

ISBN 0315-2

*Proceedings of the
Entomological Society of Manitoba*



2022
Volume 78

Cover photo: Brown Wasp Mantidfly (*Climaciella brunnea*) photographed by Thilina Hettiarachchi (hettiart@myumanitoba.ca)

VOLUME 78

2022

ISBN 0315-2

Editors:

Kelsey L. Jones

Agriculture and Agri-food Canada

kelsey.jones@agr.gc.ca

Jason Gibbs

Department of Entomology, University of Manitoba

jason.gibbs@umanitoba.ca

Winnipeg, Manitoba

Published: October 25, 2023

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.

Persons interested in joining the Society should consult the website at:
<https://www.entsocmb.ca/>, or contact:

Jade Tanner
Secretary
Entomological Society of Manitoba
entsocmanitobasecretary@gmail.com

Contents

Submitted Papers:

FIRST RECORD OF THE OAK TIMBERWORM, <i>ARRHENODES MINUTUS</i> (DRURY) (COLEOPTERA: BRENTIDAE) IN MANITOBA	6
FIRST RECORD OF DION SKIPPER (LEPIDOPTERA: HESPERIIDAE) IN MANITOBA, CANADA	13
FIRST RECORDS OF THE ORACHE LEAFMINER MOTH <i>CHRYSOESTHIA SEXGUTTELLA</i> (LEPIDOPTERA: GELECHIIDAE) AND AN ASSOCIATED PARASITOID WASP, <i>NEOTHLIPSIS CINCTA</i> (HYMENOPTERA: BRACONIDAE) IN MANITOBA	18

Scientific Programme Abstracts for the 2022 Annual Meeting of the Entomological Society of Manitoba	23
Acknowledgements	38
Meeting Minutes for 78th Annual Business Meeting of the ESM	39

Appendices:

Appendix A: Agenda of the 78 th AGM	43
Appendix B: President's Report to the Membership	45
Appendix C: Report of the Secretary	47
Appendix D: Financial Report	48
Appendix E: Report of the <i>Proceedings</i> Editors	50
Appendix F: Endowment Fund Report	51
Appendix G: Report of the Regional Director to the ESC	52
Appendix H: Newsletter Report	53
Appendix I: Common Names Report	54
Appendix J: Youth Encouragement and Public Outreach Report	55
Appendix K: Fundraising Report	58
Appendix L: Social Committee Report	59

Appendix M: Report of the Scientific Chair 60
Appendix N: Election Report 62
Appendix O: Webmaster/Archivists' Report 63
Appendix P: Report of the Scholarship Committee 64

FIRST RECORD OF THE OAK TIMBERWORM, *ARRHENODES MINUTUS* (DRURY) (COLEOPTERA: BRENTIDAE) IN MANITOBA

Robert E. Wrigley¹ and Tim Arendse²

¹505 Boreham Blvd., Winnipeg Manitoba R3P 0K2, robertwrigley@mts.net

²Box 663, Portage la Prairie, MB R1N 3C2, tim.arendse@gmail.com

The Oak Timberworm, *Arrenodes minutus* (Drury 1773) is a saproxylic species widespread in hardwood forests throughout the eastern half of North America, from North Dakota (iNaturalist.org), southern parts of Ontario and Quebec (LaPlante *et al.* 1991; Bousquet *et al.* 2013) to New Brunswick and Nova Scotia (Majka *et al.* 2008,), south to Texas and Florida (Blatchley and Leng 1916; Downie and Arnett, 1996, Thomas 1996). The nearest records to Manitoba are in central Minnesota (iNaturalist.org; 7 km SE Toivola, St. Louis County, photo by Dexter Nienhaus, 09 Jun 2020) and Turtle River State Park, 5 km W Grand Forks, North Dakota (Bugguide.net; photo by Carl Barrentine, June 12, 2012). Of the three members of the subfamily Brentinae in Canada and the United States, *A. minutus* is the most northern. Since this species is by no means rare over its large range, numerous excellent photos of male and female specimens are available on bugguide.net and the Maryland Biodiversity Project (<https://www.marylandbiodiversity.com/view/11745>).



Figure 1. Dorsal view of the Oak Timberworm from Manitoba (photo by Thilina Hettiarachchi).



Figure 2. Lateral view of the Timberworm from Manitoba (photo by Thilina Hettiarachchi).

Arrenodes minutus is shiny, dark reddish-brown with yellow streaks on the deeply furrowed elytra, and characterized by an extremely thin, elongate body, large pear-shaped pronotum, and long, non-elbowed antennae held in the forward position alongside the rostrum. Males usually range from 13–25 mm, females 6–14 mm (Craighead 1950; Buchanan 1960; Downie and Arnett 1996); however, some exceptional males may reach 35 mm (Solomon *et al.* 1980; Thomas 1996). Riley (1874) described the larval, pupal and adult stages; Craighead (1950) illustrated the larval stage in great detail. Davis (2017) presented scanning electron micrographs and semithin images of the external and internal anatomy of the head and rostrum of *A. minutus* in a study of the phylogenetic relationships among the Curculionoidea.

On June 4, 2021, amateur entomologist Tim Arendse found a 16 mm male Oak Timberworm under his house-yard light at 7.2 km E Portage la Prairie (49.995, -98.178), in south-central Manitoba. This specimen extends the species' range 250 km north, presumably having dispersed into the province from North Dakota. Although the yard light had been checked almost daily around 10:30 PM. and 6:00 A.M. all spring and summer for years, only one Oak Timberworm was found. The property and surrounding area consists of agricultural fields, woodlots, and riparian forest along the Assiniboine River. Tree species include aspen poplar (*Populus tremuloides*), balsam poplar (*Populus balsamifera*), Manitoba maple (*Acer negundo*), burr oak (*Quercus macrocarpa*), basswood (*Tilia americana*), and green ash (*Fraxinus pennsylvanica*). Numerous ash trees had been cut down recently, however, only the first five species have been reported as susceptible to attack by this weevil. We suspect this weevil has long been a resident

in Manitoba, but not reported previously due to its rarity. Here at the northern limit of its range, it may become more abundant with the warming of the climate. If so, it may increase competition with other saproxylic species in the province.



Figure 3. Male guarding in a pair of *Arrenodes minutus*. Note the differences in rostral length and mandibular size (photo by Ted MacRae).

Arrenodes minutus demonstrates striking sexual dimorphism in both body size and mandibular shape, with the large male having short, broad, well-developed mandibles, while the female has a greatly elongated, cylindrical rostrum with tiny pincer-like mandibles, specialized for boring holes in trees for oviposition. The male uses its mandibles to defend its position with a female during courting, mating and egg laying. Males are aggressive toward each other, and seldom toward females, with male dominance decided by size and strength (Buchanan 1960; Sanborne 1983; Anderson and Kissinger 2002).

Riley (1874) reported that should a strange male happen by a pair, a furious contest at once ensues, and continues sometimes for hours, until one or the other is thrown from the log or tree. The successful party then takes his position as guard. Leconte and Horn (1883) added that they result in no injury to either of the parties engaged, the dense chitinous covering affording protection. The weaker male, overcome by exhaustion, eventually flees and leaves to his more vigorous victor the honorable task of guarding and assisting the fair object of strife in her efforts to preserve the species. The etymology of *Arrenodes* is from the Greek *arrhenes*, meaning strong, fierce, brave, which well describes the male's vigorous defense of its mate.

Riley (1874) recorded that it takes from a few hours to a day for a female to drill a hole and deposit an egg, the male meanwhile standing guard and occasionally assisting his mate in extracting her rostrum should she become stuck. The female's antennae act like a fluttering brush around the mouthparts when drilling, which dislodge the accumulation of fine wood particles. Following egg laying, she then fills the hole with frass and secretions (Solomon 1995). Blazes and other wounds on trees over 15 cm in diameter are attractive egg-laying sites, with recent damage preferred to older ones.

Solomon (1995) indicated that adults are active from May to August over much of its range; iNaturalist shows records from March to September. The larva burrows (0.2 to 4 mm in diameter) in all directions deeply into the heartwood, often tunneling right through to the other side of the trunk before turning around. It maintains its tunnels free of frass and wood particles by pushing them out the exit hole. Feeding on both wood and fungal mycelia (Buchanan 1960; Sanborne 1983), the larva requires two to four years to develop, generally two (Solomon 1995). Pupation takes place near the exit hole of the larval gallery, and the adult emerges the following spring (Hopkins 1904; Buchanan 1960). Defense of the adult from predators is provided by the thick chitinous exoskeleton and the typical weevil habit of dropping to the ground and remaining immobile.

