing white mustard (*Sinapis alba* L. (Brassicaceae)) seed for oil extraction (Jonasson 1995), has been used for this purpose; the meal is applied as a thin layer (20 g/m<sup>2</sup>) to the soil surface. Early in the growing season, mustard seed meal attracts adult *A. bipustulata* in brassica vegetables in southern Sweden; in one of four trials, *A. bilineata* was also attracted (Ahlström-Olsson and Jonasson 1992). Mustard seed meal applications reduce *D. radicum* damage to swedes (Ahlström-Olsson and Jonasson 1992), possibly because of enhanced predation of immature *D. radicum* by *Aleochara* spp., although other mechanisms may be involved (Jonasson 1995). In field plots of canola in Switzerland, later season applications of mustard seed meal attract adult *A. bipustulata* and significantly increase levels of its parasitism of *D. radicum* (Riley *et al.* 2007). In a Y-tube olfactometer, adult *A. bipustulata* are attracted to volatiles released by wet or dry mustard seed meal (Riley *et al.* 2007). Riley *et al.* (2007) found no response to mustard seed meal by *A. bilineata*, either in the field or in the laboratory. An alternative attractant is dimethyl disulphide (DMDS), a volatile compound produced by *D. radicum*-infested roots of *Brassica napus* L. (Ferry *et al.* 2007). Pitfall traps baited with DMDS catch significantly more adult *A. bilineata* and *A. bipustulata* than do unbaited control traps (Ferry *et al.* 2007). However, attracting the two *Aleochara* species to broccoli plots early in the growing season by enhancing the levels of DMDS does not increase predation of *D. radicum* eggs or reduce crop damage (Ferry *et al.* 2009).

It might be inferred that DMDS is the active ingredient in mustard seed meal and, as the meal is a health food of poorly defined chemical composition, that future research efforts should focus on DMDS. However, the responses of the *Aleochara* species to DMDS and mustard seed meal are not identical. Thus either the attractive volatile in mustard seed meal is not DMDS or, if DMDS is a component of mustard seed meal volatiles, other components affect the responses of the *Aleochara* species. Therefore, the objective of this study was to determine whether DMDS is a component of the volatile mixture given off by mustard seed meal.

## Methods

Two batches of mustard seed meal were tested. Both were white defatted mustard seed meal purchased from Kräuterpflug, Kiel, Germany. One was an aliquot of the meal that attracted *A. bipustulata* in the study of Riley *et al.* (2007); the meal had been stored in a sealed glass jar at room temperature until our analysis in 2011. The second batch was newly purchased in 2011. Headspace solid phase microextraction (SPME) combined with gas chromatography-mass spectrometry (GC-MS) was used to detect volatile species. The headspace of 1 g of sample was exposed to a 1 cm SPME fibre with a 100 µm nonbonded PDMS coating (Supelco, Bellefonte, PA) for 15 minutes at room temperature in a sealed 10 mL vial. Quantitative standards were prepared by diluting DMDS (Sigma-Aldrich, St. Louis, MO) in methanol; the headspace of 10 µL of solution was extracted under identical conditions to those for meal samples. A Varian (Walnut Creek, CA) Saturn 2100T GC-MS, equipped with a FactorFour VF-5ms column (30 m, 0.25 mm i.d., 0.25-µm, Varian, Walnut Creek, CA) was used for the analysis. Fibres were desorbed using a 2 minute splitless injection at 200 °C. GC programming for samples (modified from Meija *et al.* 2002) was: hold at 35 °C for 4 minutes, ramp to 125 °C at 15 °C/minute, hold for 5 minutes, then ramp to 300 °C at 25 °C/minute and hold for 2 minutes. Standard analysis was abridged at 125 °C. Column flow was 1.2 mL/minute. Using separate aliquots on each occasion, the entire procedure of sampling and analysis was replicated at least three times for the standards and twice for each batch of mustard seed meal. Fibres were cleaned in the GC injector port at 260 °C for 30 minutes before initial use and for 15 minutes between uses.

## Results and Discussion

For each batch of mustard seed meal, and for the standards, results from each of the replicates were extremely similar. SPME extraction has previously been used to detect DMDS from a variety of sources (e.g. Ferry *et al.*, 2007; Pelusio *et al.* 1995), and the effectiveness of our methodology for DMDS detection was demonstrated by the major peak at a retention time of 4.6 minutes for the DMDS standard (Fig. 1A). Although run under identical conditions, samples of mustard seed meal from Riley *et al.* (2007) (Fig. 1B), and those from meal purchased in 2011, had no major peaks with retention times less than 7 min. We therefore conclude that DMDS was not present at detectable levels in either batch of mustard seed meal. Using integration at *m/z* 94, the method detection limit of the analysis was determined to be 14 ng of DMDS. Ferry *et al.* (2007) successfully attracted adults of the two *Aleochara* species to pitfall traps that they estimated released about 2 mg (2 µL) of DMDS per 24 hours.

Peaks we saw in the mustard meal samples appear to match 10 of the 14 peaks seen by Riley *et al.* (2007), although with the exception of peak 2 (limonene) in Riley *et al.*, these peaks were identified by matches with library data, rather than by comparison with standards. Differences in the peaks for mustard seed meal between the two studies are likely methodological: Riley *et al.* (2007) used a different method to extract volatiles and a different GC temperature program that would have precluded detection of DMDS. There were differences in signal intensities of some peaks be-



tween the two batches of mustard seed meal that we tested, but the principle chemical components remained the same.

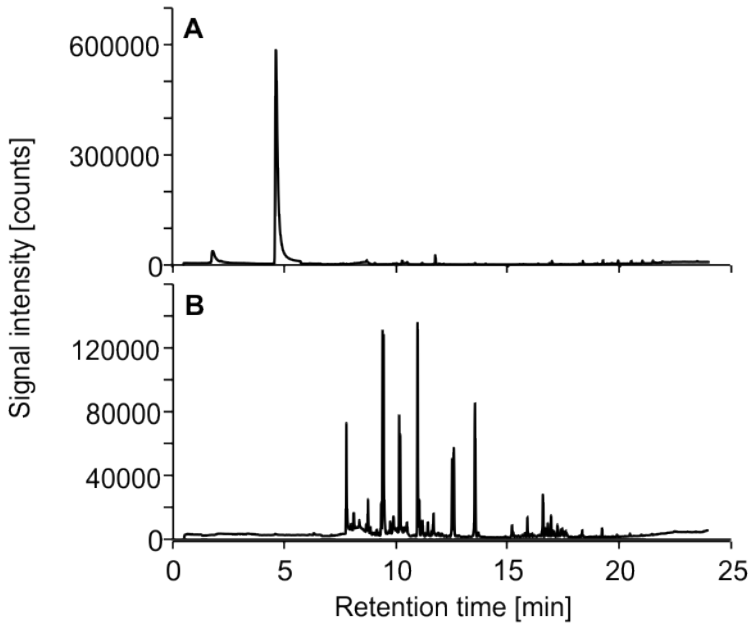


Fig. 1. Chromatograms from SPME samples of the headspace of A. DMDS standard, B. Mustard seed meal from the batch used by Riley *et al.* (2007).

DMDS is known to be released by decomposing brassica plants (Lewis and Papavizas 1970), including buried plant residues of *S. alba* (Wang *et al.* 2009), and by rotting roots of *B. napus* infested with *D. radicum* (Ferry *et al.* 2007). However, Jonasson (1995) showed that mustard seed meal is most attractive to *A. bipustulata* when it is freshly applied, and Riley *et al.* (2007) demonstrated that fresh, dry mustard seed meal attracts *A. bipustulata* adults. DMDS may be released during subsequent decomposition of the mustard seed meal, but the successful enhancement of biological control by fresh mustard seed meal (Ahlström-Olsson and Jonasson 1992; Jonasson 1995; Riley *et al.* 2007) is not caused by DMDS.

Attraction of *A. bipustulata* adults to mustard seed meal that lacks DMDS suggests that diverse chemical cues are involved in host and prey finding in this species. The failure of enhancement of *D. radicum* mortality with DMDS (Ferry *et al.* 2009) and successes with mustard seed meal (Ahlström-Olsson and Jonasson 1992; Riley *et al.* 2007) suggest that further work with mustard seed meal would be useful. In particular, elucidation of *A. bipustulata* responses to each of the volatile compounds given off by the meal might provide a chemically-defined tool for manipulation of this important

natural enemy of *D. radicum*. In addition to enhancing *D. radicum* mortality, such a tool might inhibit initial dispersal from release sites and so reduce the potential for Allee effects to interfere with establishment (Hopper and Raush 1993), in the event that *A. bipustulata* is released in a classical biological control program.

## Acknowledgements

We thank L. Andreassen, University of Manitoba, and T. Haye, CABI-Europe Switzerland, for helping to procure mustard seed meal, and Swarthmore College, the Canola Council of Canada, Western Grains Research Fund and the Canada-Manitoba Agri-Food Research and Development Initiative for funding.

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# **67<sup>th</sup> Annual Meeting**

## **Entomological Society of Manitoba**

**Friday October 21, 2011**  
**Freshwater Institute**  
**501 University Crescent**  
**and**  
**Saturday October 22, 2011**  
**Room 219 Animal Science/Entomology Building**  
**University of Manitoba**

### **Abstracts**

#### **KEYNOTE ADDRESS**

##### **SURVIVOR MANITOBA: LIVING IN MANITOBA'S WETLANDS.**

Dale A. Wrubleski, Ducks Unlimited Canada, P.O. Box 1160, Stonewall, Manitoba, R0C 2Z0.

Manitoba is a wetland province. An estimated 41% or 224,700 km<sup>2</sup> of the province is covered in wetlands. They range from the vast peatlands of the north, extensive coastal wetlands around our three great lakes, to the relatively tiny but numerous prairie potholes. Wetlands in Manitoba provide an abundant and diverse range of shallow aquatic habitats for a variety of organisms. Manitoba is also a province of climatic extremes, and this has much to do with the distribution and types of wetlands we find in our province. It is also a significant factor in determining who we find living in these habitats. Wetland inhabitants must be able to tolerate a wide range of conditions. For example, prairie pothole wetlands often go dry during drought on the prairies. Inhabitants must have some means of tolerating dry conditions, or have some way of reestablishing populations if they are extirpated. The same must also go for winter conditions, as all or part of the water column will freeze solid each year. Yet prairie wetlands are very productive and support a wide variety of organisms that are able to tolerate these extreme conditions. Examples of the many adaptations that animals use to survive in Manitoba wetlands will be presented, from the prairie potholes to the northern peatlands.

