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T.D. Galloway

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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 the Newsletter, the *Proceedings*, and hosts a variety of meetings, seminars and social activities.

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**A Belated Obituary for Professor Ásgeir Jónas Thorsteinson  
(1917-1998)**

Terry D. Galloway and Olivia Julian Thorsteinson



**Preface**

When I was a graduate student in the Department of Entomology at the University of Manitoba, Professor Thorsteinson, “Thor”, was the Head of the Department, and a rather enigmatic and mythical character. Although I never took a course from him, he served on my PhD examining committee, so I had more contact with him than many other students in the Department at the time. My interactions with him were always unpredictable. Some days he seemed distracted, he always had a lot on his mind. Some days he would focus more fully on our discussion, or the question I had asked, and he would be thoughtful and insightful. One thing for certain, my interactions with him were always interesting.

In the summer of 1976, prior to Thor’s retirement, he suffered a serious automobile accident, which delayed the family’s post-retirement plans to move to Vancouver. They eventually moved west, and he became disconnected from the entomological community

in Manitoba. I encountered him only once after that in the 1980's, at a meeting of the Western Forum, a collective of pest management specialists working out practical solutions to insect and plant disease problems. Thor and I sat down in the bar after an afternoon session for a beer; he was most interested in what had happened in the Department since he had left. He was particularly interested in the Canada Biting Fly Centre, a valuable component of the Department for about ten years. The Director of the CBFC was Dr. Mary Chance. Mary reverted to her maiden name at the time of her marriage to Manfred Jaeger. It just so happened that her maiden name was Galloway. From a distance, this caused Thor to think about the ramifications of this change, and he eventually asked me what had happened to my wife, Carol. When I explained the situation, we both had a good laugh. Cam Jay, a subsequent Head of Department was some years later visiting Vancouver with his wife, Doreen. They were driving through the city when Cam decided they should visit Thor, or at least call him while they were in the city. He had no idea about where Thor and his wife, Mildred, were living, so he turned into a strip mall where there was a telephone booth by the sidewalk. He jumped out of their vehicle and entered the telephone booth with the notion to look up Thor's contact information. As his fingers were walking up and down the pages of the directory, there was a gentle tap-tap-tap on the glass, and as he looked up, there was Thor smiling back at him. Talk about coincidence!

Several years ago, it occurred to me that I hadn't heard anything about Thor for many years. I searched obituaries and using various on-line search strategies and contacted entomologists around British Columbia to find out where he was or what had happened to him. It wasn't until Rob Currie forwarded Mildred's obituary to me that I was able to complete my quest. I contacted Thor's family via the funeral home, and his daughter, Julian, responded. From that point, the two of us worked together to compile the following obituary. (TDG)

## **Obituary**

Thor was born 2 September, 1917 in Winnipeg. He attended high school in Winnipeg from 1931 to 1935, during which time he worked in the commercial fishery on Lake Winnipeg. He was valedictorian of his graduating class in 1935 before enrolling in Winnipeg Normal School to obtain his first class teacher certification. He taught public school at Old Fort School in 1937-1938. He was hired in the Department of Entomology at the University of Manitoba during the summers of 1939 and 1940, where he had enrolled in 1939; he received an Isbister Scholarship at the University of Manitoba, and the University Gold Medal in his graduating year, when he also served as Vice Stick and President of the fourth year class in 1940-1941. Upon graduation, he worked as an assistant cereal breeder in the Cereal Division at the Rust Research Laboratory on the University of Manitoba campus.

Thor's academic career was interrupted by WWII, and he served as a Lieutenant in the Canadian Army Infantry, Motor Division from 1942-1944. After the war, he pursued

graduate training in Entomology and entered a programme at Imperial College, University of London in 1945 with a two-year British Council Scholarship. He completed his Ph.D. in December, 1946, after which he returned to Canada to work for two years as an insect physiologist at the Forest Insect Laboratory in Sault Ste Marie, Ontario. He joined A.V. Mitchener in the Department of Entomology at the University of Manitoba in 1948 as an Assistant Professor. He was promoted to Associate Professor in 1953 and became Acting Chairman of the Department of Entomology in 1956 and Professor of Entomology and Chair in 1958. Thor supervised 21 graduate students from 1955 to 1974 (1955 – W. Hanec; 1959 – D.L. Smith, M. Tauber; 1960 – R.A. Brust, D.P. Peschken; 1961 – G.K. Bracken, P.J. Proctor, J.A. Scott; 1962 – G.K. Bracken; 1963 – S. Chang; 1964 – N.R. Brandt, E.A.R. Liscombe, S.R. Loschiavo, W. Tostowaryk, F.L. Watters; 1965 – K.L.S. Harley; 1969 – A. Campbell, G.G. Wilson; 1972 – R.J.M. Trimble; 1973 – R.D. Wickstrom; 1974 – C.C. Christie), many of whom had long, successful careers in entomology. Thor stepped down as Head of the Department in 1976 and retired in August, 1977.

It's difficult to categorize Thor's research activities. He would have called himself an insect physiologist, specializing in host plant selection and interactions between herbivorous insects and plants. He and his collaborators published at least 40 refereed papers, spanning a considerable range of topics. Notable among these is his 1960 paper, "Host plant selection in phytophagous insects", which appeared in the Annual Review of Entomology. This paper was recognized as a Science Citation Classic, cited more than 300 times since it was published, and is still being cited in 2015. He and a number of post-doctoral researchers and graduate students have contributed significantly to the nature of insect-host plant relationships. Many of these studies involved important crop pests, such as diamondback moth, cabbage maggot, and the two-striped and lesser migratory grasshoppers.

Another well connected thread through Thor's research career was his interest in biting flies. This included mosquitoes, and the impact of various natural chemicals on growth and development for mosquito larvae. In later years, he interacted extensively with the City of Winnipeg personnel who were in charge of mosquito abatement activities. Thor's views were well entrenched and he was a frequent contributor to public hearings conducted by the City. He firmly believed that thermal fogging, the adulticide strategy at the time, was not effective and should be abandoned. Dr. Reiny Brust, one of the best known mosquito researchers in Canada, studied for his M.Sc. under Thor's supervision.

Another area related to biting flies arose from Thor's observations on behaviour of host-seeking horse flies. As the story goes, he watched horse flies accumulate inside his vehicle when he parked with the windows rolled down at the family cottage near Piney, Manitoba. This is certainly prime horse fly habitat, so there would have been no shortage of flies for study. As he wondered about what it was that attracted flies to enter his vehicle, he considered heat as a first hypothesis, given the higher temperature inside the car. This led him to conceive what he initially referred to as a heliothermal trap, a large

black target that he thought would absorb the sun's radiant energy and thus have a higher temperature. The trap for his target worked brilliantly, but as he later discovered through careful experimentation carried out by graduate students, Garth Bracken, Dieter Peschken and Wally Tostowaryk, along with departmental collaborator, Dr. Bill Hanec, it was the reflective nature of a shiny, black sphere that was most responsible for the attraction. This trap became universally known as the Manitoba Horse Fly Trap, and you can find horse fly workers the world over who use this trap, or one based on its principles, wherever horse flies are studied. His papers on the horse fly trap have been cited collectively more than 200 times. As an amazing testament to the effectiveness of the trap, TDG recorded an astounding average catch of 10,000 horse flies, per hour, one day at a study site near Whitemouth Lake, Manitoba.

It is unfortunate this summary was inadvertently delayed from the time of his death, 15 March, 1998. With this publication, we hope Thor's contributions to his field of research and to the University of Manitoba might be recognized.

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# **First records of ensign wasps (Hymenoptera: Evaniidae) and their cockroach host (Blattodea: Blatellidae) in Manitoba**

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**Abstract** – We provide the first record of Evaniidae in Manitoba with the discovery of *Hyptia harpyoides* Bradley and the first published record of its host, *Parcoblatta virginica* (Brunner von Wattenwyl), in the province.

## **Introduction**

Ensign wasps (Hymenoptera: Evaniidae) are solitary egg predators of cockroach oothecae (Blattodea). There are 21 extant genera and 580 extant described species of Evaniidae, with the majority of diversity occurring in tropical regions (Yu *et al.* 2011; Mullins *et al.* 2012). There are 65 known species of *Hyptia* in the New World, only ten of which are recorded from North America including Mexico (Deans 2005). Species of *Hyptia* attack a wide variety of cockroaches across different subfamilies, but are common predators of saprophagous wood cockroaches in the genus *Parcoblatta* (Blattellinae).

Only two species of Evaniidae have been reported from Canada: *Hyptia harpyoides* Bradley and *Hyptia thoracica* (Blanchard) (Mullins *et al.* 2012). The known distribution of these two species is vague, with *H. thoracica* reported from Ontario and *H. harpyoides* only specified as collected in Canada (Deans 2005). Evaniids have never been recorded specifically from Manitoba, which is not surprising given that native cockroaches are rarely collected in this region (Vickery and Kevan 1985). Recent field trips to Whiteshell Provincial Park in Manitoba led to the discovery of two specimens of *H. harpyoides*. Additionally, one of the known hosts of this species, *Parcoblatta virginica* (Brunner von Wattenwyl), was subsequently discovered in the Wallis-Roughley Museum of Entomology at the University of Manitoba, which is also a new record for the province.

## Materials and Methods

Evaniids were collected from Star Lake Research Station using sweep nets and aspirators in August 2013 and 2014. The species of Evaniidae was determined using the key in Deans *et al.* (2013). All specimens are deposited in the Wallis-Roughley Museum of Entomology, Department of Entomology at the University of Manitoba.

### New Manitoba records

#### EVANIIDAE

*Hyptia* Illiger 1807

*Hyptia harpyoides* Bradley, 1908

**Material Examined.** CANADA: MB: Star Lake; Whiteshell Provincial Park; 49.743140, -95.258295; 26.viii.2013, sweep net, 1♀; coll: Daniel L. Klassen. CANADA: MB: Star Lake; Whiteshell Provincial Park; 49.752718, -95.256714; 23.viii.2014, aspirator, 1♂; coll: S. Steinmann.

**Distribution.** This species is found in Canada (Manitoba and Ontario) and throughout the eastern and midwestern United States (Deans 2005).

#### BLATTELLIDAE

*Parcoblatta* Hebard, 1917

*Parcoblatta virginica* (Brunner von Wattenwyl, 1865)

**Material Examined.** CANADA: Manitoba, Great Falls Generating Station on the Winnipeg River near Pointe du Bois; 27.vi.1997; coll. D. Wytrykush.

**Distribution.** This species is found in northeastern United States (Vickery and Kevan 1985) and in Ontario (Vickery and Scudder 1987) and Manitoba, Canada.