This species is not particular on which species of live, stressed, or dead (standing, logs and stumps) hardwood trees it attacks, including various oaks (red and white groups), basswood, aspen and balsam poplars, elm (*Ulmus americana*), American beech (*Fagus grandifolia*), and formerly American chestnut (*Castanea dentata*) (Riley 1874; Blatchley and Leng 1916; Thomas 1996). Ulyshen (2009) collected specimens of *A. minutus* in 29, 11-month-old snags and logs of water oak (*Quercus nigra*) and sweetgum (*Liquidambar styraciflua*) in bottomland and upland forests in South Carolina, and none from loblolly pine (*Pinus taeda*). Multiple specimens under loose bark of Manitoba maple and honey locust (*Gleditsia triacanthos*) indicate that additional hardwood species are susceptible (Solomon 1995). Wounds on trees are particularly attractive to this weevil, as adults feed at these sap flows and they also serve as oviposition sites (Solomon 1995). The female is likely attracted to volatiles emitted from wounded wood for oviposition, and is commonly found on the stumps and trunks of trees harvested for lumber or other reasons (Solomon 1995; MacRae 2011). The feeding activities of larvae not only result in economic pinhole damage to standing trees and unseasoned lumber (Solomon 1995), but the larvae are also a vector of the destructive fungus *Bretziella fagacearum*, which causes oak wilt (Bragard *et al.* 2019). Losses of valuable timber and unseasoned lumber have been described as enormous (Hopkins 1903). During the early summer peak larval activity in the Missouri Ozark's, Buchanan (1960) reported incidences of attack from 50 to 78% on blazed or wounded trees. Ives and Wong (1988) made no mention of this species in Manitoba in their comprehensive account of tree and shrub insect pests in the Prairie Provinces.

Majka *et al.* (2007) reported on a specimen intercepted in Nova Scotia in wooden furniture imported from Indiana. David Deng photographed two males in combat translocated far west of

the species' range on 06 May 2021 at Tahuya, Mason County, west of Seattle, Washington (iNaturalist). Other extralimital records are Montana and Central America (Wikipedia), and Ciudad de Mexico, Mexico (<http://bdi.conabio.gob.mx/fotoweb/archives/5037-Colección%20Zoológica/Animales/Invertebrados/LFSMCA0081%20Arrenodes%20minutus.jpg>. info). An individual was found in a shipment of oak products in France in 2005, but the species has not become established in Europe (Bragard *et al.* 2019). The European Food Safety Authority (EFSA Panel on Plant Health, 2019) decided that *A. minutus* meets all the criteria assessed for consideration as a potential Union quarantine pest, since there exists in Europe similar climatic conditions and wide distribution of potential host trees; consequently, phytosanitary requirements exist for *Quercus* and *Populus* (EFSA Panel on Plant Health 2019).

ACKNOWLEDGEMENTS

We appreciate the assistance of the following curators who confirmed that there were no Manitoba records of *Arrenodes minutus* in their respective collections: Drs. Randy Mooi (Manitoba Museum, Winnipeg), Jason Gibbs (JB Wallis/RE Roughley Museum of Entomology, Winnipeg), Patrice Bouchard (Canadian National Collection of Insects, Arachnids and Nematodes, Ottawa), Andrew Smith (Canadian Museum of Nature, Ottawa), Greg Pohl and David Langor (Biodiversity Pest Management, Northern Forestry Centre, Canadian Forest Service, Edmonton), and David Larson (Saskatchewan). Drs. Gerald Fauske and Patrick Beauzey (Entomology Department, North Dakota State University, Fargo) checked for the presence of records in North Dakota. We thank Ted MacRae for permission to use his excellent photo of the mating pair of *Arrenodes minutus*. We appreciate the editorial contributions by Drs. Jason Gibbs and Patrice Bouchard.

REFERENCES

- Anderson, R.S. and D.G. Kissinger. 2002. Brentidae Billberg 1820. In American Beetles. CRC Press, Boca Raton, Florida. Volume 2: 711–719.
- Blatchley, W.S. and C.W. Leng. 1916. *Rhynchophora* or Weevils of North Eastern America. The Nature Publishing Company, Indianapolis. 682 pp.
- Bousquet, Y, P. Bouchard, A.E. Davies and D.S. Sikes. 2013. Checklist of Beetles (Coleoptera) of Canada and Alaska. Second Edition. Pensoft, Sofia-Moscow. 402 pp.
- Bragard, C., K. Dehnen-Schmutz, K. Serio, P. Gonthier, M.A. Jacques, J.A.J. Miret and P. Milonas. 2019. Pest categorization of *Arrenodes minutus*. European Food Safety Authority Journal 17(2): 1–26.
- Buchanan, W.D. 1960. Biology of the oak timber worm, *Arrenodes minutus*. Journal of Economic Entomology 53: 510–513.

- Craighead, F.C. 1950. Insect Enemies of Eastern Forests. US Department of Agriculture, Miscellaneous Publication 657: 679 pp.
- Davis, S.R. 2017. The weevil rostrum (Coleoptera: Curculionoidea): internal structure and evolutionary trends. *Bulletin of the American Museum of Natural History* 416: 76 pp.
- Downie, N.W. and R.H. Arnett. 1996. The Beetles of Northeastern North America. Volume Two. The Sandhill Crane Press, Gainesville, Florida. 1721 pp.
- European Food Safety Authority, Panel on Plant Health. 2019. Pest categorization of *Arrhenodes minutus*. *European Food Safety Authority Journal* 17(2): 5617.
- Hopkins, A.D. 1904. Insect injuries to hardwood forest trees. *Yearbook of the United States Department of Agriculture, 1903*: 313–328.
- Ives, W.G.H. and H.R. Wong. 1988. Tree and Shrub Insects of the Prairie Provinces. Information Report NOR-X-292, Northern Forestry Centre, Canadian Forestry Service. 327 pp.
- LaPlante, S., Y. Bousquet, P. Belanger and C. Chantal. 1991. List des espèce de coleopteres du Québec. *Fabriques supplement* 6: 1–136.
- Leconte, J.L. and G.H. Horn. 1883. Classification of the Coleoptera of North America. *Smithsonian Miscellaneous Collections* 26(4): 567 pp.
- MacRae, T. 2011. Different jaws for different jobs. beetlesinthebush.com, 7 October.
- Majka C.G., R.S. Anderson and E. Georgeson. 2007. Introduced Aprionidae and Brentidae (Coleoptera: Curculionoidea) in the Maritime Provinces of Canada. *Proceedings of the Entomological Society of Washington* 109(1): 66–74
- Majka, C.G., K. Neil and R. P. Webster. (2008). *Arrenodes minutus* (Drury, 1770) (Coleoptera: Brentidae) discovered in the Maritime Provinces of Canada. *Journal of Acadian Entomology* 4: 32–35.
- Riley C.V. 1874. The northern brenthian – *Eupsalis minutus* (Drury). (Ord. Coleoptera; Fam. Brentidae). Sixth annual report on the noxious, beneficial, and other insects, of the State of Missouri. Regan and Carter, Jefferson City, Missouri. (113–118): 169 pp.
- Sanborne, M. 1983. Some observations on the behaviour of *Arrhenodes minutus* (Drury) (Coleoptera: Brentidae). *The Coleopterists Bulletin* 37: 106–113.
- Solomon, J.D., F.I. McCracken, R.L. Anderson, R. Lewis, Jr., F.L. Oliveria, T.H. Filer and P.J. Barry. 1980. Oak Pests: A guide to major insects, diseases, air pollution, and chemical

injury. United States Department of Agriculture, Southern Forest Experimental Station, General Report SA-GR11. 69 pp.

Solomon, J.D. 1995. Guide to Insect Borers in North American Broadleaf Trees and Shrubs. United States Department of Agriculture, Forest Service Agriculture Handbook AH-706. Washington. 735 pp.