## Submitted Papers

### MANIPULATING THE HIVE ENVIRONMENT TO ENHANCE GROOMING BEHAVIOUR IN HONEY BEE COLONIES.

Rassol Bahreini, and R.W Currie, Department of Entomology, University of Manitoba, Winnipeg, Manitoba, R3T 2N2.

Honey bees can reduce varroa mite (*Varroa destructor* A. & T.) load over winter through grooming behaviour but success is affected by environmental factors (e.g., temperature, humidity and possibly carbon dioxide). The objective of this study was to manipulate ventilation rate to assess interactions between CO<sub>2</sub> concentration, grooming behaviour and mite load reduction in different genotypes of honey bees. In this experiment, twenty-two small hives from resistant (n=10) and susceptible (n=12) varroa-infested bees were randomly positioned in either standard ventilation conditions in an overwintering building at a temperature of ~5 °C or under controlled ventilation in a plexi-glass chamber at a “low” ventilation rate (0.24 L/min). Following the 14 days of treatment, the change in varroa mite mean abundance was calculated. The proportional change in mean abundance of mites in resistant bees decreased (-0.320±0.081) over time, but increased slightly in susceptible bees (0.019±0.081) when kept under normal ventilation. Mean abundance decreased at similar rates in both genotypes of bees when held under restricted ventilation (Resistant: -0.347±0.081, Susceptible: -0.379±0.081). Average of CO<sub>2</sub> concentration in the bee cluster under restricted ventilation was similar for both genotypes (resistant: 4.35±0.37%, susceptible: 4.32±0.37%) but higher than those which were maintained under normal ventilation (resistant: 2.08±0.37%, susceptible: 1.62±0.37%). Our results demonstrated that both bee genotype and low ventilation rate have the potential to enhance varroa mite mortality in clusters of wintering honey bees.

### MOLECULAR PHYLOGENY OF *VANESSA* BUTTERFLIES (LEPIDOPTERA: NYMPHALIDAE).

R. Abbasi, and J.M. Marcus, Department of Biological Sciences, University of Manitoba, Winnipeg, Manitoba, R3T 2N2.

*Vanessa* is a cosmopolitan genus including 20 species of butterflies; *V. cardui*, the painted lady, is the most widespread extant butterfly species. There are two published molecular phylogenetics studies of *Vanessa* by Wahlberg *et al.* (2005) and Otaki *et al.* (2006). The study by Wahlberg *et al.* (2005) used three genes: *COI*, *EF1-a* and *wingless* and included 10 out of 20 species. The analysis by Wahlberg *et al.* (2005) suggests only one lineage of *Vanessa* butterflies. However, the study by Otaki *et al.* (2006) using two genes (*COI* and *ND5*) and 12 out of 20 species proposes three distinct lineages within the genus. The two studies used different philosophical frameworks for phylogenetic analysis. I shall examine and reanalyze both of these published data sets using a consistent phylogenetics framework to test the degree to which these two studies support different evolutionary hypotheses. I shall then use my own data and a more comprehensive taxon and gene sampling to produce a definitive phylogeny for this genus.

**DETERMINATION OF DAKOTA SKIPPER (*HESPERIA DACOTAE*) CRITICAL HABITAT IN MANITOBA: CHARACTERIZATION OF VEGETATION.**

C.L. Rigney, and A.R. Westwood, Department of Biology, University of Winnipeg, 515 Portage Avenue, Winnipeg, Manitoba, R3B 2E9.

The Dakota skipper, *Hesperia dacotae*, is a threatened butterfly restricted to fragmented prairies in Manitoba. There are limited data on the life history and habitat requirements in Canada to implement effective conservation measures. We seek to better understand key biological and physical habitat requirements to develop a preferred site profile. Vegetation and nectar flower surveys were conducted in 2010. Analysis of the vegetation abundance and diversity was used to develop critical habitat profiles to determine optimal Dakota skipper habitat.

**INFESTATION PARAMETERS OF CHEWING LICE (PHTHIRAPTERA: MENOPONIDAE, PHILOPTERIDAE) ON ADULT AND JUVENILE MALLARDS (*ANAS PLATYRHYNCHOS*) IN MANITOBA.**

Alexandra Grossi, University of Manitoba, Faculty of Agriculture and Food Science, Department of Entomology, Winnipeg, Manitoba R3T 2N2.

Mallards (*Anas platyrhynchos*) are host to seven species of chewing lice. Over 16 years, 243 ducks were salvaged from rehabilitation centres and washed to remove lice. Three classes of birds were compared, downy chicks (n=150), partly feathered to fully feathered young (n=23) and adults and flying young of the year (n=64). Infestations in all three classes were highly aggregated (k= 0.122, 0.287 and 0.245, respectively). Prevalence was highest in the partly feathered to fully feathered young class (78.3%), with a mean intensity of 106.8 (range: 1-472); followed by the adult and flying young of the year class with a prevalence of 67.2% and a mean intensity of 33.1 (range: 1-336). Downy chicks had the lowest prevalence (36.0%) with a mean intensity of 10.8 (range: 1-75). Mean intensity for lice on all ducks in decreasing order was *Anatoecus* (32.5), *Anaticola* (12.4), *Holomenopon* (11.4) and *Trinoton* (9.3).

**SEASONAL DYNAMICS OF ECTOPARASITES INFESTING RICHARDSON'S GROUND SQUIRREL, *UROCITELLUS RICHARDSONII*.**

M. Yunik, Department of Entomology, University of Manitoba, Winnipeg, Manitoba R3T 2N2.

Two hundred and fourteen Richardson's ground squirrels, *Urocitellus richardsonii*, were trapped at the Assiniboine Park Zoo, 22 March to 17 September, 2010. Euthanized squirrels were aged, sexed, date of collection recorded, and washed to remove ectoparasites. Ectoparasites were identified to species, by stage of development and sex. In total, 1,033 fleas and 5,057 lice were removed. There were 922 ground squirrel fleas, *Oropsylla (Opistocrostis) bruneri*. The mouse fleas, *Eptedia wenmanni wenmanni* (n=96), *Ctenophthalmus pseudagyrtis pseudagyrtis* (n=13), and *Orchopeus leucopus* (n=2) were also collected. The only louse species recorded was *Linognathoides laeviusculus*. There were two peaks in prevalence of *O. bruneri* occurring

in late May and late summer. Mean intensity of infestation was approximately four fleas per host for the majority of the trapping season but climbed to 18 fleas per host in the fall. Host sex and age had no significant effect on infestation by male or female fleas. There were two peaks in prevalence of *L. laeviusculus* infestations occurring in early April and mid June. One peak in *L. laeviusculus* mean intensity was observed in early June. Juvenile squirrels had significantly higher prevalence and mean intensity of lice when compared to adults. Adult lice comprised most of the population infesting emerging adult squirrels in the spring but nymphs predominated for most of the trapping season. Distributions of infestations by fleas and lice were highly aggregated, lice being more aggregated than the fleas. The seasonal dynamics of the ectoparasites appear to be strongly correlated with the annual cycle of the squirrel.

### **CHEWING LICE (PHTHIRAPTERA) ON AMERICAN WHITE PELICAN AND DOUBLE-CRESTED CORMORANT (PELECANIFORMES; SULIFORMES) IN MANITOBA.**

Terry D. Galloway, Department of Entomology, University of Manitoba, Winnipeg, Manitoba R3T 2N2.

Twenty-nine American White Pelicans, *Pelecanus erythrorhynchos*, salvaged from rehabilitation hospitals from 1994-2011 were infested by *Colpocephalum unciferum*, *Piagetiella peralis* and *Pectinopygus tordoffi* (prevalence - 93.1%, 100% and 100%, respectively; mean intensity - 258.2, 519.4 and 546.6, respectively). *Piagetiella peralis* infested the body and pouch; only adult lice were found in the pouch. Female *P. peralis* were often paired with males, and often *in copula*. Double-crested Cormorants, *Phalacrocorax auritus*, (n=54) collected over the same time period were infested by *Eidmanniella pellucida* and *Pectinopygus farallonii* (prevalence - 75.9 and 98.1%, respectively; mean intensity - 226.7 and 380.6, respectively). Although *Piagetiella incomposita* has been often recorded from Double-crested Cormorants in North America, none were found infesting birds in Manitoba. Males predominated in *P. peralis* and *Pectinopygus* spp. The most heavily infested pelican carried 2,654 lice; the most heavily infested cormorant carried 3,422 lice.

### **MOLECULAR IDENTIFICATION OF BLACK-LEGGED *Aedes/Ochlerotatus* SPECIES (DIPTERA: CULICIDAE) OCCURRING IN MANITOBA, CANADA USING PCR-RFLP TECHNIQUE.**

Hooman H. Namin, B. Sharanowski, and M. Iranpour, Department of Entomology, University of Manitoba, Winnipeg, Manitoba R3T 2N2.

About twenty species of black-legged *Aedes/Ochlerotatus* have been reported in Manitoba, Canada. Many species of this group are considered important vectors because of their potential to transmit a number of human viral-pathogens. Accurate and rapid identification of the pathogens and vectors are essential parts of epidemiological studies which can be used for directing mosquito control programs. Previous studies have indicated that mitochondrial DNA analysis can be used for reliable and quick identification of closely related taxa due to relatively low rate of recombina-

tion, maternal inheritance and rapid rates of evolution. This work attempts to apply the PCR-restriction fragment length polymorphism (PCR-RFLP) technique using mitochondrial DNA for the identification of several members of the black-legged *Aedes/Ochlerotatus* species distributed in Manitoba.

### **RNA INTERFERENCE AS A POTENTIAL SPECIES-SPECIFIC PESTICIDE AGAINST MOSQUITOES.**

A.D. Singh, S. Wong, C. Ryan, and S. Whyard, Department of Biological Sciences, University of Manitoba, Winnipeg, Manitoba R3T 2N2.