## Discussion

Hosts of *H. harpyoides* include *P. virginica*, *P. pennsylvanica* DeGeer and *P. uhleriana* (Saussure) (Edmunds 1952; Smith 1998). None of these species have been recorded west or north of North Dakota. Here we report the first record of an evaniid wasp, *H. harpyoides*, and its host, *P. virginica*, from Manitoba. This is the most northerly record

for both of these species. Although there has been extensive entomological research in Manitoba for over 120 years dating back to the time of Norman Criddle, these species have only been recently collected. *Parcoblatta virginica* is saprophagous, feeding on decaying organic matter, and is commonly found in ground litter, under rotting logs or residing in hollow trees. Thus, the boreal shield ecozone of Whiteshell Provincial Park provides suitable habitat for this cockroach. This species has been previously recorded from northern North Dakota, only a few hundred kilometres from the Whiteshell Provincial Park, and thus these new records may represent range expansions given the similarity in climate between North Dakota and Manitoba.

Finally, the discovery of *P. virginica* in the Wallis-Roughley Museum of Entomology, a relatively large university insect collection, highlights the importance of museums for both taxonomic and environmental research. This specimen was collected 18 years ago but this new record has not been published until the writing of this manuscript. Museums, including regional and university collections, provide important long term documentation of species, their habitats, and changes in species distributions through time and space (Wiggins *et al.* 1991). As climate and habitats continue to become altered through anthropogenic activities, museums become increasingly important to understand how these environmental changes affect extant organisms. Thus, long term funding of museums should be a high priority for governments interested in understanding the impacts of environmental change.

## Acknowledgements

We thank Terry Galloway for his helpful guidance and advice. We also thank Jordan Bannerman for helping the students of the Entomology field course collect these specimens and properly preserve them. Funding was provided by an NSERC Discovery Grant to BJS.

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# **70th Annual Meeting Entomological Society of Manitoba, Inc.**

**Friday October 31, 2014**

**Freshwater Institute**

**501 University Crescent**

**and**

**Saturday November 1, 2014**

**Room 219 Animal Science/Entomology Building**

**University of Manitoba**

## **Abstracts**

### **KEYNOTE ADDRESS**

#### **ADVANCES IN TICK PARALYSIS.**

Tim Lysyk. Retired Research Scientist, formerly Agriculture and Agri-Food Canada Research Station, Lethbridge, Alberta, Canada, T1J 4P4.

Tick paralysis remains an important issue for cattle and human health in BC. This talk will focus on the general biology of this condition, and aspects of the animal-tick interaction that influence its expression.

## **SYMPOSIUM**

### **Veterinary and Medical Entomology in Canada: Honouring Dr. Terry Galloway**

#### **A TRIBUTE TO TERRY GALLOWAY; MENTOR OF MANY.**

Kateryn Rochon. Department of Entomology, University of Manitoba, Canada, Winnipeg, Manitoba, Canada, R3T 2N2.

#### **SHOULD ENTOMOLOGY MATTER TO MILITARIES?**

Steve Schofield. Senior Advisor Pest Management/Entomology, Communicable Disease Control Program, Force Health Protection, CF Health Services Group HQ Ottawa, Department of National Defence.

Militaries, including contemporary Western ones, tend towards scientific pragmatism. This reflects a normative in which "importance" is tied to the question: "Will thing x/information y/scientific result z help (or hinder) us in meeting our operational objective?" With this in mind, one can ask the question - why should militaries care about entomology? The simple answer is because it matters. By this, I do not mean entomology in isolation but rather as it applies to military forces. Insects (I will use this term generally) can stop armies - by killing and/or sickening them, or less obviously, by impacting logistics (*e.g.*, supplies and movements).

In this talk, my focus will be on "public health" entomology in the military. My objectives are fourfold. First, I will provide historical context with respect to entomology, diseases and war - including recent examples of "insects" having operational impacts on militaries. Next, I will situate entomology within the Canadian Armed Forces (CAF) - including persons, processes and capabilities. Third, I will describe how the CAF uses entomology to inform decision making for health protection, using the specific examples of: an operational deployment to an international site and a domestic location where Lyme disease presents a threat. Finally, I will outline current "entomological" research efforts in the CAF.

### **TROUBLE ACROSS THE BORDER: HOST-SEEKING MOSQUITOES IN NORTHEASTERN NORTH DAKOTA.**

Jefferson A. Vaughan. Biology Department, University of North Dakota, Grand Forks, North Dakota 58202, USA.

The Red River valley of northeastern North Dakota is a wide, flat expanse formed by an ancient glacial lake. The soil is thick, black and does not drain well. This creates an enormous area for mosquito breeding habitat. Each summer, residents of the Red River valley are plagued by mosquitoes, yet there is little information regarding the ecology and biology of the mosquitoes in this area. We collected host-seeking mosquitoes using CO<sub>2</sub>-baited traps (Mosquito Magnets and MMX traps). Trapping was conducted in the city of Grand Forks from 2002 to 2006 and in two rural sites (open farmland and forested tract) from 2009 to 2011. In the city, mosquito fauna was dominated by three species; *Aedes vexans*, *Ae. dorsalis*, and *Culex tarsalis*. Species diversity was greater in the rural areas. *Aedes vexans* and *Cx. tarsalis* predominated in the open farmland. *Aedes excrucians* predominated in the forest. Blood meal analysis indicated that white-tailed deer comprised the main blood source for *Aedes* species. For *Cx. tarsalis*, a wide range of avian species constituted the main blood source. Further analysis of the avian blood meals revealed that over 50% of the bird blood taken by *Cx. tarsalis* were infected with haemosporidian (*e.g.*, malaria) parasites. The strengths and constraints of using mosquito blood meals for xenodiagnoses of blood infections in vertebrates will be discussed.



## **EMERGING TICK-BORNE DISEASES IN CANADA: THE “OTHER” PATHOGENS TRANSMITTED BY BLACKLEGGED TICKS.**

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From a historical perspective, tick-borne diseases in Canada have been relatively rare and the scarcity of infection was primarily due to the limited range of some of the key tick vectors. However, in recent years the range of the blacklegged tick, *Ixodes scapularis*, an important vector of several emerging pathogens (e.g., *Borrelia burgdorferi*, *B. miyamotoi*, *Anaplasma phagocytophilum*, *Babesia microti*, *Ehrlichia muris*, and Powassan encephalitis virus), has expanded in a number of provinces. As a result, the risk of exposure to ticks and these pathogens has increased. The objective of this presentation will be to provide an overview of this range expansion and to highlight the changing dynamics of human exposure to pathogens other than *Borrelia burgdorferi*, the agent of Lyme disease. A summary of the methodologies currently used to track the changes in tick distribution, and how this information is used to assess the overall risk of exposure to tick-borne pathogens will be provided. Finally, the challenges that these “other pathogens” represent in terms of public health will be discussed.

## **PATTERNS AND PROCESSES IN VETERINARY ENTOMOLOGY IN WESTERN CANADA.**

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

The introduction of domesticated livestock brought with it an invasion of insect pests, most of which are now universal where these livestock species are maintained in North America. As livestock spread to new areas, they were challenged by the diverse array of native insects, mostly biting flies, that brought the suite of attacking species to an impressive total, at all times of the year. In the past 40 years, the number of veterinary entomologists in Canada has been seriously eroded. Where in the 1970's there were entomologists in federal and provincial governments, universities and industry, sometimes in concentrations of expertise, governments have now all but divested themselves of this interest. The numbers of new chemicals for insect control fell, and the industry shifted its emphasis to larger markets. Specific focus in entomology at universities was lost to large departments of biological sciences, and with these administrative changes, veterinary entomologists all but disappeared. Yet the diversity of pests, intensity of attack and impact on domestic animals and the management decisions for producers in the Prairies have changed little. Livestock production systems continue to evolve, while the pest insects adapt along with them. Alternate pest management

strategies in the face of insecticide resistance and the demands for reductions in chemical inputs to livestock production place considerable pressure on producers. There are risks from invasive species of arthropods and pathogens that affect the health of domestic animals and threaten our food supply. The need for veterinary entomologists in western Canada has perhaps never been greater, but in half a century, we have never been less prepared to address these threats to the industry.

## **SUBMITTED PAPERS**

### **INTERACTIVE IDENTIFICATION KEY FOR THE PEST INSECTS OF CANOLA IN CANADA.**

Amber Bass, and Barbara J. Sharanowski. Department of Entomology, University of Manitoba, Winnipeg, Manitoba, Canada, R3T 2N2.

Consequences of pesticide use include economic loss and environmental damage. Tools to assist farmers in making important control decisions can reduce the damage caused by pesticide use. My project was to build an identification key for pest insects in canola. The key is intended to help farmers in the Prairie Provinces quickly and accurately identify pests within canola (*Brassica* sp.) fields, as well as provide IPM pages to make informed control decisions. Thirty eight pests were entered and differentiated by numerous crop damage and appearance related characters. The key was built using the free version of Lucid 3.3. Lucid is an easy to use, interactive key building program. The program includes many options to build a user friendly key. Future work exists concerning the use and input of this key, and others, in current projects.

### **IDENTIFYING PCR PRIMERS TO FACILITATE MOLECULAR PHYLOGENETICS IN CADDISFLIES (ORDER TRICHOPTERA).**

Bonnie S. McCullagh, and Jeffrey M. Marcus. Department of Biological Sciences, University of Manitoba, Winnipeg, Manitoba, Canada, R3T 2N2.

Efficiently acquiring DNA sequences from multiple genes has been among the greatest challenges for phylogenetic studies in taxa with few molecular genetic resources. The caddisflies (order Trichoptera) are well studied morphologically, but phylogenetic studies have focused on only a few genes. However, the butterflies and moths (order Lepidoptera, sister clade to Trichoptera) are well studied phylogenetically. Several large libraries of degenerate PCR primers have been developed for lepidopteran molecular phylogenetics, and might be applicable to the Trichoptera. DNA from eight species of caddisflies: *Asynarchus nigriculus*, *Grammotaulius lorettae*, *Hesperophylax occidentalis*, *Limnephilus externus*, *Limnephilus picturatus*, *Limnephilus secludens*, and *Limnephilus*

*sublunatus* (Trichoptera: Limnephilidae); and *Agrypnia deflata* (Trichoptera: Phryganeidae) was used to screen primers. We tested 107 degenerate PCR primer pairs originally designed for Lepidoptera for use in trichopteran systematics. Twenty-four primer pairs (15 new to the Trichoptera) that amplified portions of nine different genes (three mitochondrial and six nuclear) were successfully recovered. Eight of these genes had been used previously for trichopteran phylogenetics, but in many cases, new primer pairs were identified, extending the genomic region that can be sampled. Primers were identified for one gene, *40S ribosomal protein S2 (RPS2)*, not studied previously in this taxon. Sequence evolution rates among loci varied by two orders of magnitude. Differences in rates of sequence evolution and modes of inheritance among the genes now available for trichopteran phylogenetics offer a flexible tool set for resolving a variety of evolutionary questions and examining mosaic evolution in the trichopteran genome.