Thomas, M.C. 1996. The primitive weevils of Florida (Coleoptera: Brentidae: Brentinae). Florida Department of Agriculture. Division of Plant Industry. Entomology Circular 375. 3 pp. Updated 2007
(https://entnemdept.ufl.edu/creatures/trees/beetles/primitive_weevils.htm)

Ulyshen M.D. 2009. Relationships between dead wood and arthropods in southeastern United States. PhD Thesis, University of Georgia. 117 pp. (accessed 28 June 2022)
https://getd.libs.uga.edu/pdfs/ulyshen_michael_d_200905_phd.pdf

FIRST RECORD OF DION SKIPPER (LEPIDOPTERA: HESPERIIDAE) IN MANITOBA, CANADA

Kirstyn Eckhardt

University of Manitoba, 12 Dafoe Rd., Animal Science/Entomology Bldg., Winnipeg, MB,
Canada R3T 2N2, keckhardt95@gmail.com

The Dion skipper, *Euphyes dion* W.H. Edwards, 1879 (Lepidoptera: HesperIIDae) is associated with sedge meadows and bog fen habitats (Shuey 1985). They use *Carex lacustris* (Cyperaceae) and other sedges as larval host plants and have also been associated with the exotic *Carex acutiformis* (Cyperaceae) (Catling and Kostiuk 2014). The butterfly's known range extends north to northwestern Ontario, northern Minnesota, and southeastern North Dakota, but they have never been reported from Manitoba (Klassen *et al.* 1989; Layberry *et al.* 1998).



Figure 1. Dion skipper nectaring on swamp milkweed, 25 July 2022. Photo by K. Eckhardt.

During an informal survey for butterflies in late July 2022, I encountered two Dion skippers 11.7 km southeast of the hamlet of Molson, Manitoba (49.99 N, 96.15 W), about 70 km east-northeast of Winnipeg. The observations were made along a 10 m section of Moss Spur Road at an elevation of 267 m. The gravel road is bordered by mixed forest and wetlands, namely Julius Bog and Shelley Bog. A wide ditch with several inches of standing water, and many sedges (*Carex* spp.), lay between the road and the Canadian Pacific Railway tracks.



Figure 2. Dion skipper nectaring on thistle, 29 July 2022. Photo by K. Eckhardt.

On 25 July, at 14:30h two Dion skippers were seen amongst stands of sedges (*Carex* spp.) growing in a ditch. I was able to approach the butterflies as they nectared on swamp milkweed (*Asclepias incarnata*) (Apocynaceae), thistle (*Cirsium* sp.) (Asteraceae) and vetch (*Vicia* sp.) (Fabaceae). Dozens of Dun skippers, *Euphyes vestris* Boisduval, 1852 (Lepidoptera: HesperIIDae), frequented the same flowers alongside Dion skipper. Near the end of this survey around 14:55h CDT, I photographed and collected as a voucher specimen a single worn female (Figure 1) who had presumably laid eggs. I was unable to determine the sex of the second worn individual. On 29 July I returned to the site, hoping to locate more Dion skippers before the end of their flight period. I began surveying at 10:30h. I again observed two Dion skippers, one of which was a female with minimal wing wear (Figure 2). Both individuals observed on 25 July were worn, which rules out the possibility that the fresh female from 29 July was a re-sighting. Minimum number of individuals observed for the two dates is therefore three. I walked east along Moss Spur Road for 1 km without further Dion skipper sightings and ended my survey at 11:30h CDT.

Dion skippers are distinctly marked, with two pale orange streaks on the ventral hind wing (Layberry *et al.* 1998). The orange rays are clearly visible on my voucher specimen despite moderate wing wear (Figure 3). The voucher specimen I collected closely resembles verified *E. dion* specimens from Ohio (Figure 4). The identity of the Manitoba specimen was confirmed by lepidopterist Peter W. Hall, an honorary research associate with the Canadian National Collection of Insects. The specimen is currently held in the author's personal collection, with plans to move it to the J.B. Wallis/R.E. Roughley Museum of Entomology at the University of Manitoba.

Dion skipper was not included in a comprehensive list of the province's butterflies (Klassen *et al.* 1989). There are no Dion skipper specimens of Manitoba origin in either the Manitoba Museum or the J.B. Wallis/R.E. Roughley Museum of Entomology. As of April 2023, community science databases (www.iNaturalist.org, www.DiscoverLife.org, www.butterfliesandmoths.org, www.bugguide.net) also lack Dion skipper observations from Manitoba.



Figure 3. Female Dion skipper collected near Molson, MB, 25 July 2022. Ventral view (left), dorsal view (right). Wingspan 33.9 mm. Photos by K. Eckhardt.



Figure 4. Female Dion skipper collected in Marion County, OH, 20 July 1983. Manitoba Museum specimen MM658. Ventral view (left), dorsal view (right). Wingspan 40.0 mm. Photos by K. Eckhardt.

The Canadian range of Dion skipper is discontinuous (GBIF 2022). The species is primarily distributed in southern Ontario; additional populations in northwest Ontario, as far north as Lake of the Woods, are thought to be the result of recent range expansions (Kamstra *et al.* 2019). Dion skipper was first reported in Ontario's Rainy River district in 2013 (Layberry and Jones 2014). It

is therefore likely that movement into Manitoba occurred sometime in the past ten years. The Manitoba records reported here are roughly 160 km northwest of the northernmost Rainy River sightings (49.15 N, 94.16 W) and provide possible further evidence of an ongoing northern range expansion for this species (Kamstra et al. 2019; Layberry and Jones 2014).

Considering there are no similar-looking species found in Manitoba, it is unlikely that Dion skippers as occurring here have been overlooked in the past due to misidentification. Eastern Manitoba has been extensively surveyed for butterflies in the past (Westwood and Blair 2010). Range expansions into southeastern Manitoba have been documented for other lepidopterans including Northern broken-dash, *Wallengrenia egeremet* Scudder, 1864 (Lepidoptera: Hesperidae) and Baltimore checkerspot, *Euphydryas phaeton* Drury, 1773 (Lepidoptera: Nymphalidae) (Taylor and Westwood 2010; Semmler and Westwood 2013). It is possible that the skippers at the Molson site may represent a breeding population established because of range expansion. In support of this conclusion, a fresh female was observed on 29 July, suggesting recent eclosion at or near the Molson site, rather than immigration from the nearest location in Ontario.

Future surveys should take place earlier in the skipper's flight season to estimate population size at the Molson site. Identification of sedge species in the area would help determine the likely host plants in Manitoba. A search for additional Dion skippers in southeast Manitoba, in appropriate marshy habitat, may also prove fruitful. Possibly there are other populations waiting to be discovered in the 160 km between Molson and Lake of the Woods.

ACKNOWLEDGEMENTS

Thanks to Peter Hall for confirming the identification of the specimen. Thank you to Jason Gibbs, Jim Reist, and Richard Westwood for editing this paper, and to Randy Mooi at the Manitoba Museum for access to museum specimens.

REFERENCES

- Catling, P. and B. Kostiuk. 2014. Use of a marsh dominated by the introduced European lake sedge, *Carex acutiformis*, by highly localized native butterflies. *Canadian Field Naturalist*, 128: 358–362.
- GBIF. 2022. GBIF occurrence download. Available from <https://doi.org/10.15468/dl.y7ht2x> [Accessed 23 April 2023].
- Kamstra, J., M. Dawber and D. Elder. 2019. Northern range expansion of Dion skipper (*Euphyes dion*) in Ontario. In: R. Cavašin and J.E. Linton (eds) *Ontario Lepidoptera 2018*. Toronto Entomologists' Association Occ. Pub. 50: 15–17. Available from https://www.ontarioinsects.org/publications/lep_sum.html [Accessed 8 May 2023].

- Klassen, P., A.R. Westwood, W.B. Preston and W.B. McKillop. 1989. The butterflies of Manitoba. Manitoba Museum of Man and Nature, Winnipeg, Manitoba, Canada.
- Layberry, R.A. and C.D. Jones. 2014. Summary of Ontario butterflies and skippers in 2013. *Edited by: R.A. Layberry and C.D. Jones. Ontario Lepidoptera 2013. Toronto Entomologists' Association Occ. Pub. 44: 21–81.*
- Layberry, R.A., P. Hall and J.D. Lafontaine. 1998. The butterflies of Canada. University of Toronto Press Incorporated, Toronto, Canada.
- Semmler, S. and A.R. Westwood. 2013. *Wallengrenia egeremet* (Hesperiidae): A new population for western Canada. *Journal of the Lepidopterists' Society*, 67: 59–61.
- Shuey, J.A. 1985. Habitat associations of wetland butterflies near the glacial maxima in Ohio, Indiana, and Michigan. *Journal of Research on the Lepidoptera*, 24: 176–186.
- Taylor, P. and A.R. Westwood. 2010. Records of the Baltimore checkerspot butterfly in Manitoba. *Blue Jay*, 68: 87– 89.
- Westwood, A.R. and D. Blair. 2010. Effect of regional climate warming on the phenology of butterflies in boreal forests in Manitoba, Canada. *Environmental Entomology*, 39: 1122–1133.