The gene silencing mechanism, RNA interference (RNAi), has been extensively used as a tool to identify gene functions in many organisms. As it is induced by double-stranded RNA (dsRNA) complementary to a gene target, RNAi also has the potential to be used as a species-specific pesticide to silence essential genes in pests. However, widespread use of RNAi is dependent on the development of easier methods of dsRNA delivery. The yellow fever mosquito, *Aedes aegypti*, transmits several viruses to humans, including Dengue and West Nile Virus. Current control of these mosquitoes involves the use of broad-spectrum chemical insecticides. With growing concerns over the use of chemical pesticides, new control methods are being sought. We examined the efficacy of inducing RNAi in the mosquito, *Ae. aegypti*, by feeding pesticidal dsRNAs to first instar larvae using a simple soaking method. Stunted growth and mortality were observed when larvae were fed dsRNAs targeting chitin synthase and heat shock protein 83. A dose-dependent mortality response was observed in larvae fed dsRNAs targeting  $\alpha$ -tubulin. Species-specificity was also observed when the fruit fly, *Drosophila melanogaster*, was fed dsRNAs specific to the mosquito, and showed no significant adverse effects, whereas fruit fly-specific dsRNAs killed the fruit fly larvae. Orally-delivered dsRNAs have the potential to be developed into a novel class of species-specific insecticides.

### **IDENTIFICATION OF THE CARBON DIOXIDE GENES IN THE YELLOW FEVER VIRUS VECTOR MOSQUITO, *AEDES AEGYPTI*.**

C.N.G. Erdelyan, T.H. Mahood, T. Bader, and S. Whyard, Department of Biological Sciences, University of Manitoba, Winnipeg, Manitoba R3T 2N2.

Carbon dioxide is a long-range chemosensory cue to many haematophagous insects, including female mosquitoes. The CO<sub>2</sub> receptor in the fruit fly, *D. melanogaster*, was previously determined to be a heterodimer composed of two gustatory receptor proteins, *DmGr21a* and *DmGr63a*. Bioinformatic analyses of the genomes of the Yellow fever mosquito *Aedes aegypti* and the West Nile virus vector *Culex pipiens quinquefasciatus* identified three predicted proteins (*Gr1*, *Gr2*, and *Gr3*) with high degrees of identity to the *Drosophila* CO<sub>2</sub> receptor proteins. Quantitative RT-PCR analyses revealed that all three *Gr* genes are expressed in the maxillary palps and not the antennae in *Ae. aegypti* and *Cx. pipiens quinquefasciatus*. RNA interference (RNAi)-mediated knockdown of either *Gr1* or *Gr3* in *Ae. aegypti* resulted in loss of CO<sub>2</sub> sensitivity in both male and female mosquitoes, while knockdown of *Gr2* had no



apparent affect on CO<sub>2</sub> detection, thereby supporting the premise that the CO<sub>2</sub> receptor in mosquitoes is also a heterodimer of the *Gr1* and *Gr3* proteins. Interestingly, expression of the two CO<sub>2</sub> receptor genes was not equivalent in the two sexes and may reflect differential use of the CO<sub>2</sub> perception in males and females. The functional validation of the CO<sub>2</sub> receptor in mosquitoes could prove useful in the strategic design of compounds that could inhibit the mosquitoes' ability to perceive CO<sub>2</sub> and also aid in the development of more potent insect repellents.

### **IS HE A STUD OR DUD? INHIBITING GENES INVOLVED IN MOSQUITO SEXUAL DEVELOPMENT AND FERTILITY.**

Steve Whyard, H. Collins, M. Francisco, R. Capina, A. Partridge, and A. Turko, Department of Biological Sciences, University of Manitoba, Winnipeg, Manitoba R3T 2N2.

The Sterile Insect Technique (SIT) is a method of controlling pest insects by releasing large numbers of sterile males into the environment to compete for female mates. Radiation is often used to sterilize the insects, but it can render the males less competitive than their wild counterparts. Ideally, only males should be released, as females, even when sterile, can either attack crops or transmit pathogens. We are developing genetic modification techniques to produce all-male, sterile populations of insects for SIT. Here, we describe our efforts to apply these tools to the yellow fever mosquito, *Aedes aegypti*. We have identified and characterized the genes involved in the sex determination pathway of *Ae. aegypti*, and using RNA interference (RNAi) techniques to silence female-specific gene expression, we suppressed the development of female mosquitoes, thereby producing all-male cohorts. Using RNAi to suppress genes involved in spermatogenesis, we also rendered males sterile. Interestingly, some genes once thought to be testis-specific, when silenced, reduced the male's interest or ability to mate, which suggests that these genes may also influence mating behaviour and silencing them may prove unsuitable for SIT. However, we have identified some candidate genes that appear to prevent the development of sperm, and yet the sterile males are highly competitive with fertile males when offered mates. The prospect of using genetically-modified mosquitoes in an SIT program is intriguing, but understandably, we will want to ensure that we produce only males, and that they are good competitors in the mating game.

### **DOES RAPID REMOVAL OF INFECTED TREES REDUCE DUTCH ELM DISEASE INFECTION RATES: A REAL WORLD STUDY.**

Jonathan Veilleux<sup>1</sup>, J. Leferink<sup>2</sup>, and N.J. Holliday<sup>1</sup>, <sup>1</sup>Department of Entomology, University of Manitoba, Winnipeg, Manitoba R3T 2N2; <sup>2</sup>Manitoba Conservation – Forestry Branch, Winnipeg, Manitoba R3J 3W3.

From 2004–10 in seven pairs of Manitoba communities, American elm trees newly displaying symptoms of Dutch elm disease (DED) were removed within six weeks of symptom detection in one member of the pair; in the other, removal was at the standard time of fall or winter. The average annual prevalence of DED in rapid removal communities was 1.5±0.2% — significantly lower than the 3.1±0.4% with

fall/winter removal. In a decade in such communities, rapid removal could reduce elm losses by \$600,000/km<sup>2</sup>.

### **BIONOMICS OF THE BANDED ELM BARK BEETLE, *SCOLYTUS SCHEVYREWI*, IN SASKATCHEWAN AND MANITOBA AND IMPLICATIONS FOR DUTCH ELM DISEASE MANAGEMENT.**

Jonathan Veilleux, and N.J. Holliday, Department of Entomology, University of Manitoba, Winnipeg, Manitoba R3T 2N2.

If the alien invasive *S. schevyrewi* were to vector Dutch elm disease (DED) on the Prairies, its arrival could compromise programs protecting urban American elms from DED. Sticky trap and trap log data from 2009 and 2010 show that *S. schevyrewi* was multivoltine, with adults trapped most frequently in late summer, and that mature larvae survived winter. Siberian elm was the preferred brood host and is seldom infected with DED, so the probability of DED transmission by *S. schevyrewi* may be small.

### **EFFECT OF *LYGUS LINEOLARIS* ON NAVY BEANS.**

Tharshy Nagalingam, and N.J. Holliday, Department of Entomology, University of Manitoba, Winnipeg, Manitoba R3T 3N2.

More than 80% of the of the plant bugs attacking navy beans in Manitoba are *Lygus lineolaris*, and their effects on yield quality and quantity were studied in field cages and the laboratory. At flowering and pod formation, *L. lineolaris* nymphs and adults caused significant loss in seed yield weight, primarily due to abortion of plant reproductive structures. Near pod maturation, losses of yield weight were not significant, but seed quality and grade were reduced by direct injury to the seed coat.

### **RESPONSES OF *ALEOCHARA BILINEATA* AND *A. BIPUSTULATA* (COLEOPTERA: STAPHYLINIDAE) TO DIMETHYL DISULPHIDE.**

Jing Du, and N.J. Holliday, Department of Entomology, University of Manitoba, Winnipeg, Manitoba, Canada R3T 2N2 .

*Aleochara bilineata* and *A. bipustulata* are natural enemies of *Delia radicum*, and are attracted to dimethyl disulphide (DMDS)-baited traps. In the laboratory, both *Aleochara* spp. responded similarly to DMDS: larvae were arrested by DMDS and preferred to attack *D. radicum* puparia associated with DMDS. In still air, adults were uninfluenced by DMDS. In a Y-tube olfactometer, newly-emerged adults of both sexes avoided DMDS-laden air; after 10 days, mated females were attracted to DMDS but males were not.

### **FACTORS AFFECTING THE TIME OF OVIPOSITION OF THE POTENTIAL WEED BIOLOGICAL CONTROL AGENT *EUPHRANTA CONNEXA* (DIPTERA: TEPHRITIDAE).**

Alicia M. Leroux<sup>1,2</sup>, and A. Gassmann<sup>2</sup>, <sup>1</sup>Department of Entomology, University of Manitoba, Winnipeg, Manitoba R3T 2N2; <sup>2</sup>CABI Europe-Switzerland, CH-2800 Delémont, Switzerland.

Swallow-worts, *Vincetoxicum rossicum* and *V. nigrum*, are native to the eastern and Mediterranean areas of Europe, respectively. During the later part of the 1900's, these species escaped from cultivation and are now a serious threat to the native and agricultural ecosystems of the north eastern U.S., Ontario, Quebec, British Columbia (*V. rossicum* only), and California (*V. nigrum* only). *Euphranta connexa* is a European tephritid fly that is thought to reduce seed production by swallow-worts, and has been identified as a potential biological control agent for introduction to North America. Females lay their eggs in swallow-wort pods and the larvae feed on pod contents; mature larvae pupate in the soil, and winter is spent in pupal diapause. In 2011, two experiments were conducted to investigate the factors determining the time of oviposition by female flies. The duration of pupal post-diapause development was assessed at six constant temperatures. So far, adults of *E. connexa* have emerged in 15, 20, and 25°C treatments; adults have yet to emerge from the apparently healthy pupae held at 10°C. At 30 and 35°C there was no emergence. Unmated females were housed at 20°C and at intervals after emergence, were killed and dissected to determine whether they contained mature eggs. Mature eggs were found in unmated females starting 2 days after emergence. We shall discuss the implications of these results for development of experimental protocols for assessing the suitability of *E. connexa* for biological control of *Vincetoxicum* spp.

### ***CHLAENIUS CORDICOLLIS* (COLEOPTERA: CARABIDAE) ON BEACHES: MECHANISMS OF AGGREGATION.**

Neil J. Holliday<sup>1</sup>, A.E. Holliday<sup>2</sup>, and T.M Mattingly<sup>2</sup>, <sup>1</sup> Department of Entomology, University of Manitoba, Winnipeg, Manitoba R3T 2N2; <sup>2</sup> Department of Chemistry and Biochemistry, Swarthmore College, 500 College Avenue, Swarthmore, PA 19081-1397.