### **CHARACTERIZATION OF CANADIAN MOSQUITO FAUNA (DIPTERA: CULICIDAE) USING MALDI-TOF MS, AN EMERGING METHOD FOR ROUTINE MOSQUITO IDENTIFICATION.**

Mahmood Iranpour<sup>1,2</sup>, D. Cabiles<sup>1</sup>, L. Robbin Lindsay<sup>1,2</sup>, Antonia Dibernardo<sup>1</sup>, S. McCorrister<sup>1</sup>, P. Chong<sup>1</sup>, Michael Drobot<sup>1,3</sup>, and G. Westmacott<sup>1</sup>. <sup>1</sup>National Microbiology Laboratory, Public Health Agency of Canada, 1015 Arlington St., Winnipeg, Manitoba, Canada, R3E 3R2; <sup>2</sup>Department of Entomology, <sup>3</sup>Department of Medical Microbiology, University of Manitoba, Winnipeg, Manitoba, Canada, R3T 2N2.

Mosquito identification is typically based on morphological features using taxonomic identification keys and the process is labour intensive. In addition, not all specimens can be accurately identified because critical morphological structures can be lost from specimens during collecting and sorting. The use of protein profiling by matrix-assisted laser desorption ionization-time-of-flight mass spectrometry (MALDI-TOF MS) has been increasingly used for the routine identification of bacteria and recently for arthropods. The method is accurate, fast and inexpensive after preparing the MALDI spectral database. We created a database of reference spectra at the National Microbiology Laboratory after testing protein extracts from mosquito legs. So far the database includes more than 25 species from *Aedes*, *Ochlerotatus*, *Culex*, *Anopheles*, *Culiseta*, *Coquillettidia*, *Uranotaenia*, and *Psorophora*. An overview of this novel process will be provided as well as a discussion of the specificity of the approach.

### **POSSIBLE EVIDENCE FOR A NEW WING COMPARTMENT BOUNDARY AND ITS ROLE IN EYESPOT COLOUR PATTERN DEVELOPMENT IN VANESSA BUTTERFLIES (NYMPHALIDAE: NYMPHALINI).**

Roohollah Abbasi, and Jeffrey M. Marcus, Department of Biological Sciences, University of Manitoba, Winnipeg, Manitoba, Canada, R3T 2N2.

We evaluated the organizational effects of compartment boundaries in *Vanessa* butterflies based on wing landmarks defined by the position and the number of color elements included in each eyespot. Using a phylogeny of *Vanessa* reconstructed with 7750 bp from 10 genes, we performed an Independent Contrast Analysis (ICA) between eyespot characters on all wing surfaces. Many significant correlations were found between eyespots, but most correlations were limited to single wing surfaces. The analysis also revealed significant positive correlations between eyespots 2 and 5 and between eyespots 3 and 4 on all wing surfaces. The consistency of these correlations among eyespots suggests a possible link to the developmental architecture responsible for patterning insect wings. To explain these correlations, we propose a developmental organizer between wing cells 3 and 4 that patterns tissue in mirror-image symmetry along the anterior-posterior (A-P) axis. However, the position of this proposed organizer does not coincide with the well-studied organizer associated with the *engrailed* A-P compartment boundary between wing cells 1 and 2. The dimensions and organization of the wing tissue patterned by the two A-P organizers are very similar. We hypothesize the existence of a second compartment boundary associated with the organizer between wing cells 3 and 4 that is responsible for patterning the posterior region of butterfly wings. The suspected patterns of overlapping gene expression associated with the two A-P organizers produce a unique combination of expressed genes, suggesting a mechanism by which eyespots in each wing cell can be individually regulated.

## A COMPARISON OF SAMPLING METHODS FOR NATURAL ENEMIES OF SOYBEAN APHID.

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Several sampling methods are used to monitor natural enemy populations in soybean, but there has been little work investigating their relative bias, precision and efficiency. We compare five sampling methods: quadrats, whole-plant counts, sweep-netting, walking transects and yellow-sticky-cards to determine the most practical methods for sampling the three most prominent species, which included *Harmonia axyridis*, *Coccinella septempunctata* (Coleoptera: Coccinellidae), and *Orius insidiosus* (Hemiptera: Anthocoridae). Based on bias, precision and efficiency considerations, the most practical sampling methods for natural enemy monitoring in soybean include walking transects for coccinellid detection and whole-plant counts for detection of small predators like *O.*

*insidiosus*. Sweep-netting and quadrat samples are also useful for some applications, when efficiency is not paramount.

### **MONOPHYLY OF EUSOCIAL WASPS (HYMENOPTERA: VESPIDAE): MOLECULES AND MORPHOLOGY TELL OPPOSING HISTORIES.**

Patrick K. Piekarski<sup>1</sup>, Robert W. Longair<sup>2</sup>, and Sean M. Rogers<sup>2</sup>. <sup>1</sup>Department of Entomology, University of Manitoba, Winnipeg, Manitoba, Canada, R3T 2N2; <sup>2</sup>Department of Biological Sciences, University of Calgary, Calgary, Alberta, Canada, T2N 1N4.

Subfamily relationships of the Vespidae were inferred through analysis of phenotypic characters (269 morphological and 66 behavioral) and molecular data (CO1, 28S, 16S, 12S) across 74 taxa. Maximum-Likelihood, Bayesian Inference, and Maximum Parsimony were employed and analyses were done for individual and combined subsets of data. This approach allowed us to evaluate incongruence among different subsets of data (i.e. biological drivers of conflict) and the effect of methodological choice on estimation. Simultaneous analysis of all evidence supports a (Stenogastrinae + (Polistinae + Vespinae)) clade and thus a single origin of eusociality. Phylogenies derived strictly from molecular evidence consistently support a dual origin of eusociality. We argue that previous studies recovering diphyly of eusocial wasps may withstand the effects of low taxon sampling, suboptimal alignments and a two-step approach causing phylogenetic error; we achieved similar topologies using ~three-fold more terminal ingroups and a different suite of loci. Three aspects of the tree are incongruent when comparing molecular and phenotypic evidence: the placement of Stenogastrinae; the relationship between Euparagiinae and Masarinae; and Polistinae tribal relationships. We conclude that vespidae subfamily relationships are obfuscated by the fact that phenotypic and molecular evidence are at odds. This study highlights the confounding effects of biological processes on tree reconstruction and the importance of elucidating drivers of conflict when formulating phylogenetic hypotheses. A current working hypothesis is that a period of rapid adaptive divergence characterizes the early history of Vespidae, resulting in random sorting of ancestral polymorphisms for both molecular and phenotypic characters.

### **POPULATION STRUCTURE OF *JUNONIA* BUTTERFLIES ACROSS THE WESTERN HEMISPHERE.**

Jeffrey M. Marcus, Department of Biological Sciences, University of Manitoba, Winnipeg, Manitoba, Canada, R3T 2N2.

The nine New World species of buckeye butterflies (genus *Junonia*) are a model system for the evolution of colour pattern development. This group has also been described as a

possible ring species. Laboratory studies indicate that forms can hybridize and produce fertile offspring. Mitochondrial DNA barcoding fails to distinguish among most New World *Junonia* species, but has identified two disparate mitochondrial haplotype groups, both found in most species, that differ by 4% sequence divergence. The node in the phylogenetic tree between these two haplotypes and the nearest sister clade of Old World *Junonia* is unresolved, so it is not clear whether the haplotype groups diverged from a common ancestor within the New World, or whether they represent evidence of two separate colonization events of the New World. Nuclear genotyping of New World *Junonia* often can distinguish between named species, and also frequently identifies extensive population structure within *Junonia* species. This may indicate population genetic subdivision based geographic variation, host race specialization, or perhaps the existence of undescribed cryptic species. Larval host plant has a strong influence on genetic population structure in *Junonia*. Analysis of nuclear genotypes also shows that individuals from different sympatric species are more genetically similar to each other than to supposedly conspecific individuals from elsewhere, suggesting some ongoing gene flow. The morphological variation exhibited within the New World *Junonia*, in combination with the ability of different forms to hybridize easily presents additional opportunities to complement existing techniques for the study of colour pattern evolution and development.

**SOME POPULATION PROCESSES OF LICE (PHTHIRAPTERA: MENOPONIDAE, PHILOPTERIDAE) LIVING ON FERAL PIGEONS AND NIGHTHAWKS IN MANITOBA.**

Robert J. Lamb and Terry D. Galloway, Department of Entomology, University of Manitoba, Winnipeg, Manitoba, Canada, R3T 2N2.

Using 14-20 years of data on the lice collected from hundreds of birds, we investigated annual and seasonal abundance and population stability of four species of lice on feral pigeons and one species on common nighthawks in Manitoba. The five species of lice all had distinct seasonal patterns of abundance, levels of aggregation, average abundance, and population variability. The most abundant species had the most stable populations. On pigeons, we detected no competition among the four co-habiting lice, or synchrony in their populations. On nighthawks, the one species of louse was more prevalent in the first decade than in the second, although intensity was stable, possibly a result of declining populations of the host.

**REVISION OF *PARANASTATUS MASI* (EUELMINAE, EUELMIDAE) WITH DESCRIPTIONS OF FOUR NEW SPECIES.**

Melanie L. Scallion<sup>1</sup>, Gary A.P. Gibson<sup>2</sup>, and Barbara J. Sharanowski<sup>1</sup>. <sup>1</sup>Department of Entomology, University of Manitoba, Winnipeg, Manitoba, Canada, R3T 2N2; <sup>2</sup>Canadian

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*Paranastatus* Masi, 1917 (Eupelmidae, Eupelminae) was described originally for two species from Seychelles, *P. egregius* and *P. violaceus* (Masi 1917). Eady (1956) subsequently described *P. verticalis* and *P. nigriscutellatus* from Fiji. Here, four new species are described, Sp. 1 and Sp. 2 from Indonesia, and Sp. 3 and Sp. 4 from Fiji. Colour variation observed from newly collected material of *P. verticalis* is noted. Distribution patterns of *Paranastatus* and possibilities for future research are discussed.

### **INFECTION FREQUENCY AND DISTRIBUTION OF SPOTTED FEVER GROUP RICKETTSIAE IN MANITOBA, CANADA, IN ADULT AMERICAN DOG TICKS, *DERMACENTOR VARIABILIS* (ACARI: IXODIDAE).**

Matthew E. M. Yunik<sup>1,2</sup>, Terry D. Galloway<sup>1</sup> and L. Robbin Lindsay<sup>1,2</sup>. <sup>1</sup>Department of Entomology, University of Manitoba, Winnipeg, Manitoba, Canada, R3T 2N2; <sup>2</sup>Public Health Agency of Canada, National Microbiology Laboratory, Winnipeg, Manitoba, Canada, R3E 3R2.