**FIRST RECORDS OF THE ORACHE LEAFMINER MOTH
CHRYSOESTHIA SEXGUTTELLA (LEPIDOPTERA:
GELECHIIDAE) AND AN ASSOCIATED PARASITOID WASP,
NEOTHLIPSIS CINCTA (HYMENOPTERA: BRACONIDAE) IN
MANITOBA**

Chris Friesen¹ and Greg Pohl²

¹Manitoba Conservation Data Centre, Box 24, 200 Saulteaux Crescent, Winnipeg, Manitoba R3J 3W3, Canada. chris.friesen@gov.mb.ca ORCID 0000-0002-8180-8508

²Natural Resources Canada, Canadian Forest Service, 5320 - 122 Street, Edmonton, Alberta T6H 3S5. gpohl@nrcan.gc.ca ORCID 0000-0001-5468-7221

The Orache Leafminer Moth, *Chrysoesthia sexguttella* (Thunberg 1794; Figure 1), is a European species that has become widespread in eastern North America with scattered records further west (Eiseman 2021). Confirmed Canadian records include Ontario, Quebec, and Nova Scotia (Pohl *et al.* 2018). Recent records from Alberta and British Columbia are present in the Barcode of Life Database (BOLD; Ratnasingham and Hebert 2007; Index Number BOLD-AAD8505). This species appears to have been established in eastern Canada by the 1930's based on material at the Canadian National Collection of Insects, Arachnids and Nematodes (CNC). It is most easily observed in the larval stage due to their conspicuous leaf mines (Figure 2).



Figure 1. *Chrysoesthia sexguttella* adult, collected as a larva in a leaf mine, Warren, Manitoba, 18 June 202; emerged 7 July 2020.

Adults are minute moths with a wingspan of about 8 mm. The forewings are mottled grey and black, with a series of orange spots (Figure 1). Two large orange spots are on the trailing margin of the forewing, at one quarter and one half the distance from the wing base; in some specimens the proximal spot is not present. Additionally, a smaller orange spot is near the costal margin of the forewing at about four fifths the distance from the wing base, adjacent to a cream-coloured spot on the costal margin. The spots are variable in size, but their positions are consistent and distinctive, unlike any other Gelechiidae in North America. The upturned labial palps are dark with a white tip; the antennae have alternating rings of light and dark scales.

Larvae are translucent cream-coloured, with a dark thoracic shield, brown dorsal stripe, and two brown spots on each side of the abdominal segments. The larvae mine the leaves of various members of Amaranthaceae (Caryophyllales) (Eiseman 2021). Females lay eggs on the underside of leaves, and upon hatching the larvae form contorted linear mines that become large, transparent blotch mines with black frass deposited in a central clump (Figure 2; Eiseman 2021). Larvae exit the mine to pupate (Eiseman 2021). The species is bivoltine in North America (Eiseman 2021).



Figure 2. *Chrysoesthia sexguttella* larva in its mine on *Chenopodium album* leaf in Warren, Manitoba, 28 August 2019.

Several species of Eulophidae (Hymenoptera: Chalcidoidea) and Braconidae (Hymenoptera: Ichneumonoidea) have been recorded as parasitoids of *C. sexguttella* larvae in its native range (Yefremova *et al.* 2010; Doğanlar and Yiğit 2011; Yegorenkova and Yefremova 2012; Gadallah and Ghahari 2013; Yu *et al.* 2016). The native braconid wasp *Neothlipsis cincta* (Cresson 1873)

(Sharkey *et al.* 2011) has been recorded from hosts in several families of Lepidoptera, including *Chrysoesthia drurella* (Fabricius) (Krombein 1979; Pohl *et al.* 2018). Its distribution appears to be widespread, especially in eastern North America (Krombein 1979). In Canada, it has been collected in Alberta, Saskatchewan, Ontario, and Quebec (Yu *et al.* 2016).

Here we provide the first records of *C. sexguttella* and *N. cincta* in Manitoba. Additionally, this is the first record of *N. cincta* using the introduced species *C. sexguttella* as a host.

Lamb's quarters, *Chenopodium album* (Amaranthaceae), leaves with one or more active mines consistent with those of *C. sexguttella* were collected by CF in a residential yard in Warren, Manitoba (50.1304N, 97.54412W) in August 2019 and July 2020 (Table 1). Leaves were kept in containers, sometimes with a small amount of soil and wood chips. Larvae exited the mines within three days of collection (Table 1). The larvae chose pupation sites in substrate where it was provided, otherwise cocoons were attached to the sides of the rearing containers. Adult emergence occurred 15–16 and 11–33 days for moths and wasps, respectively, after larvae left their mines. In total, three adult moths and seven wasps were reared.

GP examined one of the adult moth specimens to confirm its identity, and identified the remaining two specimens from photographs. All wasps were sent to the CNC and identified by Jose Fernandez-Triana.

Table 1. Mine Collection and Adult Emergence Dates of *Chrysoesthia sexguttella* and its braconid parasitoid *Neothlipsis cincta*.

Leaf Mine Collection Date	Pupation Date	Adult Moth Emergence Date (Friesen Specimen ID)	Wasp Emergence Date (Friesen Specimen ID)
18.viii.2019	18.viii.2019	n/a	16.ix.2019
18.vi.2020	21.vi.2020	7.vii.2020 (2020-0008)	16.vii.2020 (2020-0030) 24.vii.2020 (2020-0022A)
25.vi.2020	unknown	31.vii.2020 (2020-0023)	13.vii.2020 (2020-0024)
30.vi.2020	1.vii.2020	16.vii.2020 (2020-0029)	n/a

Chenopodium album is a ubiquitous, weedy introduced annual in fields, gardens, and 'waste' places throughout Manitoba as far north as Churchill (Scoggan 1957). While the range of *C. sexguttella* in Manitoba may not extend as far north as *C. album*, it almost certainly occurs more broadly at least in the southern part of the province than the paucity of records suggests. As of

November 14, 2022, there was one confirmed iNaturalist report of this species in Manitoba: an adult observed in Winnipeg on 15.vii.2021 (<https://inaturalist.ca/observations/87216232>).

ACKNOWLEDGEMENTS

We thank David Holden for image processing of Figure 1; Jose Fernandez-Triana for identification of the wasps and review of an earlier draft of the manuscript; Jason Dombroskie for review of an earlier draft of the manuscript; and Charles Eiseman for leafminer rearing advice.

REFERENCES

- Cresson, E.T. 1873. Descriptions of North American Hymenoptera, No. 5. *Canadian Entomologist*, 5: 51–54.
- Doğanlar, M. and A. Yiğit. 2011. Parasitoid complex of the Tomato Leaf Miner, *Tuta absoluta* (Meyrick, 1917), (Lepidoptera: Gelechiidae) in Hatay, Turkey. *KSU Journal of Natural Science*, 14(4): 28–37.
- Eiseman, C. 2021. *Leafminers of North America*, 2nd edition. Self published.
- Gadallah, N.S. and H. Ghahari. 2013. An annotated catalogue of the Iranian Agathidinae and Brachistinae (Hymenoptera: Braconidae). *Linzer biologische Beitrage*, 45(2): 1873–1901.
- Krombein, Karl V. 1979. *Catalog of Hymenoptera in America North of Mexico / Prepared Cooperatively by Specialists on the Various Groups of Hymenoptera under the Direction of Karl v. Krombein ... [et al.]*, Available from <https://doi.org/10.5962/bhl.title.5074> [Accessed 1 Nov. 2021].
- Pohl, G.R., J.-F. Landry, B.C. Schmidt, J.D. Lafontaine, J.T. Troubridge, A.D. Macaulay, E.J. van Nieukerken, J.R. deWaard, J.J. Dombroskie, J. Klymko, V. Nazari and K. Stead. 2018. Annotated Checklist of the Moths and Butterflies (Lepidoptera) of Canada and Alaska. Series Faunistica No. 118. Pensoft Publishers.
https://repository.naturalis.nl/pub/648850/Pohl_et_al_2018_Checklist_Lepidoptera_Canada_Alaska.pdf
- Ratnasingham, S. and P.D.N. Hebert. 2007. BOLD: The Barcode of Life Data System. (www.barcodinglife.org). *Molecular Ecology Notes* 2007. 10pp.
<https://onlinelibrary.wiley.com/doi/10.1111/j.1471-8286.2007.01678.x>
- Scoggan, H.J. 1957. *Flora of Manitoba*. Department of Northern Affairs and National Resources, Ottawa, Ontario, Canada.