*Chlaenius cordicollis* is a large nocturnal ground beetle that inhabits freshwater shorelines that have limestone slabs and pebbles. Adult beetles have characteristic odours, some of which are associated with a defensive spray. In summer, during the day, adults are frequently found in aggregations. Beetles are aggregated vertically on the beach, and their locations are correlated with recent water levels and weather. Beetles are also aggregated horizontally with respect to the beach. We are examining two hypotheses to explain how horizontal aggregations form: either that aggregation is brought about by responses to pheromones produced by beetles, or that no pheromones are involved and beetles individually choose the same locations in response to environmental characteristics. Using GC-MS analysis of Solid Phase Micro-extraction (SPME) fibre extracts of headspace volatiles from individual beetles, we have identified several compounds produced by the beetles. The defensive spray is known to be

mostly 3-methylphenol (m-cresol); this compound and other phenols are present at high concentrations in the head space after a beetle's antenna has been pinched with forceps. Benzyl alcohol is sometimes also present in the head space. Differences in volatile compositions do not appear to be sex-related. Bioassays are being performed to assess whether 3-methylphenol, benzyl alcohol, or mixtures of the two, induce behaviours that would result in aggregation of the beetles.

## **INSECTS ON FIELD CROPS IN MANITOBA IN 2011 – AN EXTENSION UPDATE.**

John Gavloski, Manitoba Agriculture, Food and Rural Initiatives, Box 1149, Carman, Manitoba R0G 0J0.

The biggest insect concerns in cereal crops in 2011 were aphids, armyworms (*Mythimna unipuncta*), and thrips. Diamondback moth (*Plutella xylostella*) and lygus bugs were widespread concerns in canola, and there were localized problems with bertha armyworm, *Mamestra configurata*. High levels of striped flea beetle, *Phyllotreta striolata*, in some canola fields in eastern Manitoba in mid- and late-July were an unusual occurrence. Soybean aphid, *Aphis glycines*, populations were at economic levels in many soybean fields from late-July to late-August. Levels of zebra caterpillar, *Melanchra picta*, were high and a concern to some canola and flax growers in late-August and early-September. Annual summaries of insect pests in crops in Manitoba are posted at: <http://www.gov.mb.ca/agriculture/crops/insects/index.html>.

## **Posters**

### **OVERWINTERING OF THE NATIVE ELM BARK BEETLE, *HYLURGOPINUS RUFIPES*, IN AMERICAN ELM TREES, *ULMUS AMERICANA*, IN MANITOBA.**

Sunday Oghiakhe, and N.J. Holliday, Department of Entomology, University of Manitoba, Winnipeg, Manitoba R3T 2N2.

*Hylurgopinus rufipes* is the major vector of Dutch elm disease (DED) in Manitoba. Adult *H. rufipes* overwinter in trunks of healthy American elms and basal insecticide applications are made to such trees for DED management. In a previous study, few beetles overwintered >55 cm above the ground. In this study, we sought to define more precisely the distribution of overwintering beetles. In river bank forest sites, bark on the lower trunk of selected healthy American elms was subdivided into sample plots by scoring with a saw. Holes in the marked bark plots were counted in summer and in late fall to estimate the number of entrance holes for the current year. In one site, adult beetles, marked with Day-Glo powder, were released from trap logs in late summer. In winter, some of the sampled trees were felled, and slices at different heights were dissected; overwintering *H. rufipes* that were found were counted and assessed to determine whether they carried spores of the DED pathogen and whether they were marked. Entrance holes were most dense in the basal 15 cm and overwintering beetles were most dense in the basal 5 cm of sampled tree trunks. We record for the first time that many *H. rufipes* overwinter underground. Up to 83.1% of unmarked overwintering beetles carried pathogen spores. In sites where marked beetles had been released,

about 50% of overwintering beetles had marks and marked beetles never carried spores. The implications of these findings for disease management will be discussed.

### LICE ON THE AMERICAN ROBIN: SEASONAL INFESTATION PARAMETERS OF CHEWING LICE (INSECTA: PHTHIRAPTERA) ON THE AMERICAN ROBIN (*TURDUS MIGRATORIUS*) IN MANITOBA.

Zoe Rempel, Department of Entomology, University of Manitoba, Winnipeg, Manitoba R3T 2N2.

The primary objective was to determine infestation parameters of lice on the American Robin. The secondary objective was to test the hypothesis that louse populations would be higher in spring than fall. Birds (n=434) were salvaged from the Prairie Wildlife Rehabilitation Centre, the Wildlife Haven, and the general public. Louse populations were collected by washing the birds in warm soapy water and straining the sample through a fine sieve. *Brueelia iliaci*, *Sturnidoecus simplex* and *Ricinus elongatus* were the most abundant species found in this study. Total prevalence and mean intensity of *Brueelia iliaci* were 10.8% and 13.2, respectively. *Sturnidoecus simplex* had a prevalence of 12.0% and a mean intensity of 10.8. *Ricinus elongatus* had a prevalence of 5.1% and a mean intensity of 4.2. *Myrsidea emersoni* and *Menacanthus eurysternus* were present but prevalence was <1%. Except for the prevalence of *Sturnidoecus simplex*, the prevalence and mean intensities of louse populations were higher in spring. This increase of louse populations in spring could be due to stress of migration or breeding. A stressed bird may not preen effectively, allowing for an increase in the ectoparasite populations. It is important to obtain quantitative data for avian lice because they contribute to biodiversity and could potentially affect the fitness of their host.

### DISPERSION AND SAMPLING OF ADULT ROCKY MOUNTAIN WOOD TICKS IN RANGELAND IN WESTERN NORTH AMERICA.

Kateryn Rochon<sup>1</sup>, G.A. Scoles<sup>2</sup>, and T.J. Lysyk<sup>1</sup>, <sup>1</sup>Lethbridge Research Centre, Agriculture and Agri-Food Canada, Lethbridge, AB, T1J 4B1; <sup>2</sup>USDA-ARS Animal Disease Research Unit, Pullman, WA 99164.

Off-host populations of adult Rocky Mountain wood tick, *Dermacentor andersoni* (Stiles), were sampled by dragging at 13 locations in Alberta, Washington, and Oregon. A total of 222 samples were taken, ranging in size from 86-250 10 m<sup>2</sup> quadrats. In simulated quadrats ranging in size from 20-50 m<sup>2</sup>, none of these sizes provided estimates more precise than using 10 m<sup>2</sup> quadrats. Using index of dispersion test, samples taken when abundance was < 0.04 ticks per 10 m<sup>2</sup> were less likely to depart significantly from randomness than samples taken when abundance was greater. Data were grouped into ten abundance classes and assessed for fit to the Poisson and negative binomial distributions. The Poisson distribution fit only data in abundance classes < 0.02 ticks per 10 m<sup>2</sup>, while the negative binomial distribution fit data from all abundance classes. A negative binomial distribution with common k = 0.3742 fit data in 8 of the 10 abundance classes. Both the Taylor and Iwao mean-variance relationships were fit and used to predict sample sizes for a fixed level of precision.

Sample sizes predicted using the Taylor model tended to underestimate actual sample sizes, while sample sizes estimated using the Iwao model tended to overestimate actual sample sizes. Using a negative binomial with common  $k$  provided estimates of required sample sizes closest to empirically calculated sample sizes.

## **Symposium**

### **Manitoba: A Province of Extremes**

#### **EXTREME TEMPERATURES: ADAPTATIONS BY INSECTS AND CONTROL OF STORED-PRODUCT INSECTS.**

Paul Fields<sup>1</sup>, and F. Jian<sup>2</sup>, <sup>1</sup>Cereal Research Centre, Agriculture and Agri-Food Canada, 195 Dafoe Rd., Winnipeg, Manitoba, R3T 2M9; <sup>2</sup>Department of Biosystems Engineering, University of Manitoba, 75A Chancellor's Circle, Winnipeg, Manitoba R3T 2N2.

Insects are found in almost all habitats on the planet. The only major habitat they have failed to exploit extensively is salt water. Insect growth, feeding and movement normally occur from 5 to 40°C, yet temperatures in many habitats go below or above this safe zone. We shall give examples of insects that are able to survive extreme low (-270°C) or high (100°C) temperatures, and examine how they have adapted to these extreme temperatures. The habitat of the stored products is one of the most influenced by humans, and extreme temperatures are often used to control insect populations in grain bins and elevators. The Canadian Prairie winter is an excellent way to control pests of stored wheat. Low temperature is also used to control insects in flour mills. With the loss of the fumigant methyl bromide, flour mills and pasta production plants have begun to use extreme heat, 50°C for 24 h, to control insects. There are extensive data on the time and duration needed to control stored-product insects at extreme temperatures. Most of these laboratory data are at constant temperatures. However, insects are exposed to fluctuating temperatures in their habitats. We present some of the mathematical models used to predict insect mortality at extreme temperatures.

#### **THE EFFECTS OF SHORT TERM EXTREME WEATHER EVENTS AND LONG TERM CLIMATE CHANGE ON THE LIFE HISTORY TRAITS AND HABITAT USE OF SOME MANITOBA BUTTERFLIES (LEPIDOPTERA).**

Richard Westwood, Department of Biology, University of Winnipeg, 515 Portage Ave., Winnipeg, Manitoba R3B 2E9.

Accumulating evidence indicates that changes in long term global climate patterns are likely to cause a discernible shift in butterfly distributions on temporal and spatial scales. Recent research in Manitoba has examined the effects of climate changes on phenology of butterflies in boreal forest ecosystems. The results of these studies are discussed along with the implications for future movement of biota in Manitoba. The short term effect of local extreme weather events on endangered butterflies in Manitoba is contrasted with potential long term climate change influences.

## **INSECTS OF THE CARBERRY SANDHILLS.**

Robert E. Wrigley, 505 Boreham Boulevard, Winnipeg, Manitoba R3P 0K2.