The American dog tick, *Dermacentor variabilis* (Say) (Acari: Ixodidae), is a known vector of numerous bacterial endosymbionts, some of which are pathogenic to vertebrate hosts. A notable group among these bacteria are the spotted fever group rickettsiae which include the causative agent of Rocky Mountain spotted fever, *Rickettsia rickettsii* Brumpt. Little is known about the distribution and prevalence of the spotted fever group rickettsiae in Canada. We conducted active surveillance for tick-associated rickettsiae in ten localities in Manitoba. A total of 1044 adult American dog ticks were collected and screened for spotted fever group rickettsiae. *Rickettsia montanensis* was the only species of rickettsia detected. The mean prevalence of infection was 9.8% (range, 0.00 - 21.74% among localities). The proportion of infected male and female ticks was not significantly different; however, tick populations near the northern limit of *D. variabilis* distribution in Manitoba had lower prevalence of infection compared to tick populations from more southern localities in the province.

### **BIOLOGICAL CONTROL OF SOYBEAN APHID IN A GRADIENT OF AGRICULTURAL LANDSCAPES AND MOVEMENT OF NATURAL ENEMIES FROM ADJACENT HABITATS.**

K.G.L. Ishan Samaranayake, and Alejandro C. Costamagna. Department of Entomology, University of Manitoba, R3T 2N2.

Movement of transient generalist predators to soybean fields is crucial for controlling soybean aphid, *Aphis glycines* Matsumura (Hemiptera: Aphididae), before populations reach economic injury levels. We hypothesized that the structure and composition of agricultural landscapes affect the level of soybean aphid biological control observed in Manitoba. We conducted field studies to compare suppression of soybean aphid in 12 soybean fields in 2013 and 15 soybean fields in 2014, across a gradient of landscape complexity in Manitoba. For field manipulation, we infested the potted soybean plants with soybean aphids (14 aphids/pot) and treated them as: 1) open to predation versus 2) protected from predation by ambient levels of natural enemies. This design was replicated five times in each soybean field. Fields were distributed on six separate locations in 2013 and nine separate locations in 2014 that varied in the proportion of natural vegetation and alfalfa at the landscape scale. There was a strong to moderate suppression of soybean aphids across the province during both years. In addition, we conducted a mark-release-recapture experiment to determine direction of movement, travel distance and speed of *Coccinella septempunctata* (Coleoptera: Coccinellidae) moving between neighbouring fields of soybean and alfalfa. We released 654 (2013) and 600 (2014) marked lady beetles and recaptured around 5.5 % of them during both years. Results show that there was a trend of lady beetles moving greater distances in a short period of time from soybean to alfalfa fields, but also some movement in the opposite direction. These results can be explained by the presence of high numbers of aphids in alfalfa fields and the lack of aphids in soybean. In addition, lady beetles can move rapidly between both crops, suggesting that alfalfa may act as a source of aphidophagous natural enemies for soybeans when they are infested by soybean aphid.

## **LIKES, RETWEETS, AND HASHTAGS: A BEGINNER'S GUIDE TO BECOMING A SOCIAL ENTOMOLOGIST.**

Y. Miles Zhang, Department of Entomology, University of Manitoba, Winnipeg, Manitoba, Canada, R3T 2N2.

As the use of internet and social media become more prevalent in our daily lives in the digital age, news regarding science, biology, and entomology is becoming much more accessible to the general public thanks to the mainstream media. However, one caveat with this influx of attention to science is the amount of negative or false information as results of misquotation or bad journalism. As scientists, and particularly entomologists, it is our duty to use social media as a new way of interacting and discussing science with a broader audience and dispel misinformation. Another fringe benefit of social media is providing an unparalleled opportunity to interact with other scientists of different disciplines, thus networking at a global scale. I explain some of the ways in which social media can be used in science communication, and discuss my personal experience on how using social media has benefitted me as an entomologist.



## **FIELD AND LABORATORY TEST OF PREDATION ON CEREAL LEAF BEETLE.**

Arash Kheirodin<sup>1</sup>, Héctor Cárcamo<sup>2</sup>, and Alejandro C. Costamagna<sup>1</sup>. Department of Entomology, University of Manitoba, Winnipeg, Manitoba, Canada, R3T 2N2<sup>1</sup>,  
<sup>2</sup>Agriculture and Agri-Food Canada, Lethbridge Research Centre.

The cereal leaf beetle (CLB), *Oulema melanopus* (Linnaeus) (Coleoptera: Chrysomelidae) is an alien invasive pest found recently in western Canada. The species is native of Eurasia and feeds on a variety of important cereal crops including wheat, oats and barley. This study was conducted in Lethbridge, Alberta, from May to July, 2014. Several native predators were tested as potential egg and larval predators of cereal leaf beetle. Twelve predator taxa were tested separately for eggs and larvae of the CLB in petri dishes in a no-choice condition during 24 and 48 hours, respectively. In addition, predation rate on CLB eggs was quantified in 10 wheat fields using sentinel egg-tapes exposed to 24 h of predation by ambient levels of predators. Kruskal-Wallis and ANOVA tests followed by sequential Bonferroni corrections were used to analyze the data of the laboratory experiments. A two-way randomized block design was used to analyze the data of the field egg predation experiment. In general, several lady beetle species were the most important predators of eggs and larvae of the CLB in the lab. In addition, Carabidae and Staphylinidae also caused significant rates of egg and larval predation. In the field, sentinel eggs had 20 % mortality and differed statistically from controls protected from predation. Our results suggest that cereal fields in Alberta may host several species of predators that can provide biological control for CLB and deserve further study and conservation.

## **HIGHER-LEVEL MOLECULAR PHYLOGENY OF OPHIONIFORMES (HYMENOPTERA: ICHNEUMONIDAE).**

Andres Fabian Herrera-Florez; Barbara J. Sharanowski. Department of Entomology, University of Manitoba, Winnipeg, Manitoba, Canada, R3T 2N2.

The parasitoid wasp family Ichneumonidae includes around 1500 genera in 38 (Quicke *et al.*, 2009) to 41 extant subfamilies (Gauld 1991, Porter 1998, Quicke *et al.*, 2005, Laurence *et al.* 2006, Zhaurova, 2006, Yu *et al.*, 2005). Based on morphological features, most of the subfamilies of Ichneumonidae have been classified in seven informal groups. One of these groups, the Ophioniformes, as conceptualized by Quicke *et al.* (2009) would be monophyletic and would currently include 16 subfamilies. In this work, the monophyletic status of the Ophioniformes as well as the monophyletic status of the subfamilies currently included in the Ophioniformes group is tested based on molecular data from a mitochondrial gene (28S) and a nuclear gene (CAD). Maximum Likelihood and Bayesian Inference were conducted and their results compared. Individual phylogenetic gene trees as well as a species tree are presented and discussed.

## **CONTRIBUTION OF SOYBEAN APHID ALATES TO COLONY FITNESS UNDER PREDATION.**

Aldo Rios-Martinez, and Alejandro C. Costamagna. Department of Entomology, University of Manitoba, Winnipeg, Manitoba, Canada, R3T 2N2.

Predation is believed to be a key selective force for aphids, resulting in several behavioural and physiological adaptations. An interesting adaptation is the predator-induced transgenerational wing development displayed by some aphid species. Wing polyphenism is a decisive element in the performance of a colony because different morphs are specialized in different life-cycle roles. The ability of winged individuals to disperse is often penalized by a reduced reproductive output. This trade-off raises questions about the role of the alate morph in the overall fitness (numerical contribution) of a parthenogenetic colony under predation. We conducted a study using soybean aphid (*Aphis glycines*). Field soybean plants were manually infested with a constant number of aphids with differing morph ratios across treatments, which after settling, were eventually exposed to predation by *Coccinella septempunctata* (Coleoptera: Coccinellidae). Infested plants were enclosed within cages that either hindered or allowed the movement of alates to new uninfested plants that in addition, provided predator-free space. Several counts were performed during a 14 day period. Migratory behaviour was low, as well as its resulting numerical contribution. There was no apparent benefit of colonizing predator-free space on the overall numbers of a colony. Similarly, alate migration did not show a numerical benefit over a colony comprised only by apterae under strong predation. Separate controls with only one morph showed more than double the population growth in apterae than in alate aphids. In soybean aphid, reproduction by apterae may be a more effective way to counteract predation than alate migration.

## **THE PARASITOID COMMUNITY ASSOCIATED WITH ECONOMICALLY IMPORTANT CUTWORMS IN CANADA.**

Udari Wanigasekara<sup>1</sup>, Jim Broatch<sup>2</sup>, Jeremy Hummel<sup>3</sup>, Jennifer Otani<sup>4</sup>, Barbara J. Sharanowski<sup>1</sup>. <sup>1</sup>Department of Entomology, University of Manitoba, Winnipeg, Manitoba, Canada, R3T2N2; <sup>2</sup>Agriculture and Agri-Canada Research Station, Lacombe, Alberta, Canada, T4L 1W1; <sup>3</sup>Lethbridge College, Lethbridge, Alberta, Canada, T1K 1L6; <sup>4</sup>Agriculture and Agri-Food Canada Research Station, Beaverlodge, Alberta, Canada, T0H 0C0.

Cutworms (Lepidoptera: Noctuidae) cause economic damage to several Canadian agricultural crops. Previous studies suggest that the parasitoids are potentially effective biological control agents for controlling cutworms. Parasitoids are not incorporated into control strategies of cutworms as research on the parasitoids of cutworms has been extremely limited in Canada. We examined the hymenopteran parasitoids attacking

economically important cutworms. We collected larval cutworms from infested fields in Manitoba and Alberta, and reared them in the laboratory until the cutworm moth or parasitoid wasps emerged. Prevalence of parasitism was higher in Alberta compared to Manitoba, but was often too low to reduce cutworms below economic levels. *Copidosoma* spp. are common in Canada but do not effectively control red-backed and dark-sided cutworms. *Cotesia* spp. effectively control dingy and army cutworms in Alberta, but no *Cotesia* spp. were found attacking cutworms in Manitoba. There is no effective parasitoid wasp to control economically important cutworms in Manitoba. This study extends the existing knowledge on parasitoids as biocontrol agents and serves as a baseline for further study.

### **FREEZING A FLOUR PACKING PLANT TO CONTROL *TRIBOLIUM CASTAENUM*.**

Ahmed Abdelghany and Paul Fields. Cereal Research Centre, Agriculture and Agri-Food Canada, Department of Biosystems Engineering, University of Manitoba, Winnipeg, Manitoba, Canada, R3T 2N2.