- Sharkey, M.J., K.A. Parys and S. Clutts. 2011. A new genus of Agathidinae with the description of a new species parasitic on *Samea multiplicalis* (Guenée). *Journal of Hymenoptera Research*, 23: 43-53. <https://doi.org/10.3897/jhr.23.1100>
- Thunberg, C.P. 1794. *D. D. Dissertatio Entomologica sistens Svecica*, 7: 83–98.
- Yefremova, Z.A., H.S. Civelek, P.S. Boyadzhiev, O. Dursun and A. Eskin. 2010. Contributions to the Turkish Eulophidae (Hymenoptera, Chalcidoidea) with new records. *Turkish Journal of Entomology*, 34(4): 447–463.
- Yegorenkova, E. and Z. Yefremova. 2012. The preimaginal stages of *Pnigalio gyamiensis* Myartseva & Kurashev, 1990 (Hymenoptera, Eulophidae), a parasitoid associated with *Chyrsoesthia sexguttella* (Thunberg) (Lepidoptera, Gelechiidae). *Zookeys*, 214: 75–89. <https://doi.org/10.3897/zookeys.214.3266>.
- Yu D.S.K., C. van Achterberg and K. Horstmann. 2016. Taxapad 2016, Ichneumonoidea 2015. Database on flash-drive. Nepean, Ontario. <http://www.taxapad.com>

78TH ANNUAL MEETING OF THE ENTOMOLOGICAL SOCIETY OF MANITOBA

ABSTRACTS

**PARASITIC MIND CONTROL: HOW THE PARASITIC WASP, *COTESIA CONGREGATA*,
MANIPULATES THE BRAIN OF ITS HOST**

Shelley Adamo

Dalhousie University, Halifax, Nova Scotia

The parasitic wasp *Cotesia congregata* lays her eggs inside the body of her host, the caterpillar *Manduca sexta*. During wasp larval development, the caterpillar's behaviour is normal. But after the wasps scrape their way through the host's body wall to the outside, the caterpillar's behaviour shows a dramatic change. It loses all self-generated behaviours such as feeding and locomotion. The caterpillar retains robust defence responses and protects the wasp cocoons attached to its back. The caterpillar is now a bodyguard for the wasps. The wasp mother and larvae use an assortment of physiological mechanisms to control host behaviour. The wasps alter neurohormonal levels, induce a cytokine storm and use a domesticated virus to introduce novel genes into the brain of their host. These manipulations result in neuroinflammation and changes in neural activity resulting in altered host behaviour. Parasitic manipulators show us that there are many ways to alter neuronal function.

ASSOCIATION BETWEEN INFESTATION PARAMETERS OF NASAL MITES (ACARI: RHINONYSSIDAE: *TINAMINYSSUS* SPP.) AND HOST BODY CONDITION IN ROCK PIGEONS (AVES: COLUMBIDAE: *COLUMBA LIVIA*) IN MANITOBA

Madeleine Dupuis, Mirelle Krul, Terry Galloway and Kateryn Rochon

Department of Entomology, University of Manitoba, Winnipeg, Manitoba, Canada R3T 2N2

Rock pigeons (*Columba livia*) are host to a variety of parasites including nasal mites (Rhinonyssidae: *Rhinonyssus* spp.). While distribution and host association have been studied through surveys in Canada, there are gaps in the ecological relationships of these parasites. We salvaged pigeons to determine nasal mite prevalence and mean intensity as well as to examine the relationship between host body condition and the determined infestation parameters. Forty-four pigeons salvaged from Manitoba Wildlife Haven were given a body condition score (BCS) from 1-5, with 1 being emaciated and 5 being obese. Their respiratory passages were flushed with a curved 12 ml Monojet™ 412 syringe with soapy water so that it ran out of the mouth onto a 90 µm sieve. The sample was preserved in 95% ethanol until the mites were counted. Data were analyzed using Quantitative Parasitology (QPWeb). Pigeons were infested with nasal mites, *Tinaminyssus* spp. Prevalence and mean intensity were 56.8% and 16.9 mites per bird respectively. Prevalence of infestation was significantly higher in pigeons with poor body condition scores. There were no significant differences between intensity and body condition. Additional research is required to understand the host-parasite relationships between birds and nasal mites.

THE EFFECTS OF BODY CONDITION SCORE AND COLOUR MORPH OF ROCK PIGEONS (*COLUMBA LIVIA*) ON CHEWING LOUSE (PSOCODEA: PHTHIRAPTERA) INFESTATIONS IN MANITOBA

Mireille Krul, Madeleine Dupuis, Terry D. Galloway and Kateryn Rochon

Department of Entomology, University of Manitoba, Winnipeg, Manitoba, R3T 2N2

Corresponding author: krulm@myumanitoba.ca

Taxonomy and infestation parameters of chewing lice have been well documented in Manitoba. The objectives of this research were to determine if there were relationships between body condition score or colour morph of rock pigeons (*Columba livia*) and the prevalence or mean intensity of their chewing louse infestations. Forty-four pigeons were used for this research. Euthanized pigeons were obtained from Manitoba Haven Rehabilitation Hospital and washed in a bucket of hot water, twice with and once without liquid dish detergent. The water was drained through a 90 µm sieve, and the collected chewing lice were identified and counted. Pigeons were body condition scored on a scale of 1-5 using a chart; these body condition scores were divided into three categories for data analysis. Pigeons were divided into five categories based on colour morph, ranging from light-coloured to melanistic. Data were analyzed using Quantitative Parasitology (QPWeb). Total chewing louse prevalence was 97.7%, and mean intensity was 174.3. There were no significant differences in prevalence or mean intensity of chewing lice between categories of either body condition score or colour morph. Information concerning the relationship between louse infestations and bird body condition is sparse; this research provides new information.

THE ROLE OF AWNS AND HAIRY GLUMES IN SPRING WHEAT LINES AS PHYSICAL DETERRENTS TO ORANGE WHEAT BLOSSOM MIDGE, *SITODIPLOSI MOSSELLANA* (GÉHIN) (DIPTERA: CECIDOMYIIDAE) OVIPOSITION

Bridget A. White¹, Chaminda D. S. Weeraddana¹, Shelia Wolfe², Curt A. McCartney³, Robert J. Lamb¹, Tyler Wist⁴ and Alejandro C. Costamagna¹

¹ Department of Entomology, University of Manitoba, 217 Animal Science/Entomology Building, 12 Dafoe Road, Winnipeg, Manitoba R3T 2N2, Canada

² Agriculture and Agri-Food Canada, Morden Research and Development Centre, 195 Dafoe Road, Winnipeg, Manitoba, R3T 2M9

³ University of Manitoba, Department of Plant Science, 222 Agriculture Building, 66 Dafoe Road, Winnipeg, MB, R3T 2N2

⁴ Agriculture and Agri-Food Canada, Saskatoon Research and Development Centre, 107 Science Place, Saskatoon, Saskatchewan, S7N 0X2

The wheat midge, *Sitodiplosis mosellana* (Géhin) (Diptera: Cecidomyiidae) poses a substantial threat to spring wheat in Canada. Larvae feed on the developing kernels and cause decreased grain quality and yield loss. Currently, this pest is primarily managed using resistant wheat varieties that contain the *Sm1* gene, a single, naturally occurring gene that kills the larvae. It is important not to rely on only one form of resistance, especially a single gene, as virulent biotypes may evolve over time, leading to future outbreaks and economic losses. To this end, a group of spring wheat lines with different combinations of awns and hairy glumes were developed to assess if these mechanical barriers deter wheat midge oviposition. To determine egg laying preference between the traits, adult wheat midge were introduced to choice cages containing twelve wheat spikes divided evenly between four combinations of awns or no awns with either hairy or smooth glumes, under laboratory conditions. In addition, five lines per trait class, including those tested in the laboratory, were exposed to wheat midge under field conditions to determine seed damage from wheat midge larvae. Results from both the laboratory and preliminary field trials indicate that there is no effect of hairy glumes or awns in reducing wheat midge oviposition. Within each trait class, there was high variation among lines, indicating that some of these lines may be promising in reducing egg laying but not because of the presence of hairy glumes or awns.