The Carberry Sandhills represent one of the most-biologically rich regions of Manitoba due to the juxtaposition of three major biomes -- Grassland, Boreal Coniferous Forest and Eastern Deciduous Forest. The sandy soil and moisture gradients have generated a diversity of habitats which provide homes for thousands of species of invertebrates, with conspicuous insects being well represented. The dune fields constitute some desert-like conditions to which many insect species have evolved interesting adaptations, such as avoiding excessive ground temperatures at mid-day by retreating to burrows and by foraging at night. Insects and spiders were collected on several field trips annually from 1995 to 2011, with a focus on tiger beetles. The 13 species of tiger beetles constitute 68% of the provincial list, and up to nine species were taken in daily surveys. The zonation of these beetles was examined, from the sand and clay exposures along the Assiniboine River, riparian deciduous forest, oak-aspens-pruce savanna, mixed-grass prairie, sparse shrub-grass sand flats and slopes, to the peaks of the barren dunes. The Carberry Sandhills provide refuge for two tiger beetle species at-risk -- the Ghost Tiger Beetle (*Cicindela lepida*) is found sparingly on the open dunes and at this single locality in the province, and the Hairy-necked Tiger Beetle (*Cicindela hirticollis*) is restricted to sandy shoreline habitat which has been greatly impacted by human activities and flooding. The author presented a proposal to Manitoba Conservation in 1998 to create a 3.2 km<sup>2</sup> Spirit Sands Ecological Reserve within Spruce Woods Provincial Park to offer the highest level of protection for representative habitats and biota. A photo-survey of other insect families is provided. Over 3000 specimens of arthropods from the Carberry Sandhills were prepared and donated to the J.B. Wallis/R.E. Roughley Museum of Entomology.

## **ENVIRONMENTAL ASSESSMENT AND MONITORING IN NORTHERN MANITOBA.**

F. Schneider-Vieira, North/South Consultants, Inc., Winnipeg, Manitoba R3Y 1G4.

North/South Consultants is a Winnipeg-based environmental consulting firm, specializing in the aquatic environment. Our work focuses on practical problems: predicting and monitoring the effects of developments, and identifying ways of addressing adverse environmental effects, to the extent practicable. The variations in aquatic habitats create many challenges spatially and temporally, in particular as the waterbodies and time scales of interest are set by the project being assessed. Typically environmental assessment in the aquatic environment considers the range of environmental components, including water quality, physical attributes of aquatic habitat, algae, macrophytes, zooplankton and benthic invertebrates, and fish. Methods that have been used to sample the range of habitats effectively in large lakes and rivers are discussed, as well as the use of GIS-based analysis as a tool to assist in predicting effects of developments. Issues related to temporal variability, including seasonal, inter-annual and long term shifts in the natural aquatic community are described. An example is provided of the considerations in the development and final design of a recently implemented large scale, long term monitoring program.

***The Entomological Society of Manitoba  
gratefully acknowledges the following organizations  
which provided financial support for the  
67<sup>th</sup> Annual Meeting***

*Abell Pest Control*

*Bayer CropScience Canada Co.*

*Canadian Centre for Mosquito Management*

*Canadian Grain Commission*

*Canola Council of Canada*

*City of Winnipeg Insect Control Branch*

*Dow Agro Sciences Canada, Inc.*

*Metro Pest Control*

*Monarch Pest Control*

*North South Consultants*

*Orkin PCO Services*

*Poullins Pest Control*

*Province of Manitoba-Conservation*

*Viceroy Distributors*



# The Entomological Society of Manitoba

## 67<sup>th</sup> Annual Business Meeting

22 October, 2011

Room 219, Animal Science/Entomology Building,  
University of Manitoba

### Attendance

President	Taz Stuart
Secretary	David Wade
President-elect	Lisa Capar
Regional Director to ESC	Terry Galloway
Proceedings Editor	Terry Galloway
Member-at-Large	Alicia Leroux
Treasurer	Ian Wise
Robert Lamb	
Neil Holliday	
Rob Currie	
John Gavloski	
Kathy Cano	
Kateryn Rochon	
Alejandro Costamagna	
Jonathan Veilleux	
Erica Smith	
Josephine Facunda	
Barb Sharanowski	
Bob Wrigley	
Paul Fields	
Pat Mackay	
Marjorie Smith	
Mahmood Iranpour	
<b>Regrets:</b> Joel Gosselin, Robbin Lindsay, Désirée Vanderwel, Richard Westwood	

### Acceptance of Agenda

*Motion:* Currie/Fields – to accept the Agenda (Appendix A).....Carried

### Acceptance of the Minutes of the Last Annual Business Meeting (23 October 2010)

Jonathan mentioned the incorrect spelling of his and Candice's first names under Appendix Q.

*Motion:* Galloway/Lamb – to accept previous Minutes of the 66<sup>th</sup> Business Meeting with above noted corrections.....Carried

**Business Arising from the Minutes**

There was no business arising from the Minutes.

**Reports – Executive**

*Motion:* Holliday/Lamb – to receive the reports .....Carried

**Appendix B – President**

Stuart thanked Jonathan for redesigning the Society’s web pages and noted that the esm.ca domain is already taken and therefore the site will continue to be hosted by the U. of M. Taz also thanked David Ostermann for his time as Secretary and welcomed David Wade as the new Secretary.

**Appendix C – Treasurer**

Wise reviewed the financial statement for the year. The Society currently has \$54,300 in assets. Difference in expenditures from 2010 is due to the increased cost of printing the Proceedings with all the abstracts from the joint meeting.

There was some general discussion about the financial statement from the Society members.

**Appendix D – Regional Director to the ESC**

Galloway reported that this year’s ESC governing board meeting will be held in November in Halifax and he will report any significant outcomes of that meeting in an upcoming issue of the Newsletter. He also mentioned the change in editor for TCE and the new publication agreement that includes the elimination of page charges for authors including colour figures.

**Appendix E – Editor of the *Proceedings***

Galloway reported that volume 66 (2010) was printed and distributed at this year’s meeting but publication costs were not available yet. He is also looking for more scientific papers and notes to publish in upcoming volumes of the *Proceedings*.

**Appendix F – Endowment Fund Board**

Cano reported the principal stood at \$41,000 at the time of the meeting.

**Reports – Committees**

**Appendix G – Finance**

Cano reported that we are still in good financial shape.

**Appendix H – Publicity/Newsletter**

MacKay reported that three issues were distributed in 2011 and they are always looking for content contributions from the membership. MacKay also stated that she is stepping down as co-editor and will be replaced by Marjorie Smith

**Appendix I – Social**

Capar reported that there were two events planned but one (the New Members Social) had to be cancelled due to too many scheduling conflicts. Next year’s new member social will include both years’ new members.

**Appendix J – Youth Encouragement/Public Education**

Veilleux reported that 58 presentations were given to at least 1300 people and \$308.25 was raised.

**Appendix K – Archives**

Sharanowski reported that there was no activity to report.

**Appendix L – Common Names**

Sharanowski reported that there was no activity to report.

**Appendix M – Scholarship and Awards**

Presented by Wade. The winners were as follows: Student Achievement - Lindsay Geisel; Orkin/SWAT award - Derek Eyer; ESM Graduate Scholarship - Sarah Semmler; Student Paper Competition - Cass Erdelyan.

**Appendix N – Fundraising**

Presented by Wade. \$1600 was raised from 13 donors from September 2009 to August 2010.

**Appendix O – Scientific Program**

Smith reported that there were 56 registrations for this year’s meeting.

**Appendix P – Membership**

Presented by Wade. Membership is at 94, up from 91 last year. MacKay asked how many new members registered at the meeting and was told 6.

**Appendix Q – Web Page**

Currie thanked Jonathan Veilleux for his hard work on the web redesign. Currie asked for volunteers to scan older copies of Proceedings and MB Entomologist. Lamb volunteered to do it. Galloway requested that one bound set of both publications remain intact.....

**Election Results**

President Elect..... Bob Lamb  
Member-at-Large..... Barb Sharanowski

**Appendix R**

*Motion:* Currie/Holliday – to destroy the ballots.....Carried

**New Business**

Kathy Cano recommended the Society drop the SWAT name from the Orkin/SWAT Student Award.

*Motion:* Lamb/Smith – to remove the SWAT name from the Orkin/SWAT Student Award.....Carried

*Motion:* MacKay/Sharanowski – to write Joel Gosselin a letter of gratitude for his fund-raising efforts.....Carried

Marjorie Smith asked for a motion to be put forth to reinvest the T-bill that matures this year.

*Motion:* Sharanowski/Currie – to reinvest the T-bill at \$9000 when it matures  
Carried

*Motion:* Holliday/Lamb – to reappoint the *ad hoc* committee to examine the bylaws .....Carried

Taz Stuart suggested that Society consider having more than one winner for each award. Rob Currie mentioned the financial impact and Paul Fields mentioned they can apply more than once. Overall, the members present felt it was not a good idea.

**Moment of Silence for Deceased Members This Year**

No members passed away this year.

**Transfer of Office** – Taz Stuart to Lisa Capar

**Reappointment of Auditor**

*Motion:* Wise/Lamb – to reappoint Ryan Rawluk CGA as auditor .....Carried

**Other Business** - None

**Adjournment** – 3:24 p.m.

*Motion:* Lamb – to adjourn the meeting .....Carried

# APPENDIX A

**The Entomological Society of Manitoba, Inc.  
Agenda of the Entomological Society of Manitoba  
67<sup>th</sup> Annual Business Meeting  
22 October 2011**

Acceptance of Agenda

Acceptance of the Minutes of the Last Annual Meeting (23 October 2010)

Business Arising from the Minutes

Reports – Executive

**President** – Taz Stuart

**Treasurer** – Ian Wise

**Regional Director to the ESC** – Terry Galloway

**Editor of the Proceedings** – Terry Galloway

**Endowment Fund Board** – Kathy Cano

Reports – Committees

**Finance** – Kathy Cano

**Publicity/Newsletter** – Patricia MacKay, Mahmood Iranpour

**Social** – Lisa Capar

**Youth Encouragement/Public Education** – Jonathan Veilleux

**Archives** – Barb Sharanowski

**Common Names** – Barb Sharanowski

**Scholarship and Awards** – Richard Westwood

**Fund-Raising** – Joel Gosselin

**Scientific Program** – Marj Smith

**Membership** – Désirée Vanderwel

**Web Page** – Rob Currie

Election Results – Scrutineer, Colin Demianyk

New Business

Moment of Silence for Deceased Members This Year

Transfer of Office

Reappointment of Auditor

Other Business

Adjournment

## **APPENDIX B**

### **Entomological Society of Manitoba President's Report – Annual Business Meeting**

The past year has been exciting with the launch of our new ESM website. Many thanks go to Jonathan Veilleux in creating a new, dynamic and updated version of our Society's presence on the web. I have heard nothing but positive comments from people about the new web presence for the ESM. On that topic, the website name ([www.esm.ca](http://www.esm.ca)) is not available for purchase, so the plan to convert from the current University server to an independent server will not occur and the site will still be maintained by Paul Fields and updated by Rob Currie (many thanks for that).