Freezing flour mills in the Canadian Prairie provinces was common before 1980, but has fallen out of use with the practice of fumigation with methyl bromide. Methyl bromide has been phased out because it is an ozone-depleting substance, and flour mill managers are looking for alternatives. There are limited options for insect control in organic mills. In this study, we estimated the time needed to kill adult and late larval instar *Tribolium castaneum* (red flour beetle) in the lab, either not cold acclimated or cold acclimated (15, 10, 5°C/2 weeks/temperature). Acclimated insects were slightly more cold tolerant than unacclimated insects. Adults were more tolerant than larvae; lethal time 95% mortality: acclimated adults; 96, 47, 14 h; acclimated larvae; 120, 24, 8 h at 0, -5 and -10°C, respectively. During February 2014, the packing plant of a mill was left unheated and outside air blown into room for three days. Adults in vials were placed in 20 different locations and at one location, 20 vials were removed after different times. There were three types of adults: unacclimated, lab acclimated (as above), packing plant acclimated (about 15°C for 35 d). Outside temperatures ranged from -6 to -24°C, inside temperatures from 1 to -18°C; mortality ranged from 0 to 100%. Unacclimated and acclimated insects had over 80% mortality, whereas packing plant acclimated insects had only 20% mortality. Trap catches in the packing plant dropped after the freeze-out and only returned to pre-treatment levels in August.

### **INTERACTIVE KEY TO WHEAT PESTS OF PRAIRIE TERRITORIES.**

Pablo Krüger Fernandes and Barbara J. Sharanowski. Department of Entomology, University of Manitoba, Winnipeg, Manitoba, Canada, R3T 2N2.

This project is a prototype of interactive software for mobile phones, which aims to help farmers and producers in the prairie regions with the identification of pest species of insects and mites. Being part of a larger initiative the focus was only on one crop, wheat (*Triticum* spp.), in the Canadian prairie region, which includes Manitoba, Saskatchewan and Alberta; 35 pest species were used. Identification keys are important tools for many professionals, compressed diagnostic information for several entries in a format that is easy enough for a non-specialist to differentiate between those entries. The key's main target is people with little taxonomic knowledge. A multi-access tree was developed as opposed to a binary type, to minimize error tolerance, being intuitive, allowing the user to ignore difficult or missing characters, and to work with characters that are more familiar. The base program used was Lucid Builder 3.3, made by the Australian company lucidcentral.org, which has a low learning curve and because it is easily accessible as free software. Twenty-five features with 98 states were selected with indicative figures to facilitate identification, when available. A variety in the type of features selected was made to try to accommodate all situations that a producer may have in hand, such the months of activity, plant damage, egg placement, adult and larval descriptions. Each species entry had its own picture to help differentiate similar species.

## **NUTRITION AND PESTICIDE CONTENT OF HONEY BEE-COLLECTED POLLEN.**

Megan. J. Colwell<sup>1,2</sup>, Dave Shutler<sup>1</sup>, Geoffrey R. Williams<sup>1,3</sup>, and Rodger Evans<sup>1</sup>.  
<sup>1</sup>Department of Biology, Acadia University, Wolfville, Nova Scotia, B4P 2R6, <sup>2</sup> Department of Entomology, University of Manitoba, Winnipeg, Manitoba, Canada, R3T 2N2, <sup>3</sup> Institute of Bee Health, Vetsuisse Faculty, University of Bern, Bern, Switzerland.

European honey bees (*Apis mellifera*) are important commercial pollinators, which have suffered greater than normal overwintering losses since 2007 in North America and Europe. Contributing factors likely include a combination of parasites, pesticides, and poor nutrition. Honey bees use honey as an energy source, and pollen for all other nutrients (*i.e.*, protein). Widespread pesticide use in modern agriculture can be a danger to honey bees. Nutritional and pesticide status of commercial colonies were examined in the Canadian Maritime Provinces in the spring and summer of 2011. Pollen samples were collected from honey bee colonies pollinating three fruit crops: apples, blueberries, and cranberries, as well as from colonies in uncultivated areas in late summer. These three crop and one non-crop sites were compared on the basis of nutritional suitability and pesticide exposure for commercial honey bees. Proportion of pollen collected from crop flowers versus non-crop flowers was high in apples, very low in blueberries, and low in cranberries. Honey bee-collected pollen from colonies in apples tended to have good nutrition and high pesticide diversity, from blueberries had poor nutrition and high pesticide diversity, from cranberries had good nutrition and low pesticide diversity, and from uncultivated fields had poor nutrition and low pesticide diversity. No pesticides

were present at or above LD<sub>50</sub> levels. There were differences among site types that could inform improved honey bee management.

### **THE INFLUENCE OF VEGETATION AND SOIL CHARACTERISTICS ON ABUNDANCE OF POWESHIEK SKIPPERLING.**

Mahsa Hooshmandi, and Richard Westwood. Department of Biology, University of Winnipeg, Manitoba, Canada, R3B 2E9.

The Poweshiek skipperling (*Oarisma poweshiek*) is listed as threatened under the federal *Species at Risk Act* and as endangered under the province of Manitoba's *Endangered Species Act*. Previous studies on skipperling habitat in Manitoba have focused on coarse habitat structure over large habitat patches. In this study, we examined vegetation and soil characteristics at locations within general habitat areas where adult skipperlings feed on nectar, bask or oviposit (microsite level). We report on the relationship between the number of skipperlings per unit area and associations with specific vegetation species and soil characters.

### **POSTERS**

#### **COLLECTION OF *AMBLYOMMA AMERICANUM* (ACARI: IXODIDAE) IN SOUTHERN MANITOBA.**

Daniel Klassen and Kateryn Rochon. Department of Entomology, University of Manitoba, Winnipeg, Manitoba, Canada, R3T 2N2.

A lone star tick, *Amblyomma americanum* (Acari: Ixodidae), was collected in Beaudry Provincial Park, Manitoba, Canada. The tick was collected during a study on tick seasonality in which ticks were collected on a weekly basis using a one metre squared drag, focusing on *Dermacentor variabilis* and *Ixodes scapularis*. *Amblyomma americanum* is indigenous to Central and South America and southern United States, though it has been collected throughout Canada. The tick collected most likely dropped off of a migratory bird as a nymph and moulted into an adult before being collected. These ticks are known vectors of human pathogens, including spotted fever-causing *Rickettsia* spp., ehrlichioses and the most perplexing Southern Tick Associated Rash Illness (STARI).

**REVIEW OF LITERATURE ON THE BIOLOGICAL EFFECTS OF WIRELESS RADIATION ON INSECTS: A CALL FOR STUDIES ON HONEY BEES.**

Margaret Friesen. 43 Rutgers Bay, Winnipeg, Manitoba, Canada, R3T 3C9.

World-wide reports of declining bee colonies are of great concern. Among the suspected agents which could be responsible, or be a contributing factor, is non-ionizing, electromagnetic wireless radiation (*e.g.*, radiofrequency/microwave emissions from cell tower antennae and other devices). Behavioural effects documented for bees include induction of abnormal worker piping signaling and foraging flight. Decline in colony strength, reduced egg laying ability of the queen and loss of ability to store honey have also been reported. I review the literature on behavioural and other effects documented for insects and include some well-designed studies on non-insect species, including birds and mammals. The United States Department of the Interior recently called for field studies in North America, "to validate potential impacts of communication tower radiation - both direct and indirect - to migratory and other trust species". It seems appropriate that ecologically and economically important pollinators such as bees should rank high for concerted, systematic studies. With our well-developed network of honey bee operators, and layperson and academic expertise, Manitoba is a prime location for such work.

**INFESTATION PARAMETERS OF CHEWING LICE (PHTHIRAPTERA: *BRUEELIA NEBULOSA*; AMBLYCERA: *MENACANTHUS EURYSTERNUS*) INFESTING EUROPEAN STARLING (*STURNUS VULGARIS*) IN MANITOBA.**

Erin N. McNally. Department of Entomology, University of Manitoba, Winnipeg, Manitoba, Canada, Canada, R3T 2N2.

The European starling, *Sturnus vulgaris* (Linnaeus, 1758), was introduced into North America in the late 1800's and since has reached pest status in many parts of the continent. It was first recorded in Manitoba in 1925. In the United Kingdom and Europe, it is infested by five species of chewing lice; however, in 21 years starlings salvaged from rehabilitation hospitals have been sampled (192 birds) in Manitoba, only two species of lice have been collected, *Menacanthus eurysternus* (Burmeister, 1838) and *Brueelia nebulosa* (Burmeister, 1838). Total prevalence of infestation for both species was 40.6% (95% C.I. = 34-48%), with a mean intensity of 48.8 (95% C.I. = 34.79-68.82) lice per infested bird. Prevalence of infestation by *M. eurysternus* (22.4%; 95% C.I. = 0.17-0.29) was not significantly different ( $p = 0.07$ , Fisher's exact test) from prevalence of *B. nebulosa* (32.3%; 95% C.I. = 0.25-0.38). Mean intensity of infestation by *M. eurysternus* (39.5; 95% C.I. = 26.26-59.88%) was not significantly different ( $p = 0.83$ , Bootstrap 2-sample t-test) from that of *B. nebulosa* (36.8; 95% C.I., 22.93-59.65%). The majority of starlings ( $n = 164$ ) in this study were salvaged during May, June and July. It would be interesting to sample birds equally in each month of the year to examine seasonal patterns in infestation.

**COMPARING ACTIVE AND PASSIVE *IXODES SCAPULARIS* SURVEILLANCE IN MANITOBA: TRENDS, LIMITATIONS, AND SUGGESTIONS.**

Zack C. Polk, and Kateryn Rochon. Department of Entomology, University of Manitoba, Winnipeg, Manitoba, Canada, Canada, R3T 2N2.

The first established population of *Ixodes scapularis* (Say), or the blacklegged tick (BLT), was detected in the southeast corner of Manitoba in 2006. This species has since expanded its range north and westward. This obligate parasite is a vector of pathogens causing diseases such as Lyme, babesiosis, and human anaplasmosis. Passive surveillance for BLT's began in 1996. We mapped passive surveillance data for 2012-2014, using the localities from which ticks were submitted. Active surveillance data were also mapped for 2013 and 2014. Submissions east of Winnipeg are frequent in all years, and submissions north of Riding Mountain and Lake Winnipeg are thought to be adventive ticks. Localities from which ticks have been sent for passive surveillance do not always yield ticks when active surveillance is performed. We found that limitations to passive surveillance are population density, and adventive ticks, while limitations to active surveillance are time and money. We suggest that more resources should be put towards promoting passive surveillance in the western half of the province. We also recommend that active surveillance should continue in areas such as south of Riding Mountain National Park, and south of Brandon to the Turtle Mountains where passive surveillance indicates the potential for emerging tick populations.