EXPLORING CHEMICAL COMPOSITION OF SURFACE WAXES FROM WHEAT SPIKES OF SUSCEPTIBLE AND DETERRENT LINES TO THE ORANGE WHEAT BLOSSOM MIDGE, *SITODIPLOSIS MOSELLANA* (DIPTERA: CECIDOMYIIDAE) TO DISCOVER NEW SOURCES OF WHEAT RESISTANCE

Chaminda De Silva Weeraddana¹, Daniel Hupka², Mark A. Smith², Ramya Wijesundara¹, Tyler Wist², Curt McCartney³ and Alejandro C. Costamagna¹

¹University of Manitoba, Department of Entomology, 217 Animal Science/Entomology Bldg, 12 Dafoe Road, Winnipeg, MB, R3T 2N2, Canada

²Agriculture and Agri-food Canada, Saskatoon Research Centre, 107 Science Place, Saskatoon, Saskatchewan, S7N 0X2

³University of Manitoba, Department of Plant Science, Agriculture Building, 66 Dafoe Road, Winnipeg, Manitoba, R3T 2N2

The orange wheat blossom midge (hereafter named wheat midge), *Sitodiplosis mosellana* (Géhin) (Diptera: Cecidomyiidae), is a chronic pest in wheat in Canada. Female wheat midges tap the spike surface with their antennae and ovipositor to detect the chemical and structural differences on the wheat spike surface before oviposition. This indicates that the composition of surface waxes may influence wheat midge oviposition decisions after landing on wheat spikes, as observed in related species, such as Hessian fly, *Mayetiola destructor* (Say) (Diptera: Cecidomyiidae). Therefore, wax chemical analysis of wheat spikes is warranted. This study analyzed three wheat midge susceptible (Roblin, AC Barrie, Superb) and three resistant wheat lines (Key24, Reeder, BW278). Our results found that wax profiles are consistent within each wheat lines but have some differences in the ratios of components among different lines. In general, diketones and hydroxyl-diketones are the most abundant chemical components in all wheat lines. Interestingly, Superb and Reeder appear to have some low abundance wax components that are different from other wheat lines. The identification and quantification of minor wax components are currently in progress. Future experiments will focus on testing the wax extracts on wheat midge antennae using GC-EAD (Gas Chromatography - Electroantennographic Detection), and conducting wheat midge behavioral assays on different wax components to determine if these are attractant or deterrent. Once surface chemicals influencing wheat midge oviposition are found, they can be used to develop direct molecular markers for wheat midge resistance and to identify lines with higher/lower levels of these chemicals.

AN ASSESSMENT OF PRAIRIE MANAGEMENT PRACTICES FOR MAINTAINING
HABITAT QUALITY FOR THE ENDANGERED POWESHIEK SKIPPERLING
BUTTERFLY IN CANADA

Jaimée Dupont-Morozoff¹, Richard Westwood² and **Justis Henault**²

¹. Nature Conservancy of Canada, 7071 Bayer's Road, Suite 337, Halifax, NS B3L 2C2

². Dept. of Biology, University of Winnipeg, 515 Portage Ave., Winnipeg, MB R3B 1E9

The endangered Poweshiek skipperling butterfly lives in tall grass prairies in Canada and the United States. In the absence of historical disturbances, habitat stewards must employ disturbance strategies to maintain and create habitat that can support this butterfly. We compared vegetative and edaphic variables, as well as Poweshiek skipperling abundance, amongst sites which had been burned and/or grazed either 1-2, 4-6, or >15 years before. We found that intermediate-aged burn sites and grazed sites contained the most skipperlings. Our findings may guide habitat stewards to use conservation disturbances that are most likely to support the Poweshiek skipperling, especially in Manitoba.



INFESTATION CONTROL AND SANITATION SERVICES AT THE CANADIAN GRAIN COMMISSION

Brent Elliot

Canadian Grain Commission, 303 Main St., Winnipeg MB R3C 3G8

The Canadian Grain Commission plays a vital role in the management of insect infestation in the shipment of grain for export. Multiple ongoing activities relate to this role including monitoring of export shipments, elevator inspection program and working closely with the Canadian Food Inspection Agency on phytosanitary issues of concern. Additionally the Canadian Grain Commission carries out applied research in a number of areas. Preliminary information pertaining to three projects will be presented: Berlese light bulb replacement; microwave use for detection of insects present in samples; lesser grain borer (*Rhyzopertha dominica*) survey to determine point of origin.



‘MR. HETTIARACHCHI, I’M READY FOR MY CLOSE-UP’: MY ADVENTURES
DOCUMENTING MANITOBA’S ENTOMOFAUNA THROUGH MACROPHOTOGRAPHY

Thilina Hettiarachchi and Reid Miller

Department of Entomology, University of Manitoba, Winnipeg, MB, R3T 2N2

Corresponding author: hettiart@myumanitoba.ca

It is hard to imagine two places as biogeographically dissimilar as Sri Lanka and Manitoba. I was worried about moving to a relatively insect depauperate climate, but the experiences of this past summer have put my fears to rest. While assisting—and sometimes slowing down—fellow entomologists documenting the pollinator fauna in Manitoba’s wildlife management areas, I was able to glimpse what Manitoba has on offer. Photographing insects helps us explore their hidden beauty and communicate that beauty and their importance to the wider public. I will present modern macrophotography techniques via the surprisingly diverse arthropods and landscapes of Southern Manitoba.



OCHLEROTATUS JAPONICUS (DIPTERA: CULICIDAE), A NEW MOSQUITO SPECIES
RECORD FOR MANITOBA

David Wade and J. Thomson

Insect Control Branch, City of Winnipeg, Winnipeg, Manitoba, R3T 4V7

Corresponding author: dwade@winnipeg.ca

Ochlerotatus (Finlaya) japonicus (Theobald) is an invasive species that was first detected in Canada in 2001 from specimens collected in southern Ontario. Since then, the species has been recorded from most of the eastern Canadian provinces and British Columbia. In August 2022, the species was detected for the first time in Manitoba. The specimen, one adult female, was captured in a New Jersey Light Trap in the Rural Municipality of West St. Paul. This record increases the total number of mosquito species in Manitoba to 50 and adds another arbovirus vector species to the existing fauna. Further research will be required to determine if the species is established in the province.

LANDSCAPE HETEROGENEITY ENHANCING POLLINATOR ABUNDANCE AND DIVERSITY IN MANITOBA ECOREGIONS

Sydney Shukla-Bergen and Kyle Bobiwash

Department of Entomology, University of Manitoba, Winnipeg, MB R3T 2N2

Corresponding author: shuklabs@myumanitoba.ca

Pollinators are essential to ecosystems, providing pollination services to natural and agricultural ecosystems. For pollinators to successfully provide pollination services they require heterogeneous resources in the landscape. Landscape heterogeneity describes an ecosystem that has several different ecosystem features, creating a matrix of diverse landscape types with distinct plant and animal communities. When Manitoban landscapes are homogenized for conversion to croplands, there is a loss of heterogeneity, decreasing floral diversity and pollinator diversity. This study aims to quantify how landscape heterogeneity is affecting pollinator communities in four Manitoban ecoregions by determining what aspect of landscape heterogeneity may be driving pollinator diversity at agricultural, natural, and semi-natural sites. Bumble bees (Apidae; *Bombus*) provide a model for how pollinators may be using the landscapes due to their center place feeding strategy and general use of floral communities. By examining how *Bombus* species are affected by different sites and ecoregions, we begin to uncover any relationships between specific species and varying levels of heterogeneity. Performing a community composition analysis will highlight any relationships between specific sites and species. These results will help guide future analysis of the pollinator communities in each ecoregion.

PEST CONTROL CHALLENGES AND OPPORTUNITIES IN HERITAGE COLLECTIONS.

Jane Dalley

Dalley Froggatt Heritage Conservation Services, Winnipeg, MB R3G 2G8

Heritage collections present an interesting challenge for pest control as they are composed of a wide variety of materials that are attractive to insects. Pest management techniques and resources have been developed over the years to address the prevention and control of infestations, with and without the input of trained entomologists. This presentation discusses heritage pest control techniques and how they compare with agricultural approaches. The opportunities for an interdisciplinary approach are discussed.

TESTING IF OA AFFECTS THE REPLICATION OF VIRUSES IN HONEYBEES IN THE ABSENCE OF VARROA MITES

Charu Sharma¹, Rob Currie² and Zoe Rempel³

Department of Entomology, University of Manitoba, Winnipeg, MB R3T 2N2

Corresponding author: sharmac1@myumanitoba.ca

Honey bees face heavy colony losses and *Varroa destructor* is considered a major reason for this loss. This ectoparasitic mite is a vector for the deformed wing viruses (DWV) which is also deadly for honey bees. Oxalic acid is used to control varroa mites, but we don't know if it affects the virus replication in honey bees. To fill this knowledge gap, we did a cage experiment by treating varroa-free honey bees with OA. Varroa mites could alter the level of viral titers, so we used Australian honey bees which lack varroa infestation due to geographical isolation. For the experiment, we treated honey bees in 10 cages with OA and 10 cages were left untreated as a control. Half of the treated cages and control cages were inoculated with unpurified viruses and the other half were not inoculated but had natural virus infestation. Unpurified viruses in the inoculum were predominantly DWV. The level of viruses in bees was measured by qPCR. The results did not show any significant difference in the level of viral titers in the OA-treated cages and untreated cages. We will be testing the viral titers in the live bees samples that were collected before and after the experiment.