The Executive Committee met earlier this year to discuss the business necessary to run the ESM. By all accounts, we are in good shape and will continue looking that way for the many years to come. We also enjoyed a fantastic talk at Triple B's by Terry Galloway on his experiences in New Zealand during his sabbatical as organized by Lisa Capar. Many thanks to both for providing the members in attendance an opportunity to see a part of the world many may not get to enjoy. If you are lucky enough to travel there, then you can rely on Terry's experiences to make some excellent choices on where and what to do in New Zealand.

I thank David Ostermann for his many years of service as Secretary to the ESM. David's experience to the ESM will be missed. I wish to welcome David Wade officially as our new Secretary. I know David Wade will serve the ESM extremely well in the future.

With respect to the Committee Chairs, we need to replace Jonathan Veilleux for the Youth Encouragement Committee and Public Education Committee; with this report I am asking someone to come forward so if you are interested please let us know.

I personally wish to thank Marjorie Smith and John Gavloski for taking on the primary roles of Scientific Co-Chairs for the ESM's Annual meeting. Plus, I wish to thank Bob Lamb and Joel Gosselin for excellent input and of course fundraising to make our first non-joint annual meeting likely to turn a profit! YAY! Without their hard work, suggestions and ideas for this year's theme, I doubt it would have gotten off the ground.

Lastly, I thank all the people that make the ESM run so well. It's the people who volunteer their time and effort to make this society one of the best in Canada.

Respectfully submitted,  
Taz Stuart  
President, Entomological Society of Manitoba

# APPENDIX C

## Report of the Treasurer

ENTOMOLOGICAL SOCIETY OF MANITOBA INC.  
FINANCIAL STATEMENTS  
(UNAUDITED - SEE REVIEW ENGAGEMENT REPORT)  
AUGUST 31, 2011

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**Ryan Rawluk Certified General Accountant**

PROFESSIONAL CORPORATION

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**REVIEW ENGAGEMENT REPORT**

**To the Members of:**

**Entomological Society of Manitoba Inc.**

I have reviewed the balance sheet of **Entomological Society of Manitoba Inc.** as at **August 31, 2011** and the statements of revenues and expenditures, and net assets for the year then ended. My review was made in accordance with Canadian generally accepted standards for review engagements and, accordingly, consisted primarily of enquiry, analytical procedures, and discussion related to information supplied to us by the Society.

A review does not constitute an audit and, consequently, I do not express an audit opinion on these financial statements.

These financial statements have been prepared using the cash basis of accounting as further described in Note 2. The effects of this departure from Canadian generally accepted accounting principles on the unaudited financial statements has not been determined.

My review indicates that, because these financial statements are prepared using the cash basis of accounting as described in the preceding paragraph, these financial statements are not in accordance with Canadian generally accepted accounting principles.

Winnipeg, Manitoba  
September 28, 2011

  
**Ryan Rawluk**  
**Certified General Accountant**  
**Professional Corporation**



**ENTOMOLOGICAL SOCIETY OF MANITOBA INC.**  
**BALANCE SHEET**  
**(UNAUDITED - SEE REVIEW ENGAGEMENT REPORT)**  
**AUGUST 31, 2011**

<b>ASSETS</b>		<b>2011</b>	<b>2010</b>
<b>CURRENT</b>			
	Cash	\$ 9,344	\$ 11,561
	Money market fund (Note 3)	3,676	3,656
	Term deposits (Note 4)	<u>8,000</u>	<u>8,000</u>
		21,020	23,217
	<b>TERM DEPOSITS (Note 4)</b>	<u>33,280</u>	<u>32,280</u>
		<u><b>54,300</b></u>	<u><b>55,497</b></u>
<b>LIABILITIES</b>			
<b>CURRENT</b>		nil	nil
<b>NET ASSETS</b>			
	<b>INTERNALLY RESTRICTED (Note 5)</b>	41,280	40,000
	<b>UNRESTRICTED NET ASSETS</b>	<u>13,020</u>	<u>15,497</u>
		<u>54,300</u>	<u>55,497</u>
		<u><b>\$ 54,300</b></u>	<u><b>\$ 55,497</b></u>

APPROVED BY THE BOARD:

\_\_\_\_\_ Director

\_\_\_\_\_ Director

The accompanying notes form an integral part of these financial statements

**Ryan Rawluk Certified General Accountant**  
PROFESSIONAL CORPORATION

ENTOMOLOGICAL SOCIETY OF MANITOBA INC.  
STATEMENT OF REVENUES AND EXPENDITURES  
(UNAUDITED - SEE REVIEW ENGAGEMENT REPORT)  
FOR THE YEAR ENDED AUGUST 31, 2011

	<u>2011</u>	<u>2010</u>
<b>REVENUES</b>		
Annual meeting	\$ 670	\$ 2,000
Donations	1,800	-
Interest income	1,143	1,173
Joint ESC/ESM Annual Meeting (Note 6)	-	6,305
Members fees	1,619	1,271
Miscellaneous	1,284	66
Proceedings	31	329
Youth encouragement and public education	<u>650</u>	<u>550</u>
	7,197	11,694
<b>EXPENDITURES</b>		
Awards and scholarships	1,500	2,100
General	2,061	845
Meetings	2,473	2
Newsletter	143	460
Proceedings	1,771	327
Social committee	-	273
Youth encouragement and public education	<u>446</u>	<u>298</u>
	<u>8,394</u>	<u>4,305</u>
<b>EXCESS/(DEFICIT) OF REVENUES OVER EXPENDITURES</b>	<u>\$ (1,197)</u>	<u>\$ 7,389</u>

The accompanying notes form an integral part of these financial statements

**Ryan Rawluk Certified General Accountant**  
PROFESSIONAL CORPORATION

**ENTOMOLOGICAL SOCIETY OF MANITOBA INC.  
STATEMENT OF CHANGES IN NET ASSETS  
(UNAUDITED - SEE REVIEW ENGAGEMENT REPORT)  
FOR THE YEAR ENDED AUGUST 31, 2011**

	<u>Internally restricted</u>	<u>Unrestricted net assets</u>	<u>2011 Total</u>	<u>2010 Total</u>
<b>Balance, beginning of the year</b>	\$ 40,000	\$ 15,497	\$ 55,497	\$ 48,108
Excess/(deficit) of revenues over expenses	--	(1,197)	(1,197)	7,389
Fund transfer	1,280	(1,280)	--	--
<b>Balance, end of the year</b>	<u>\$ 41,280</u>	<u>\$ 13,020</u>	<u>\$ 54,300</u>	<u>\$ 55,497</u>

The accompanying notes form an integral part of these financial statements  
 2011-2012 Annual Report - Entomological Society of Manitoba  
 PROFESSIONAL CORPORATION

**ENTOMOLOGICAL SOCIETY OF MANITOBA INC.  
NOTES TO THE FINANCIAL STATEMENTS  
(UNAUDITED - SEE REVIEW ENGAGEMENT REPORT)  
AUGUST 31, 2011**

**NOTE 1      PURPOSE OF THE ORGANIZATION**

The Entomological Society of Manitoba Inc. ("The Society") was formed to foster the advancement, exchange, and dissemination of entomological knowledge. The Society was incorporated on July 21st, 1976 under the laws of the Province of Manitoba as a non-profit organization and a registered charity under the Income Tax Act.

**NOTE 2      SIGNIFICANT ACCOUNTING POLICIES**

Income and expenses are recorded on the cash basis of accounting. There are no accruals of receivables or payables at the year-end. Inventory is expensed when it is purchased. Interest from investment certificates is paid out annually and interest is not accrued. Capital assets are expensed when acquired and, therefore, there is no annual amortization allowances.

**NOTE 3      MONEY MARKET FUND**

The Society has a money market fund with Royal Mutual Funds Inc. The investment is highly liquid and consists of short-term government bonds. The investment is shown at market value at year-end.

**NOTE 4      TERM DEPOSITS**

The Society has five term deposits with Royal Trust Corporation of Canada. The term deposits generally have five year maturities and interest is paid annually. The table below summarizes the term deposits.

<u>Certificate Number</u>	<u>Interest Rate (%)</u>	<u>Maturity Date</u>	<u>Par Value (\$)</u>
900055611-0010	4.000	Nov 16, 2011	\$ 8,000
<b>Total current term deposits</b>			<b>\$ 8,000</b>
900055611-0011	3.850	Nov 9, 2012	\$ 8,000
960006276-0012	3.500	Dec 12, 2012	8,280
900055611-0012	3.000	Nov 5, 2014	8,000
900055611-0013	2.100	Nov 16, 2015	9,000
<b>Total long term term deposits</b>			<b>\$ 33,280</b>

**NOTE 5      INTERNALLY RESTRICTED NET ASSETS**

The Society's board of directors has internally restricted \$41,280 (August 31, 2010 - \$40,000) to be held for endowment purposes. These internally restricted amounts are not available for unrestricted purposes without approval of the board of directors.

**ENTOMOLOGICAL SOCIETY OF MANITOBA INC.**  
**NOTES TO THE FINANCIAL STATEMENTS**  
**(UNAUDITED - SEE REVIEW ENGAGEMENT REPORT)**  
**AUGUST 31, 2011**

**NOTE 6      JOINT ESC/ESM MEETING**

In October 2009, the Society hosted a joint annual meeting with the Entomological Society of Canada. The revenues and expenses of the joint annual meeting are shown as a net figure on the statement of revenues and expenditures. The following statement shows the breakdown of the revenues and expenditures of the joint annual meeting.

	2011	2010
<b>REVENUES</b>		
Donations	\$ --	\$ 25,369
Registration fees	--	57,669
	--	83,038
<b>EXPENDITURES</b>		
Bank service fees	--	1,649
Facility rental	--	47,037
Printing and promotional	--	3,417
Refunds	--	793
Speaker and special guests	--	1,295
Travel	--	17,695
Volunteers	--	2,100
	--	73,986
<b>EXCESS OF REVENUES OVER EXPENSES</b>	<b>\$ --</b>	<b>\$ 9,052</b>
<b>ALLOCATED AS FOLLOWS:</b>		
Earned by Entomological Society of Canada	--	2,747
Earned by Entomological Society of Manitoba	--	6,305
	<b>\$ --</b>	<b>\$ 9,052</b>

**NOTE 7      STATEMENT OF CASH FLOWS**

A statement of cash flows is not included with these financial statements as the Society uses the cash basis of accounting and it would not provide any useful information that cannot be attained by the balance sheet and the statement of revenues, expenditures, and surplus.