***The Entomological Society of Manitoba gratefully  
acknowledges the following organizations which  
provided financial support for the***

***70<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.*

*Gilles Lambert Pest Control*

*Metro Pest Control*

*North South Consultants*

*Orkin PCO Services*

*Poulin's Pest Control*

*Viceroy Distributors*

*Fiona Ross*



# The Entomological Society of Manitoba 70<sup>th</sup> Annual Business Meeting

1 November, 2014

Department of Entomology, University of Manitoba

**Attendance**

President	Robbin Lindsay
Secretary	David Wade
President-elect	Richard Westwood
Regional Director to ESC	Barb Sharanowski
Proceedings Editor	Terry Galloway
Treasurer	Ian Wise

Paul Fields	Rob Currie
John Gavloski	Erica Smith
Pat Mackay	Robert Lamb
Marjorie Smith	Kathy Cano
N.J. Holliday	Rob Anderson
Aldo Rios	Matt Yunik
Lisa Capar	Blaine Timlick
Rhéal Lafrenière	Miles Zhang
Taz Stuart	Margaret Friesen
Sunday Oghiakhe	Kateryn Rochon

**Regrets**

Désirée Vanderwel  
Colin Demianyk  
Joel Gosselin

**Acceptance of Agenda**

*Motion:* Galloway/Lamb – to accept the Agenda (Appendix A) .....Carried

2 **Acceptance of the Minutes of the Last Annual Business Meeting (2 November 2013)**

*Motion:* Lamb/Rochon – to accept previous Minutes of the 69<sup>th</sup> Business Meeting  
.....Carried

3 **Business Arising from the Minutes**

a) Mailing address – Mailing address has been changed to 214 Animal Science Bldg., Winnipeg, MB R3T 2N2

4 **Reports – Executive**

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

**Appendix B – President**

Lindsay outlined the major activities he was involved in on behalf of the Society for the past year. He also commented on what action items were outstanding such as finding a chair for the 2017 joint annual meeting. Barb was interested in being scientific chair and Stuart was interested in being general chair.

**Appendix C – Treasurer**

Wise reviewed the financial statement for the year. The Society currently has \$55,034 in assets. There was some general discussion about the financial statement from the Society members including purchasing another \$1000 GIC and encouraging the Youth Encouragement Committee to spend their allotted funds.

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

Rochon reported on this year’s ESC governing board meeting which was held in late September in Saskatoon. Highlights of her report included the transition to the new Canada Non-Profit Corporations Act, the new membership fee category of Early Career, and the new management and headquarters for ESC.

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

Galloway reported that the distribution of volume 69 (2013) was delayed and not ready for distribution at this year’s meeting. This volume will be the last one printed as it will be distributed electronically moving forward. There was one scientific paper submitted and he again stressed he is looking for scientific papers and notes to publish in upcoming volumes of the *Proceedings* and reminded people there are no page charges.

**Appendix F – Endowment Fund Board**

Cano reported the principal stood at \$44,000 at the time of the meeting.

5 **Reports – Committees**

**Appendix G – Finance**

Cano reported that we are still in good financial shape. There was some general discussion about GICs.

**Appendix H – Publicity/Newsletter**

Smith reported that three issues were produced in the past year. She discussed the cost savings associated with distributing the newsletter electronically in the future. She also announced that Jordan Bannerman has replaced Mahmood Iranpour as the new co-editor.

**Appendix I – Social**

Capar reported that the New Members Social was held on April 14<sup>th</sup> at the Pony Corral on Pembina with students getting discount rates. Holliday presented about his experiences in Switzerland. There was discussion about the Last Friday of the Month event changes and whether to continue catering lunch for the business meeting and its impact on the finances.

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

Rios reported on this year’s activities. He highlighted that they presented to over 1400 people but this was mainly through one festival and that they had to turn down requests due to lack of volunteers. He also mentioned that all graduate students will now be required to volunteer to do one event per year. There was some general discussion regarding how to increase the number of volunteers such as emailing general membership, mentoring, and posting a schedule that everyone would have access to.

**Appendix K – Archives**

Sharanowski reported that the Western Committee on Livestock Pests Archives are now housed in ESM’s archives. She is also looking for a replacement.

**Appendix L – Common Names**

Sharanowski reported that there was no activity to report and that someone should propose a common name for a Manitoba insect.

**Appendix M – Scholarship and Awards**

Westwood presented his report. The winners were as follows: Student Achievement – Melanie Scallion; Orkin award – Amber Bass; ESM Graduate Scholarship – Ishan Samaranayake and Udari Wanigasekara; Student Paper Competition – Aldo Rios. Fields asked if applications could be sent electronically and the answer was yes.

**Appendix N – Fundraising**

Gosselin reported that \$1600 was raised from 13 donors from September 2013 to August 2014.

**Appendix O – Scientific Program**

Anderson reported that there were 20 submitted papers, of which 12 were part of the student paper competition. There were also 4 submitted posters. Thanks were given to the committee.

**Appendix P – Membership**

Presented by Currie. Membership is at 96, down from 104 last year.

**Appendix Q – Web Page**

Currie provided a summary of the status of the web site. There is a plan to begin tracking web page usage to see which components are most popular. Fields asked if a mobile version could be created and Currie will investigate.

**6 Election Results**

President Elect .....	Paul Fields
Member-at-Large .....	Alejandro Costamagna
Regional Director .....	Barb Sharanowski

**Appendix R**

*Motion:* Lamb/Galloway – to destroy the ballots

**7 New Business**

a) **Online voting**

Wade presented his findings regarding electronic voting and recommended keeping mail-in voting. Wade mentioned other societies such as ESC have seen a decline in voter turnout and hosting services can cost as much as postage for our current membership size. Holliday recommended using campus mail for members at U. of M. and Fields recommended changing the bylaws to allow for the possibility in the future.

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

There were no members who both passed away in 2014.

**9 Transfer of Office** –Robbin Lindsay to Richard Westwood

**10 Other Business** – None

**11 Adjournment** – 3:15 p.m.

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

# APPENDIX A

**The Entomological Society of Manitoba, Inc.  
Agenda of the Entomological Society of Manitoba  
70th Annual Business Meeting  
1 November, 2014**

1. Acceptance of Agenda
2. Acceptance of the Minutes of the Last Annual Meeting (2 November 2013)
3. Business Arising from the Minutes
4. Reports – Executive
  - President** – Robbin Lindsay
  - Treasurer** – Ian Wise
  - Regional Director to the ESC** – Kateryn Rochon
  - Editor of the Proceedings** – Terry Galloway
  - Endowment Fund Board** – Kathy Cano
5. Reports – Committees
  - Finance** – Kathy Cano
  - Publicity/Newsletter** – Marjorie Smith/Jordan Bannerman
  - Social** – Lisa Capar
  - Youth Encouragement/Public Education** – Aldo Rios
  - Archives** – Barb Sharanowski
  - Common Names** – Barb Sharanowski
  - Scholarship and Awards** – Richard Westwood
  - Fund-Raising** – Joel Gosselin
  - Scientific Program** – Rob Anderson
  - Membership** – Désirée Vanderwel
  - Web Page** – Rob Currie
6. Election Results – Scrutineer, Colin Demianyk
7. New Business
8. Moment of Silence for Deceased Members This Year
9. Transfer of Office
10. Other Business
11. Adjournment

# **APPENDIX B**

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

This was a rather uneventful year for the President of the Entomological Society of Manitoba. The following outlines the events the president was involved in during 2014:

In May, the ESM Executive met for our annual meeting and the attached minutes provide the details. In brief the following topics were broached: financial updates, tentative agreement on the 2014 ESM Scientific Program, change of the mail address for the Society, expansion of scholarships and other awards, selection of a scientific Program Chair for the JAM in 2017, and issues around mail-outs of ESM materials including proceedings, newsletters and ballots.

In August, the Scientific Program Committee met to plan the ESM annual meeting for 2014. Robert Anderson volunteered to chair the Scientific Program Committee and did a wonderful job to organize the meeting. It was a bitter sweet meeting given that it marked the retirement of two more faculty members from the Department of Entomology (Neil Holliday and Terry Galloway) but both will undoubtedly remain active in the Society, as time permits.

There are several outstanding points of business that will need to be addressed by the ESM in short order, including: finding a volunteer to chair the Scientific Program Committee for the Joint Annual Meeting in 2017. It was suggested at the Executive meeting that Neil Holliday might be approached to be the chair; however, he was not available to take on this rather substantive tasking but did agree to serve on the committee (just not as chair). Another candidate will need to be groomed sooner rather than later. The Executive will also have to decide whether the Society has the financial flexibility to award more than one ESM Graduate Scholarship when two closely matched students apply for the award.

Robbin Lindsay, President  
Entomological Society of Manitoba

# **APPENDIX C**

## **Report of the Treasurer**

Financial Statements  
Year Ended August 31, 2014



**THE ENTOMOLOGICAL SOCIETY OF MANITOBA INC.**

Note: These Financial Statements have not been audited. The Accounts, Bank Statements and Receipts were provided by the Treasurer and reviewed by the Past-President to prepare these summary financial statements.

Past-President:

Bob Lamb

Date: 29 October 2014

**ENTOMOLOGICAL SOCIETY OF MANITOBA, INC.**  
**Statement of Financial Position**  
**August 31, 2014**

	<b>2014</b>	2013
<b>ASSETS</b>		
<b>CURRENT</b>		
Cash	\$ 7,294	\$7,501
Money market fund	<u>3,740</u>	<u>3,718</u>
	<b>11,034</b>	11,219
<b>TERM DEPOSITS</b>	<b>\$ 44,000</b>	<b>\$44,000</b>
	<b>\$ 55,034</b>	<b>\$55,219</b>
<b>LIABILITIES</b>		
<b>CURRENT</b>		
	\$ NIL	\$NIL
<b>NET ASSETS</b>		
Unrestricted net assets	<b>11,034</b>	11,219
Internally restricted	<u><b>44,000</b></u>	<u>44,000</u>
	<b>\$ 55,034</b>	<b>\$55,219</b>



**ENTOMOLOGICAL SOCIETY OF MANITOBA, INC.**  
**Statement of Financial Position**  
**August 31, 2014**

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	2014	2013
<b>REVENUES</b>		
Annual meeting	\$ 845	\$ 758
Donations	1,600	1,500
Interest income	991	1,084
Membership fees	1,554	1,575
Miscellaneous	68	82
Proceedings	152	80
Youth encouragement & public education	70	250
	<u>5,280</u>	<u>5,329</u>
<b>EXPENDITURES</b>		
Awards and scholarships	1,500	1,300
Donations	0	0
General	395	1,629
Meetings	2,025	1,522
Newsletter	385	85
Proceedings	969	600
Social committee	191	200
Youth encouragement & public education	0	0
	<u>5,465</u>	<u>5,336</u>
<b>EXCESS (DEFICIENCY) OF REVENUES OVER</b>		
<b>EXPENDITURES</b>	<u>\$ (185)</u>	<u>\$ (7)</u>