FROM THE INSIDE OUT: A SURVEY OF ECTOPARASITES IN MANITOBA, WITH AN EXPLORATION OF A PELICAN'S POUCH (PELECANIFORMES: *PELECANUS ERYTHRORHYNCHOS*)

Terry D. Galloway

Professor Emeritus, Department of Entomology, University of Manitoba, Winnipeg, Manitoba, R3T 2N2

Inspired by a literature survey of ectoparasites in Canada, this study began in 1993, when the Manitoba Wildlife Rehabilitation Organization established their facility at the Faculty of Agricultural and Food Science's Glenlea Research Station. Wildlife hosts were frozen and salvaged from various sources, and examined to obtain quantitative data for ectoparasites. Since the initiation of the survey, 12 547 animals have been examined (296 species): birds – 18 orders, 49 families, 248 species; mammals – 6 orders, 15 families, 48 species. Parasitic lice (Psocodea: Phthiraptera) have been a primary focus (292 named species): Amblycera – Laemobothriidae (4 species), Menoponidae (80 named species), Ricinidae (13 species); Ischnocera – Philopteridae (158 named species), Trichodectidae (15 species); Anoplura – Enderleinellidae (4 species), Polyplacidae (4 species), Haematopinidae (1 species), Hoplopleuridae (6 species), Linognathidae (5 species), Pediculidae (1 species), Pthiridae (1 species). An additional 76 unnamed species from birds have been recorded. American white pelican, *Pelecanus erythrorhynchos*, is infested by three species of chewing lice, one of which, *Piagetiella peralis* (Menoponidae), is found among the feathers, but also inhabiting the inside of the pouch. Males predominate inside the pouch, where they are found guarding teneral as well as mature females and in copulation with mates. This specialized and unusual life history is discussed, from the inside out.

CAN MODELS HELP US LOCATE SUITABLE HABITAT FOR ENDANGERED TALL-GRASS PRAIRIE BUTTERFLIES IN MANITOBA?

Katherine Dearborn and Richard Westwood

Department of Environmental Studies and Sciences, University of Winnipeg, 515 Portage Ave., Winnipeg, MB, R3B 2E9

Most tall- and mixed-grass prairie habitat in North America has been eliminated, which has threatened the survival of many prairie species, including the Dakota skipper and Poweshiek skipperling. These small prairie butterflies are listed as Endangered in Canada and Imperiled or Critically Imperiled globally. Some of the only remaining populations are located in Manitoba, but their numbers have been dropping in recent decades. Species reintroductions will likely be necessary to prevent extirpation or extinction, but finding suitable sites for these reintroductions remains a major challenge. Using the spatial relationships between species occurrences and habitat variables, we built species distribution models (SDM) for both species and used them to predict locations of suitable habitat in Manitoba. We also experimented with different modelling approaches and tested their accuracy by evaluating habitat suitability at hundreds of locations on the ground. We found that our Poweshiek skipperling model was fairly accurate, but only one of our Dakota skipper models was accurate enough to be useful for recovery work in Manitoba. In general, our results show that species distribution models can be helpful in insect conservation efforts like this one, but it is critically important that they be properly validated first.

BIOCHEMICAL EVIDENCE PROVIDES CLUES TO POPULATION PROCESSES IN A BEACH-DWELLING CARABID BEETLE

Neil J. Holliday¹ and Alison E. Holliday²

¹Department of Entomology, University of Manitoba, Winnipeg, Manitoba, Canada R3T 2X4

²Department of Chemistry, Moravian University, 1200 Main Street, Bethlehem, Pennsylvania, USA 18018.

The carabid beetle, *Chlaenius cordicollis*, inhabits lakeshores and river banks. In Manitoba, overwintered adults are found in spring and early summer, mating begins in late June, and adults of the new generation are evident from late July onwards. In 15 years of transect sampling on a Lake Winnipeg beach, estimates of overwintered adult numbers varied 30-fold, and those of new generation adults varied 385-fold. The “apparent reproductive rate” (estimated from new generation numbers divided by those of overwintered beetles of the same year) varied more than 250-fold. The chemical composition of the defense secretion of adult beetles provides an index of their age. Age structure of new generation beetles in Manitoba suggested that inundation of the habitat when immature stages are present can have a major effect on numbers of new generation adults. Hydrological data from the years of transect sampling were used to explore the influence of water levels on the apparent reproductive rate of *C. cordicollis*.

ACKNOWLEDGEMENTS

*The Entomological Society of Manitoba Wishes to
Thank the Following Sponsors for Their Generous
Support of the 78th Annual Meeting*

Orkin Canada Corporation

City of Winnipeg Insect Pest Control

Canadian Centre for Mosquito Management

Minutes of the Entomological Society of Manitoba

78th Annual General Meeting

Saturday, 29 October 2022, 1:30 PM

Attendance:

Jade Tanner
Kateryn Rochon
Sheila Wolfe
Justis Henault
Terry Galloway
Robert Currie
Pat McKay
Robert Lamb
Neil Holiday
Alejandro Costamagna
Vincent Hervet
Bridget White
Lavanya Ganesan
John Gavloski
Alberto Civetta
Erica Smith
Michael LeBlanc
Riley LeBlanc
Jason Gibbs
Jordan Bannerman

Regrets:

Jeffery Marcus

1. Acceptance of Agenda at 1:30 pm

2. Acceptance of the Minutes of the last Annual Meeting (4 December 2021)

3. Business Arising from the Minutes

a. Election platform

After reviewing multiple platforms, the executive selected Election Runner as our new election platform to address concerns brought forward by our membership

4. ESC Fellows Ceremony

N. Holiday urged ESCM to put forward members for ESC awards as our society does not put forward many members and mentioned scholarship availability

Bob Lamb and Terry Galloway received fellowship recognition from ESC and were presented with plaques

5. Reports of the Executive

President – Kateryn Rochon

Treasurer – Kathy Cano

There has been some struggles on collecting outreach funds from ESC

N. Holiday has volunteered to also reach out on behalf of the society

ACTION ITEM: Review expansion of fundraising to increase revenue.

Regional Director(s) to the ESC – Jason Gibbs

Editor of the Proceedings – Kelsey Jones/Jason Gibbs

R. Miler inquired after bob Wrigley's submissions editors will follow up

Membership – Jade Tanner

6. Reports of the Committees

Endowment Fund – Richard Westwood/Kathy Cano

Scientific Program – Sheila Wolfe

R. Miler pointed out membership and meeting registration fees were not clearly displayed as separate fees

P. Mackay noted cost discrepancy for previous meetings being 20\$

ACTION ITEM: Review membership/AGM attendance costs.

Newsletter – Kelsey Jones/Kateryn Rochon

K. Rochon announced J. Henault as the new co-editor

Youth Encouragement/Public Education – Bridget White

B. White welcomed K. Eckhart as the new youth encouragement representative.

Social – Lavanya Ganeson

Scholarship and Awards – Desiree Vanderwel

Fundraising – Kathy Cano

Archives and Web Page – Jordan Bannerman

J. Bannerman noted digital copies maintained on his computer is not very secure and offered to be part of a discussion with the executive for deciding the format and housing of this long term

Motion: B. Lamb motioned to review digital storage. 2nd by J. Henault... Carried.

ACTION ITEM: Executive to investigate archiving digital files more securely.

Common Names – Jason Gibbs

7. Election Progress – Kateryn Rochon

K. Rochon explained elections have not taken place yet, but we have been discussing for some time as it took awhile to find nominees willing to stand for election in opening positions. 2 candidates for president elect, and 2 candidates for members at-large.

Ballots will be coming out sometime next week and our scrutineer will be reviewing this directly after.

Motion: R. Currie motioned to destroy the ballots once reviewed by J. Gavloski, 2nd N. Holiday... Carried.

8. New Business

a. Awards Announcement (Oral and Poster Presentations)

1st - Bridget White

2nd - Charu Sharma

Posters was a tie between the two submissions

b. Presentation Awards Structure

D. Vanderwal shared it was very hard to narrow down the top prize and much of the decision was made on the fly. D. Vanderwal would like empowered authorization for award deviance without having to reach out for approval without a flurry of emails to executive and pointed out reviewing other society award distribution.