**ENTOMOLOGICAL SOCIETY OF MANITOBA INC.  
NOTES TO THE FINANCIAL STATEMENTS  
(UNAUDITED - SEE REVIEW ENGAGEMENT REPORT)  
AUGUST 31, 2011**

**NOTE 8 FINANCIAL INSTRUMENTS**

The Society's financial instruments consist of cash, money market fund, and term deposits. Unless otherwise noted, it is our opinion that the Society is not exposed to significant interest rate, currency, or credit risk arising from these financial instruments. The fair value of the instruments approximates their carrying values.

**Interest rate risk**

The Society's cash is held in an interest bearing account. The Society's cash, money market funds, and term deposits are all subject to prevailing market conditions.

## APPENDIX D

### Entomological Society of Manitoba Report of the ESC Regional Director

Because of the timing of the AGM of the ESM and the Joint ESC-AES meeting in Halifax ("Beauty and Impact", 6-9 November), many items of shared interest with ESM members have not yet been reported. I shall report on items of interest to ESM members in an upcoming *ESM Newsletter*.

The ESC President this year is Peter Mason (Agriculture and Agri-Food Canada Eastern Cereal and Oilseed Research Centre, Ottawa) and he will preside over the governing board meeting on 5 November. Michel Cusson (Laurentian Forestry Centre, Service canadien des forêts, Ressources naturelles Canada, Sainte-Foy) is 1st Vice-President, and Rosemarie DeClerck-Floate (Agriculture and Agri-Food Canada, Lethbridge) is 2nd Vice-President. The next ESC Annual Meeting is a joint meeting with the Entomological Society in Alberta and will be held in Edmonton, 4-7 November, 2012. Notices with specific information related to the meeting will be published in the March and June issues of the *ESC Bulletin*.

Cedric Gillott is the editor of the *ESC Bulletin*. ESM members who have articles or information they would like to submit to the *Bulletin* should send them to Cedric at the Department of Biology, University of Saskatchewan, Saskatoon, SK S7N 5E2, cedric.gillott@usask.ca. As with all editors, he is always receptive to good ideas for articles and information about activities in the entomological community. Watch for the upcoming article on publications out of the regional entomological societies in Canada.

As I mentioned last year, Robb Bennett, will step down from his position as Editor-in-Chief of *The Canadian Entomologist* at the end of October. For those of you who have published manuscripts in *TCE* during his editorship, you will have appreciated his efficiency, his candor and sense of humour. The new Editor-in Chief is Christopher Buddle, Department of Natural Resource Sciences, McGill University, Macdonald Campus, Ste-Anne-de-Bellevue, chris.buddle@mcgill.ca. Chris and the Publications Committee are faced with the challenges of ushering in the next phase in publication of *TCE*. The ESC has entered into a seven year agreement with Cambridge University Press, beginning in January, 2012. Manuscript submission and management will be done electronically using ScholarOne Manuscripts. This is a system used by many journals and though the transmission period might be a little bumpy, ultimately the publication process should be considerably stream-lined in the future. One significant advantage to authors is the elimination of pages charges for publication in *TCE*. In addition, Cambridge University Press will include publication of colour figures at no charge. These changes, in addition to the elimination of the tier of Division Editors for *TCE* will bring a new face to the journal and a very attractive alternative as authors consider a place to publish the results of their research.

The *Canadian Journal of Arthropod Identification* has been a much valued publication out of the University of Guelph, under the direction of Steve Marshall. For anyone

not familiar with it, I encourage you to have a look at the website, <http://www.biology.ualberta.ca/bsc/ejournal/ejournal.html>. This journal is now under the umbrella of the ESC, so its continuation into the foreseeable future is guaranteed. This is good news for everyone interested in the insect fauna of Canada.

For those of our members who may be involved with importation of live arthropods from time to time, I refer you to a recent article by Rose de Clerck-Floate (*Bulletin* 43(3): 104-119, 2011). There have been some important changes to regulations regarding these importations and I suggest you read about the details in this article.

I appreciate the opportunity to serve on the Executive of ESM and the Board of ESC. I encourage those of you who are not members of ESC to consider joining and to participate in upcoming events and society activities.

Terry Galloway  
Regional Director  
October 22, 2011

## APPENDIX E

### **Entomological Society of Manitoba Report of the *Proceedings* Editor**

Volume 66 (2010) of the *Proceedings of the Entomological Society of Manitoba* was sent to Warren Schuetz and his staff in the University of Winnipeg print shop in September, and is available for distribution to the ESM membership in time for the Annual General Meeting. Volume 66 consists of 57 pages, with one submitted manuscript, two obituaries (Phil Barker and Rob Roughley), the abstracts from the Annual Meeting of the Entomological Society of Manitoba held at the Freshwater Institute and the Department of Entomology on 22-23 October, 2010, and the Minutes of the 66<sup>th</sup> Annual Business Meeting of the Entomological Society of Manitoba held on 23 October in Room 219, Animal Science/Entomology Building. I just received the bound copies of the *Proceedings* on Wednesday, so cost of production is not yet available. This will be presented to the ESM Executive at its next meeting. It is a pleasure working with Warren on the production of the *Proceedings*; he makes things as simple and easy as possible in the production process.

As I seem to report every year, there was a shortage of submitted papers for Vol. 66. I already have one manuscript, which, if accepted, will be published in Vol. 67. If you have a manuscript that is of relevance to entomology in Manitoba, please consider submitting it to the *Proceedings*. Scientific Notes as well as full Scientific Papers are welcome. All submitted manuscripts are peer-reviewed; all published papers are available as PDF's reprints on the web. If you look at the ESM website, you will see



that Rob Currie has already posted Volume 66; you can hardly get more efficient than that. The *Proceedings* are fully accessible using on-line search engines; for several years, we have published submitted papers without page charges to the authors. The *Proceedings* are freely available to entomologists everywhere, so can you think of a better place to publish your manuscripts of regional focus, but international interest?

*Proceedings* Editor  
Terry Galloway  
October 22, 2011

## APPENDIX F

### ENTOMOLOGICAL SOCIETY OF MANITOBA Report of the Endowment Fund Board for 2010-2011

A summary of investments and projected interest income for the fiscal year is attached (Table 1). Interest generated by the Endowment Fund provides a basis for funding the publication of the *Proceedings* and other Society activities. The Endowment Fund principal was \$41,000 as of October 2011.

The \$8,000 GIC #900055611-0010 matures on 16 November, 2011 and will be reinvested for an additional 5 years and the interest will be paid annually into the chequing account. This was approved at the Annual Business Meeting on October 22, 2011.

The Endowment Fund Board will increase GIC #900055611-0010 from its current \$8,000 value by \$1,000, to be drawn from the T Bill account, to a total of \$9,000.

Kathy Cano, Chair  
Marjorie Smith  
Ian Wise  
Pat MacKay

# APPENDIX G

## Entomological Society of Manitoba Report of the Financial Committee 2010–2011

### Endowment Fund Guaranteed Investment Certificates

**Table 1:** Account information as of August 31, 2011. Interest generated during the 2010-2011 fiscal year.

Certificate No.	Principal	Interest Rate (%)	Maturity Date	Annual Interest
900055611-0012	\$8,000.00	3.00	Nov. 5, 2014	\$240.00
900055611-0013	\$9,000.00	2.10	Nov 16, 2015	\$189.00
900055611-0010	\$8,000.00	4.00	Nov 16, 2011	\$320.00
900055611-0011	\$8,000.00	3.85	Nov 9, 2012	\$308.00
960006276-0012	\$8,000.00	3.50	Dec 12, 2012	\$280.00
<b>Total</b>	<b>\$41,000.00</b>			<b>\$1337.00</b>

# APPENDIX H

## Entomological Society of Manitoba Report of the Newsletter Committee

The Newsletter Committee continues to produce three issues of the Newsletter a year on a somewhat irregular schedule. Volume 37.3, which was 12 pages in length, was distributed on February 17, 2011, along with an up-to-date membership list and the Proceedings of the ESM. The cost for 37.3 was \$29.12 which was relatively inexpensive because it was a slightly shorter issue and the mailing costs were covered by the budget for the Proceedings. Volume 38.1, which was 8 pages in length, was distributed on August 20, 2011 at a cost of \$89.52. Volume 38.2 will be completed and distributed after the ESC meetings in Halifax, which are on November 06-09 2011. Currently \$600 is budgeted by the Society for the Newsletter, \$180 for each of three issues and \$60 for supplies. We will be well within that limit this year, even after the distribution of 38.2.

Additional content from the membership would be most welcome.

Patricia MacKay  
 Mahmood Iranpour  
 Co-editors, ESM Newsletter  
 October 2011

# APPENDIX I

## **Entomological Society of Manitoba Report of the Social Committee**

There were two events planned this year, and one was canceled due to bad timing with university schedule.

Luncheon on March 9<sup>th</sup> where Terry Galloway presented his “Deep South New Zealand Adventures” at Triple B’s on Scurfield Road.

New Members Social scheduled for May 26<sup>th</sup> was cancelled due to multiple scheduling conflicts. This event will need to be held earlier, most likely in April.

Lisa Caspar  
Chair, Social Committee

# APPENDIX J

## **Entomological Society of Manitoba Youth Encouragement and Public Education Committee**

For another year, kids, teenagers, young adults and adults have had the chance to learn about insects through our presentations. Most of the times, these include a slideshow during which one or two speakers make sure to differentiate insects from other arthropods and explain basic entomological concepts to the audience. Once this part is done, drawers containing Manitoba and exotic insects are shown or passed around while questions are asked. The last part of a typical presentation is usually the one that audience members prefer. It is when they get to hold live insects: Vietnamese stick insects and Madagascar hissing cockroaches. Live darkling beetles and giant Brazilian cockroaches at different growth stages are sometimes included in the presentation as both are perfect to demonstrate the complete and incomplete developments of insects. On rare occasions, assassin bugs are also part of the presentation.