**ENTOMOLOGICAL SOCIETY OF MANITOBA, INC.**

**Statement of Financial Position**

**August 31, 2014**

---

	Unrestricted	Internally		
	net assets	restricted	<b>2014</b>	2013
<b>NET ASSETS – BEGINNING OF YEAR</b>	\$ 11,219	\$ 44,000	<b>\$ 5,219</b>	\$ 5,226
Excess of revenues over expenditures	( 185)		<b>( 185)</b>	( 7)
Fund transfer			-	-
<b>NET ASSETS – END OF YEAR</b>	<b>\$ 11,034</b>	<b>\$ 44,000</b>	<b>\$ 5,034</b>	<b>\$ 5,219</b>

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**ENTOMOLOGICAL SOCIETY OF MANITOBA, INC.**

**Statement of Financial Position**

**August 31, 2014**

---

**TERM DEPOSITS**

<b>Certificate Number</b>	<b>Interest Rate (%)</b>	<b>Purchase Date</b>	<b>Maturity Date</b>	<b>Par Value (\$)</b>	<b>Interest, 2013 (\$)</b>
900055611-0012	3.00	5 Nov 2009	5 Nov 2014	8,000	240.00
900055611-0013	2.10	12 Dec 2010	16 Nov 2015	9,000	189.00
900055611-0014	1.85	16 Nov 2011	16 Nov 2016	9,000	166.50
900055611-0015	2.05	9 Nov 2012	9 Nov 2017	9,000	184.50
900055611-0016	2.10	12 Dec 2012	12 Dec 2019	9,000	189.00
<b>Total</b>				<b>44,000</b>	<b>969.00</b>

**ENTOMOLOGICAL SOCIETY OF MANITOBA, INC.**

**Statement of Financial Position**

**August 31, 2014**

---

**Memberships and Meeting Registrations**

Membership: Regular - \$25, Student - \$10

Registration: Regular - \$20, Student - \$5, 1-day - \$10

	Membership			Registration	
	Regular	Student	Life	Regular	Student
Number	53	23	6	37	21
Income (\$)	1,325	230	-	740	105
Total	\$1,554.50*			\$845	

\*Note: Exchange rate on US\$ checks reduced actual totals slightly, and members who made a donation are excluded.

# APPENDIX D

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

The 151<sup>th</sup> Annual meeting of the Entomological Society of Canada was held in Saskatoon, Saskatchewan September 28-October 1.

The new ESC President is Staffan Lindgren, University of Northern British Columbia.

The new 2<sup>nd</sup> Vice-President is Neil Holliday. Neil will be President of the ESC in 2017, the same year the ESM will be hosting the ESC joint meeting.

### - New Canada Non-Profit Corporations Act

The transition to the CNCA has been completed successfully, and the Standing Rules have been updated for compliance, and approved by membership at the last AGM. To comply with the new regulation, the ESC had to change the fiscal year end date from December 31 to June 30.

The main change is that the ESC is now a not-for-profit corporation rather than a scientific society. As such, under the new law, the Executive no longer makes the decisions: all decisions are made by the Directors, which are all elected by the ESC membership, and include the regional directors from each affiliate society.

The Directors must be elected by the ESC membership at their AGM. This means the Director from the ESM must be elected by ESM membership prior to the ESC AGM to ensure the name is on the ballot at the ESC AGM.

### - New membership fee category

The proposal to have an "Early Career" fee category has been accepted. Early Career members will have a 25% rebate on the regular member fees for three years from their graduation date.

### - New management and new HQ address

There have been concerns about the costs of maintenance associated with the ESC Headquarters for some time, and an *ad hoc* committee was charged to look into various options. The committee on Headquarters Operations, chaired by Bernie Roitberg (Simon Fraser University), studied three options: *status quo*, hiring a part-time Executive Director, or contracting an Association Management Company (AMC).

After careful consideration, the ESC decided to hire an Association Management Company (AMC) to take care of the day-to-day management of the Society. The chosen company, Strauss Event & Association Management, is located in downtown Winnipeg. The ESC's address will change accordingly.

There are many advantages for the ESC to move to an AMC, but the main thing as far as regional societies are concerned is that the AMC will be providing support for joint

meetings. The AMC is expected to deal with meeting registration, venue and hotel arrangements, etc., reducing the burden of the local arrangements committee.

- *The Canadian Entomologist*

There is a new Editor-in-Chief for *The Canadian Entomologist*: Chris Buddle (McGill) had stepped down and has been replaced by Kevin Floate (AAFC-Lethbridge).

The TCE has increased its page length by 10%, and now also offers an Open Access option for a fee of US\$2,500.

- ESC Blog

The purpose of the blog is to publish regional society news and short summaries of recently published research. If you have something recently published and would like to make it known, consider writing a short post for the blog.

Next meeting in Montreal, November 7 to 11 – see you there!

(and start planning to attend the 2016 meeting in Orlando, Florida, during the International Congress of Entomology, September 23-30.)

Kateryn Rochon  
Regional Director

## **APPENDIX E**

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

Volume 69 (2013) of the *Proceedings of the Entomological Society of Manitoba* was sent to Warren Schuetz and his staff in the University of Winnipeg print shop on 9 September, but due to technical difficulties, was not available for distribution to the ESM membership in time for the Annual General Meeting. Volume 69 consists of 58 pages, with one Scientific Paper, the abstracts from the Annual Meeting of the Entomological Society of Manitoba held at the Freshwater Institute and the Cereal Research Centre on 1-2 November, 2013, and the Minutes of the 69<sup>th</sup> Annual Business Meeting of the Entomological Society of Manitoba held on 2 November, at the Cereal Research Centre. Based on instructions from Executive Committee, bound copies will no longer be printed; electronic copies will be sent to members via e-mail. Hard copies will be printed as needed, but not bound, and sent to members who do not have e-mail access. For Volume 69, 60 bound copies will be printed to fulfil subscriptions, exchanges and gifts for this year; each copy will be accompanied by a letter to explain that hard copies will no longer be available, but the *Proceedings* will still be available without cost from the ESM

website. Warren is in the middle of the second iteration of the *Proceedings*, and it should be available soon. The minutes of the 68<sup>th</sup> Business Meeting have been extracted from the first iteration and printed by the Secretary for this meeting. Please accept that there are a number of editorial corrections to be made to this version before being finalized and sent to the membership.

There is one scientific paper in Volume 69, and for the first time, a colour illustration will appear in the *Proceedings*, one of the clear advantages of entering the electronic age. If you have a manuscript of relevance to entomology in Manitoba, I encourage you to consider submitting it to the *Proceedings*. Scientific Notes as well as full Scientific Papers are welcome. I think the *Proceedings* is an excellent place to publish new distribution records and faunal lists for insects and related arthropods in Manitoba. In fact, two days ago, I received the first submitted paper for Volume 70, what I take as an excellent sign for the 2014 *Proceedings*. All submitted manuscripts are peer-reviewed; all published papers are available as PDF reprints on the web. Rob Currie will post Volume 69 on the ESM website as soon as it becomes available; thanks very much to Rob who posts the *Proceedings* so efficiently. The *Proceedings* are fully accessible using on-line search engines. There are no page charges to authors for published manuscripts of reasonable length. The *Proceedings* are freely available to entomologists around the world, so your papers can be accessed easily with the touch of a button.

*Proceedings* Editor  
Terry Galloway

## APPENDIX F

### ENTOMOLOGICAL SOCIETY OF MANITOBA Report of the Endowment Fund Board for 2013-2014

The endowment fund board met on October 23, 2014.

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 \$44,000 as of August 31, 2014.

GIC# 900055611-0012 matures on Nov 5, 2014. It was re-invested on October 29, 2014 + \$1,000 for 5 years at an interest rate of 2%.

Kathy Cano, Chair  
Ian Wise  
Bob Lamb

**Endowment Fund Guaranteed Investment Certificates**

**Table 1:** Account information as of August 31, 2014. Interest generated during the 2013-2014 fiscal year.

<b>Certificate No.</b>	<b>Principal</b>	<b>Interest Rate (%)</b>	<b>Maturity Date (Purchase Date)</b>	<b>Annual Interest</b>
900055611-0012	8,000.00	3.00	Nov. 5, 2014 (Nov 5, 2009)	240.00
900055611-0013	9,000.00	2.10	Nov 16, 2015 (Dec 12, 2010)	189.00
900055611-0014	9,000.00	1.85	Nov 16, 2016 (Nov 16, 2011)	166.50
900055611-0015	9,000.00	2.05	Nov 9, 2017 (Nov 9, 2012)	184.50
900055611-0016	9,000.00	2.10	Dec 12, 2019 (Dec 12, 2012)	189.00
<b>Total</b>	<b>\$44,000.00</b>			



# APPENDIX G

## ENTOMOLOGICAL SOCIETY OF MANITOBA Report of the Finance Committee for 2013-2014

The Finance committee met on October 23, 2014 and all was found to be in order. The financial statement and the budgets for the current and next fiscal years are attached. The Society continues to be in good financial shape.

Kathy Cano, Chair  
Ian Wise  
Bob Lamb

BUDGET ITEMS	2012-2013	2013-2014	2014-2015	2015-2016
<b>REVISED</b>	<b>Actual</b>	<b>Actual</b>	<b>Actual and</b>	<b>Projected</b>
<b>31 AUGUST 2013</b>			<b>Projected</b>	
<b>ASSETS</b>				
Cash	7,501	7,294	7,500	7,500
Money Market Fund	3,718	3,740	3,500	3,500
<b>TOTAL (Cash + Money Market Fund)</b>	<b>11,219</b>	<b>11,034</b>	<b>11,000</b>	<b>11,000</b>
Term Deposits (Endowment Fund)	44,000	44,000	45,000	45,000
<b>NET ASSETS (Cash + Money Market Fund + Term Deposits)</b>	<b>55,219</b>	<b>55,034</b>	<b>56,000</b>	<b>56,000</b>
<b>REVENUE</b>				
Membership Fees	1,570	1,554	1,550	1,550
<i>Proceedings</i>	80	152	100	100
Social Committee	0	0	0	0
Youth Encouragement & Public Education	250	70	500	500
Donations	1,500	1,600	1,600	1,600
Meetings: ESM/AGM	758	845	800	800
Interest Income	1,824	991	1,100	1,100
Miscellaneous	82	68	500	500
<b>TOTALS</b>	<b>6,064</b>	<b>5,280</b>	<b>6,100</b>	<b>6,100</b>
<b>EXPENSES</b>				
General Society Expenses	1,629	395	1,000	1,000
<i>Proceedings</i>	600	969	500	500

Newsletter	85	385	100	100
Social Committee	200	191	200	200
Youth Encouragement & Public Education	200	0	200	200
Fundraising Committee	0	0	0	0
Student Awards and Scholarships	1,300	1,500	1,500	1,500
Meetings: ESM/AGM	1,522	2,025	1,700	1,700
Donations	0	0	0	0
Representation at ESC	0	0	600	600
<b>TOTALS</b>	<b>5,336</b>	<b>5,465</b>	<b>5,800</b>	<b>5,800</b>
<b>Net gain (loss), year ending Aug. 31</b>	<b>(7)</b>	<b>(185)</b>	<b>300</b>	<b>300</b>

## **APPENDIX H**

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

The Newsletter Committee produced three issues of Volume 40 of the ESM Newsletter in the past fiscal year. Issue 40.1 was published in October 2013, issue 40.2 in February 2014 and issue 40.3 in June 2014. The total cost to print and mail the three issues was \$384.89.