This year, the slideshow was adapted a few times to meet teachers’ demands. In one case, it focused entirely on spiders. For this presentation, a live tarantula and an old exoskeleton were brought to the school. Other adaptations had a greater emphasis on bees, insect parasites of humans or insect development. We were even asked for a presentation in French! About 1300 persons, mostly kids, enjoyed the presentations this year. Interestingly, we had more presentations than last year, but we reached fewer people.

Again this summer, my field work brought me to Saskatchewan and Tharshinidevy Nagalingam took over the responsibility of coordinating the presentations during my absence. Both of us were helped by a number of colleagues for the presentations or to take care of our live insects: Lars Andreassen, Cherilyn Babel, Rassol Bahreini, Justin Crowe, Suresh Desai, Taryn Dickson, Derek Eyer, Katrina Froese, John Gavloski, Lindsay Geisel, Alexandra Grossi, Kristin Hynes, Alicia Leroux and Zoe Rempel.

All in all, the year was a positive one and everybody who filled an evaluation form was pleased with the presentations. \$308.25 in donations was given to the ESM at large or to the Youth Encouragement Committee more specifically.

Jonathan Veilleux  
Chair, Youth Encouragement and Public  
Education Committee

### YOUTH ENCOURAGEMENT COMMITTEE ACTIVITIES

YEAR/MONTH	PRESENTATIONS		NUMBER OF AUDIENCE MEMBERS PRESENT
	IN DEPARTMENT	OUTSIDE DEPARTMENT	
2010/11	0	1	20
2010/12	1	0	25
2011/01	1	1	126
2011/02	2	0	22
2011/03	9	8	375
2011/04	0	3	84
2011/05	4	5	260
2011/06	0	4	72
2011/07	1	10	164
2011/08	2	6	147*
2011/09	0	0	0
2011/10	0	0	0
<b>TOTAL</b>	<b>20</b>	<b>38</b>	<b>1295</b>

\*The number of audience members present is unknown for the Roland Pumpkin Fair.

## APPENDIX K

### Entomological Society of Manitoba Report of the Archivist

No activity to report.

Barb Sharanowski  
Archivist

## APPENDIX L

### **Entomological Society of Manitoba Report of the Common Names Committee**

No activity to report.

Barb Sharanowski

## APPENDIX M

### **Entomological Society of Manitoba Report of the ESM Student Awards and ESM Scholarship Committee**

#### **Student Achievement Award:**

Awarded to a student who is in a Bachelor's degree programme or who has recently completed a programme. This award recognizes students who have shown exceptional interest in entomology as evidenced by their insect collections, insect photography, published articles of entomological interest, insect experiments and/or outstanding contributions during summer employment.

This year's winner of the Entomological Society of Manitoba Student Achievement award is Ms. Lindsay Geisel. Lindsay has proven to be a diligent and dedicated student of entomology. Lindsay is currently working towards a minor in Entomology and has taken a significant proportion of the courses offered in the Entomology Department. She has excellent grades and received an NSERC Undergraduate Research Award (USRA) to work in the Entomology Department on honey bee research. She is an independent worker and has excellent potential as a scientist. Lindsay has been the recipient of the Orkin/Swat award (2010) and also served on a selection committee for a new faculty member in the Department of Entomology.

#### **Orkin/Swat Student Award:**

This award is designed to foster and encourage student interest in general Entomology including natural methods of insect pest control and the proper use of insecticides. Candidates must have a demonstrated interest in entomology, superior scholastic ability, high research potential, originality and industry in their university courses and/or summer work.

The winner of the 2011 Orkin/SWAT award is Derek Eyer. Derek is an excellent student with an extremely impressive GPA where he has demonstrated a keen interest and exceptional aptitude for entomology. Derek has taken several entomology classes including Crop Protection Entomology and Insect Taxonomy. Derek spent the summer of 2011 working on the Bugline where he assisted with pest identifications

and advice on control strategies, particularly for household and garden pests. Derek was awarded an NSERC USRA in 2011 working on the utility of introns to amplify and identify parasitoids from their hosts selectively. Derek has also volunteered for Youth Encouragement presentations to children of all ages on the wonders of insects.

**The ESM Graduate Scholarship:**

This scholarship is awarded to a student in a M.Sc. or Ph.D. program in entomology at the University of Manitoba. Students must be enrolled in their graduate programme for at least 12 months prior to Oct 1 of the award year. This award recognizes superior scholastic ability, high research potential as evidenced by industry, good judgment, originality, a conscientious attitude and organizational ability, and excellent communication skills.

This year's winner is Ms. Sarah Semmler. Sarah is enrolled as a M.Sc. candidate in the Department of Biological Sciences at the University of Manitoba and is being supervised by Dr. A. Worley. Sarah received her B.Sc. in Biology in 2010 from the University of Winnipeg. Sarah's M.Sc. research examines the effect of recent fire on plant-pollinator communities, and the quality of interactions between selected plant species and their insect visitors. Sarah has presented data from her 2010 field season and presented her results at two national conferences (Annual General Meeting for the Canadian Pollination Initiative, Guelph, ON; Annual Meeting of the Canadian Society for Ecology and Evolution, Banff, AB). She will be attending and presenting at the meeting of the Entomological Society of Canada this November. In addition to working hard on her own research, Sarah has also provided valuable mentoring to her undergraduate field assistants. Sarah's dedication, attention to detail, and work habits indicate that she has excellent research potential.

Désirée Vanderwel, Joel Gosselin,  
Rhéal Lafrenière, Taz Stuart,  
Richard Westwood, Chair,  
October 21, 2011.

## **APPENDIX N**

**Entomological Society of Manitoba  
Fundraising Committee**

The Fundraising Committee raised a total of \$1,600.00 from 13 donors to cover some of the costs of the AGM, such as bringing in the speakers from out of town. The Fundraising Committee acknowledges the continued support of our sponsors in making the AGM successful in providing quality speakers for this very educational event.

Joel Gosselin  
Chair, Fundraising Committee

# APPENDIX O

## **Entomological Society of Manitoba Report of the Scientific Programme Committee**

The 67<sup>th</sup> Annual meeting of the Entomological Society of Manitoba was held in Winnipeg at the Freshwater Institute on 21 October and at the Animal Science/Entomology Building on 22 October, 2011. A total of 56 people (23 students and 33 regular members) registered for the meeting. The theme of the meeting was “Manitoba: A Province of Extremes”. The meeting opened with the keynote address, given by Dr. Dale Wrubleski, of Ducks Unlimited Canada, Stonewall, Manitoba, titled “Survivor Manitoba: Living in Manitoba’s Wetlands”, followed by the submitted papers session. A total of 17 submitted papers were presented from 10:15 a.m. and throughout the afternoon and was chaired by Alejandro Costamagna, Bob Lamb and Terry Galloway. Thirteen of the papers were entered in the student paper competition, which was judged by Paul Fields, Mahmood Iranpour and Ahmed Abdelgheny. Cass Erdelyan was this year’s winner of the student paper competition. In addition, there were three poster presentations. In the evening, a well-attended meet-the-speakers mixer was held at the home of Bob Lamb and Pat MacKay.

On the morning of 22 October, a symposium was held on Manitoba: A Province of Extremes. Invited speakers and their topics in the symposium were:

- “Extreme temperatures: adaptations by insects and control of stored-product insects” – by Paul Fields
- “The effects of short term extreme weather events and long term climate change on the life history traits and habitat use of some Manitoba butterflies (Lepidoptera)” – by Richard Westwood
- “Insects of the Carberry Sandhills” – by Robert Wrigley
- “Environmental assessment and monitoring in northern Manitoba” – by Friederike Schneider-Vieira.

In the afternoon the Annual General Business Meeting was attended by 20 members.

Sponsors of the meeting were very generous as in previous years, providing \$1,600 in donations. Registrations provided an additional \$775 in revenue. Expenses were low, mainly because all of the invited speakers were local so no airfare or hotel costs were incurred. Printing was \$38.52, food and beverages \$418.32, and meet-the-speakers-mixer \$383.95, for a total of \$840.79. Therefore, a substantial surplus was realized.

The committee wishes to thank all the speakers for their excellent contributions to the meeting. Special thanks are extended to the many volunteers who assisted with the logistics of the meeting from helping out at the registration desk, to operating audio-visual equipment and everything in-between.

The Scientific Programme Committee consisted of Marjorie Smith (Chair), Taz Stuart, John Gavloski, Bob Lamb and Joel Gosselin (Chair, Fund Raising Committee). All members made significant contributions to the overall success of the meeting,

providing invaluable assistance during the many tasks to plan and run these meetings. Congratulations for a job well done.

Marjorie Smith, Chair

## APPENDIX P

### **Entomological Society of Manitoba Report of the ESM Membership Committee**

There are currently 94 members in the ESM, compared to 91 in November of last year. I would like to thank Ian Wise (Treasurer) for his careful record keeping of the membership.

Désirée Vanderwel, Chair.

## APPENDIX Q

### **Entomological Society of Manitoba Web Site Report**

The Entomological Society of Manitoba operates a website that is currently hosted through the public access portion of Paul Field's personal University of Manitoba web page. The website contains information about the Society and its committees, dates of meetings, programmes for meetings, and provides links to other sources of entomological resources on the web.

In 2011, the website was totally revised and reorganized by Jonathan Veilleux. The new website features a cleaner design and includes improvements in organization that should assist in keeping the site updated and facilitate navigation by users of the site. Thanks to Jonathan for all of the hard work he put into the redesign.

Copies of the Newsletter and *Proceedings* are typically posted shortly after they are released to the membership. PDF-reprints of papers that have been published in the proceedings are available on the site and papers from back issues are posted for years dating back as far as 1989. These papers are picked up by many search engines and thus provide a wide exposure for the published research. Older papers will be posted if scanned pdf's are provided to the web master.

Any suggestions for additions or changes to the website should be forwarded to Rob Currie, Department of Entomology, University of Manitoba (rob\_currie@UManitoba.ca).



# APPENDIX R

## **Entomological Society of Manitoba Election Report 2010-2011**

Elections closed October 4, 2011 for the Entomological Society of Manitoba offices of President-Elect and Member-at-Large. The successful candidate for President-Elect is Bob Lamb and for Member-at-Large is Barb Sharanowski.

Colin Demianyk  
Chairperson, Scrutineer Committee

Ian Wise  
Witness