The ESM Executive has approved the electronic distribution of the ESM Newsletter, beginning with Volume 41. The first issue was distributed to the Membership via e-mail in early October 2014. This will be a significant savings of printing and mailing costs to the Society. There are a few members who have not provided an e-mail address and they will continue to receive a paper copy of the Newsletter.

Thank you to those members who have contributed articles to the Newsletter. We encourage all ESM Members to contribute items of interest to the membership.

The position of co-editor was vacant for several months after the resignation of Mahmood Iranpour in the spring of 2013. Jordan Bannerman, an Instructor in the Department of Entomology at the University of Manitoba, joined the Newsletter Committee in November 2013.

Marjorie Smith  
Jordan Bannerman  
Co-Editors, ESM Newsletter Committee

## **APPENDIX I**

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

On April 14<sup>th</sup>, we had our New Members Social at the Pony Coral on Pembina. Neil Holliday spoke about his experience working in Switzerland over the years in his talk - "Jurassic jaunts: science and sights in Switzerland". During his presentation Neil showed us several slides of the view in Switzerland as well as the work/fieldwork that took place. Thank you, Neil, for the interesting and informative presentation. If anyone is interested in speaking at one of our social events, we would be pleased to have you present your research; you can contact me or another committee member for more information.

On this occasion, Pony Coral staff was not as helpful as in the past with setting up the room for the presentation. In addition, several people complained about the saltiness of their food. In the future we should look into another venue.

Discounts were given to students attending this year's New Members Social.

Lisa Capar  
Chair, Social Committee

## **APPENDIX J**

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

For another year, people of all ages have had the chance to increase their understanding of insects through the Youth Encouragement Program. The activities carried out throughout the year have been adapted to target different age groups and have included tours and presentations, box displays, hands-on experiences with live insects, guided visits to the J.B. Wallis/R.E. Roughley Museum, and collaboration at public events and festivals.

During presentations, emphasis has been laid on explaining the basic morphological characteristics that allow differentiation of insects from arachnids, myriapods and crustaceans, as well as how incomplete and complete metamorphoses work, although the most weight has been put on explaining the importance of insects from economical, ecological and health/veterinary perspectives. The presentations have been followed by box displays and hands-on sessions with live Madagascar hissing cockroaches, which has always been the children's favorite part.

Personalized visits to the museum were also humored, allowing a more personal interaction with children and their accompanying parents. These visits sometimes included a quick overview of the different work lines carried out in the Department, and on one time a practice session using sweep nets.

The program received a donation of \$25.00 from the Univillage Student Daycare, and about \$70.00 from personalized visits to the museum. There was no need to cover expenses for insect food because that was covered by DEGSA's money. The Youth Encouragement box has a total of \$250.00.

Although the program achieved an outreach of over 1400 people, this is mainly attributable to the Water Festival events, which had an impressive impact and drew great attention from the public and media. Despite this, some daycare presentation requests had to be turned down due to busy schedules.

During the past DEGSA meeting, held on Sep/15/2014, a new policy for the Youth Encouragement Program was approved. This new policy states that every student in the Department will be expected to participate in at least one Youth Encouragement event throughout the year.

I would like to thank and acknowledge Jordan Bannerman, Amber Bass, Alicia Leroux, Tharshi Nagalingam, Ishan Samaranayake, Melanie Scallion and Miles Zhang for their participation and involvement in YE events.

Aldo Rios

Youth Encouragement Chair 2013 – 2014

## **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  
Chair, Common Names Committee

# 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 program or recently completed a program. 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. Melanie Scallion. Melanie has developed her interest in entomology through her experience as an undergraduate researcher in the several entomology research laboratories at the University of Manitoba, her entomology based course work and as an undergraduate representative on the Dept. of Entomology, University of Manitoba Faculty Council. Melanie has also presented some of her undergraduate research at the national conference of the Entomology Society of Canada and is preparing a manuscript of her research for publication. She has also received an NSERC Undergraduate Research Award to work in the Entomology Department in 2014. Melanie has an excellent academic record and has excellent potential as a scientist.

**Orkin 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 industriousness in their university courses and/or summer work.

This year's winner of the Orkin award is Ms. Amber Bass. Amber has been enrolled in entomology courses at the University of Manitoba and has demonstrated a keen interest in entomology and an aptitude for entomological research. Amber is an excellent student with a high GPA and received an NSERC Undergraduate Research Award in 2014 to work as a summer research assistant in the Department of Entomology. Amber has worked on the Bugline insect identification service and has volunteered to provide supervision to visiting high school students learning about entomology.

**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 or the University of Winnipeg. Students must be enrolled in their graduate program 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 industriousness, good judgment, originality, a conscientious attitude and organizational ability, and excellent communication skills. Due to the unusually high number of applications for the award in 2014 the Society is

awarding two scholarships this year.

The first winner is Ishan Samaranayake. Ishan is enrolled as a MSc. candidate in the Dept. of Entomology at the University of Manitoba and is being supervised by Dr. Alejandro Costamagna. Ishan received his B.Sc. at the University of Peradeniya in Sri Lanka in 2010. Ishan's M.Sc. research examines the effects of soybean aphids on yield loss in soybeans in North America. His research focuses on the role of natural enemies in controlling aphids and the relationship of surrounding landscape diversity on abundance of parasitoids.

The second winner is Udari Wanigasekara. Udari is enrolled as a PhD candidate in the Dept. of Entomology at the University of Manitoba and is being supervised by Dr. Barbara Sharanowski. Udari received her B.Sc. the University of Peradeniya in Sri Lanka in 2010. Udari's PhD research examines the role parasitoids play in regulating cutworm populations in the Prairie Provinces with a focus of cutworms feeding canola.

Désirée Vanderwel  
Joel Gosselin  
Lara Toews  
Taz Stuart  
Richard Westwood, Chair  
October 31, 2014.

## **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.

The Fundraising Committee would appreciate leads from its members for parties who are using the valuable services that entomologists provide, so the Committee could solicit them for financial support.

Joel Gosselin,  
Chair, Fundraising Committee

# **APPENDIX O**

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

The 70th Annual Meeting Entomological Society of Manitoba was held in Winnipeg MB at the Freshwater Institute, Fisheries and Oceans Canada on 31 October, 2014 and at the Entomology Department, University of Manitoba on 2 November, 2014. The theme of the meeting was “Veterinary & Medical Entomology; Can History Predict the Future? A Tribute to Terry Galloway” in honour of the retirement of Dr. Terry Galloway from the Entomology Department at the University of Manitoba.

The invited speakers were:

Keynote Speaker

Advances in tick paralysis. **Tim Lysyk**, Retired.

Saturday Symposium: Veterinary and Medical Entomology in Canada: Honouring Dr. Terry Galloway.

A tribute to Terry Galloway; mentor of many. **Kateryn Rochon**, Department of Entomology, University of Manitoba

Should entomology matter to militaries? **Steve Schofield**, Communicable Disease Control Program, Force Health Protection, Department of National Defence

Trouble south of the border: host-seeking mosquitoes of northeastern North Dakota. **Jefferson Vaughan**. Biology Department, University of North Dakota

Emerging tick-borne diseases in Canada, the “other” pathogens transmitted by Black legged ticks. **Robbin Lindsay**, National Microbiology Laboratory, Public Health Agency of Canada

Patterns and processes in veterinary entomology in western Canada. **Terry D. Galloway**, Department of Entomology, University of Manitoba, Winnipeg.

There was a full programme with: 1 keynote talk, 5 symposium papers, 8 submitted oral papers, 4 submitted posters (of which 2 were student competition entries), 12 student oral papers (all in the student competition). The meeting organizers thank our generous sponsors for their support; Abell Pest Control, Inc., 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., Gilles Lambert Pest Control, Metro Pest Control, North South Consultants, Orkin PCO Services, Poulin's Pest Control and Viceroy Distributors, as well as Fiona Ross for the donation of door prizes.

There were 63 paid attendees, of whom 40 were regular registrations (one was a single day registration), and 23 were student registrations. A total of \$1616 was received in donations and \$910 in registration fees were generated from the meeting.

As in other years, the ESM Annual General Meeting was held after the symposium on the Saturday and the mixer was held at Pat McKay and Bob Lamb's house on the Saturday evening. Randy Gadawski of the Canadian Centre for Mosquito Management also hosted dinner on Friday evening for the symposium speakers and scientific program committee.

Submitted with respect and honour:

Chair: Rob Anderson

Past Chair: Paul Fields

Members: Robbin Lindsay, Paul Fields, Kateryn Rochon

Fund Raising: Joel Gosselin

Social/Refreshments: Lisa Caspar, Matt Yunik

Venue: Cheryl Podemski

Registration: Ian Wise

## **APPENDIX P**

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

There are currently 96 members in the ESM, compared to 104 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, programs for meetings, and provides links to other sources of entomological resources on the web. It also contains current and archival copies of the newsletter and proceedings. Current issues are typically posted shortly after (or before) they are released to the membership. PDF-reprints of papers that have been published in the

Thanks to the efforts of Bob Lamb, scanning of past issues of the *Proceedings* (1945-2012) and *Manitoba Entomologist* (1967-1979) is now complete and all issues have been uploaded onto the website. Reprints of 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. The “Entomologists of Manitoba” a joint publication of the ESM and ESC has also been scanned and added to the *Proceedings* page.

We plan to initiate tracking of the web pages in the coming year to get an idea of how much activity is on the site and which components are most popular.

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

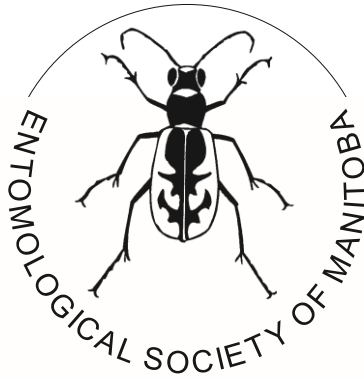
Rob Currie

## **APPENDIX R**

### **Entomological Society of Manitoba Election Report**

Elections closed September 30, 2014 for the Entomological Society of Manitoba offices of President-Elect, Member-at-Large and Honorary Member. The successful candidate for President-Elect is **Paul Fields**, for Member-at-Large is **Alejandro Costamagna**, and for Regional Director is **Barb Sharanowski**. We thank all candidates for their willingness to participate in the election. Formal announcement and commencement of terms will be at and after the ESM Annual Business Meeting, respectively.

Colin Demianyk, Chair, Scrutineer Committee  
Noel White, Witness



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