R. Westwood mentioned the awards chair generally steered this.

D. Vanderwal mentioned the potential of working with the scientific chair going forward.

N. Holiday noted until recently there was defined roles for committees, and it would be beneficial to resurrect this to alleviate last minute scrambling.

P. Mackay shared the scientific chair committee was responsible for telling the treasurer who the presentation winners were rather than the scholarship committee and the scientific committee had a awards budget that could be divvied up as necessary.

R. Currie noted all criteria for awards and committees are available online.

K. Rochon shared that she plans to have members put together a welcome package to be passed between sitting members and incoming members to ease transitions and provide guidance.

J. Gavloski noted he has a copy of the scoring form and makes choosing winners much easier and these were available for students as feedback. He also noted the committee responsibilities are hard to find for new members and making this more visible would be beneficial for new members/chairs.

N. Holiday added forms should have detachable judging identifiers so that they can give honest feedback without having to be diplomatic

D. Vanderwal requested update on the verbiage online that empowers committee to divvy awards and funding of each.

ACTION ITEM: Executive will review the guidelines and directives that will support the awarding of awards and amount and maximum and minimum values for presentation awards and scholarship

c. Travel Award

J. Tanner put forth a proposal to adopt a travel award to attract presenters for AGM that live outside of easy travel distance.

P. Mackay noted that it would be a rare event that this would be required as they likely would join other societies more useful for a travel award to be awarded to members interested in attending the ESC.

Additional members noted that students had access to funding for travel from ESC and from the department and university wide level.

R. Currie noted he would rather see this go towards scholarships here.

N. Holiday added most out of province attendees were faculty that don't pay and that focusing on current awards in the face of inflation should be a priority.

Motion: N. Holiday motions to not adopt a travel award. 2nd R. Currie... Carried.

9. Other Business

a. Transfer of office

A. Civetta expressed that he is looking forward to being taking over the role and invites all suggestions and feedback and extended a thank you to K. Rochon for her work as previous president.

10. Adjournment at 3:13pm

APPENDIX A: Agenda of the Entomological Society of Manitoba

78th Annual General Meeting

Saturday, 29 October 2022, 1:30 PM

Department of Entomology Rm 219

1. Acceptance of Agenda
2. Acceptance of the Minutes of the last Annual Meeting (4 December 2021)
3. Business Arising from the Minutes
 - a. Election platform
4. ESC Fellows Ceremony
5. Reports of the Executive
 - President** – Kateryn Rochon
 - Treasurer** – Kathy Cano
 - Regional Director(s) to the ESC** – Jason Gibbs
 - Editor of the Proceedings** – Kelsey Jones/Jason Gibbs
 - Membership** – Jade Tanner
6. Reports of the Committees
 - Endowment Fund** – Richard Westwood/Kathy Cano
 - Scientific Program** – Sheila Wolfe
 - Newsletter** – Kelsey Jones/Kateryn Rochon
 - Youth Encouragement/Public Education** – Bridget White
 - Social** – Lavanya Ganeson
 - Scholarship and Awards** – Desiree Vanderwel
 - Fundraising** – Ian Wise
 - Archives and Web Page** – Jordan Bannerman
 - Common Names** – Jason Gibbs
7. Election Progress

8. New Business

- a. Awards Announcement (Oral and Poster Presentations)
- b. Presentation Awards Structure
- c. Travel Award

9. Other Business

10. Adjournment

APPENDIX B: President's Report to the Membership
Entomological Society of Manitoba
Annual Business Meeting – 29 October 2022

There were three meetings of the Executive Committee of the Entomological Society of Manitoba in 2022:

First Executive Meeting – 10 February 2022

- We discussed some options for electronic voting that would eliminate some of the recurring issues that the ESM has been having. We decided to investigate online voting platforms.
- We moved the paper documents more than 7 years old from the ESM Treasurer and ESM Secretary to the ESM archives in the Department of Entomology.
- We started the search for a Scientific Chairperson for the 2022 meeting.
- We received a recommendation from the Chair of the Scholarship and Awards Committee to change the name of the “ESM Student Service Award” to “ESM Student Leadership and Service Award”. The selection criteria include evidence of leadership, and the Committee felt a more descriptive name would make the award more meaningful. The Executive voted unanimously to change the name of the award.
- We received a request from the ESC to comment on the future of JAMs. The ESC provided a survey that provided an opportunity for discussion. We provided feedback with a summary of the different perspectives expressed by the members of the Executive.

Second Executive Meeting – 16 June 2022

- Our Regional Director reported that the ESC is discussing the creation of a committee to look into future JAMs. The expectation is that there would be representation from the Regional Societies on this committee.
- With the Scientific Chairperson in place, we started to work on possible meeting locations that could accommodate the need to distancing. We discussed options since our regular venue at the DFO was not a possibility. Other meeting preparation updates were also shared.
- We discussed six voting platform options and selected Election Runner.
- We sent a formal invitation to the ESC to hold a JAM with the ESM in 2026.

Third Executive Meeting – 12 September 2022

- We received an update from the Scientific Chair, confirming the keynote speaker. We discussed our readiness to pivot to an online meeting if necessary, and the location of the ESM mixer.
- We discussed the elections, confirmed the positions that were up for election.
- Pursuing the ESM's commitment to equity and diversity, we approved a donation to EntoPOC equal to the value of two memberships. The donation will be revised annually.
- The Proceedings Editor provided updates on the latest edition.

The President and President-Elect also attended the Meeting of Entomological Societies. The discussions revolved mainly around the future of JAMS. We discussed the importance of JAMs as sources of revenue for the regional societies, additional costs of hybrid meetings, and different options to share content and foster connection and networking.

The year went by in a flash and I feel like I am just getting started, yet I am at the end of my term. I thank my fellow members of the ESM Executive Committee for their patience, support, and attention to the affairs of the Society. Thank you to all committee members who give their time to make the ESM what it is. The ESM received several requests from the public: some related to insect identification, inquiries about gifts or activity recommendations for young entomology enthusiasts, etc. I thank the many members who have helped me answer these requests, and all those who volunteer their time to spread entomological knowledge through the Youth Encouragement Program and other activities. Lastly, thank you for the opportunity to serve as President this year.

APPENDIX C: Report on Membership by the Secretary

The Entomological Society of Manitoba currently has 84 members (87 in 2021). Our membership is composed of 23 students, 56 regular members, three honorary members, and two lifetime members. At the time of the meeting, we are waiting on approximately 10 members to renew.

E-transfers continue to be an efficient and effective way to receive renewals, and we encourage all members to use this tool for renewals in the future.

I would like welcome our new members and thank them for joining our entomological fold. If you have not done so yet, please fill out our membership information forms to submit via email. Please continue to invite students and colleagues to join.

Members are encouraged to get in touch when there are insect related events or activities that would be of interest to our group. The Secretary can help by sending out calls for volunteers and notices for events.

I've had a fantastic first term as your secretary and I thank you for welcoming me on so graciously. I am looking forward to continuing in my role for the 2022-2023 term!

Thank you,

Jade Tanner

APPENDIX D: Entomological Society of Manitoba Financial Statements

Year Ending August 31, 2022

Kathy Cano

NOTE: These Financial statements have not been audited. The accounts, bank statements and receipts were provided by the treasurer.

ASSETS

	2022	2021	2020
Cash	11,496	22,046.89	15,827.20
GIC's	50,000	40,000.00	48,000.00
TOTAL	61,496	62,046.89	63,827.20

LIABILITIES

	2022	2021	2020
Current	NIL	NIL	NIL

NET ASSETS

	2022	2021	2020
Unrestricted net assets	11,496	22,046.89	15,827.20
Internally restricted	50,000	40,000.00	48,000.00
TOTAL	61,496	62,046.89	63,827.20

REVENUE

	2022	2021	2020
Annual Meeting	0	0	765
Donations	800	850.00	1875
ESC	0	0	0
Interest income	777.50	920.23	924.50
Membership fees	1500	1385	1340
Miscellaneous	0	0	0
Proceedings	0	0	0
Youth encouragement & public education	0	0	0
TOTAL	3077.50	3255.23	4904.50

EXPENDITURES

	2022	2021	2020
Awards and scholarships	3250	5000	1550
Donations	0	0	0
General	106.51	64.83	0
Meetings:	0	0	0
ESC	0	0	0
ESM	0	0	1408.80
Newsletter	0	0	0
Proceedings	0	0	0
Social committee	0	0	0
Youth encouragement & public education	20.25	0	0
Bank fees	85.50	61.02	46.51
Investments		2000	
TOTAL	3462.26	5125.85	5005.31
EXCESS*	(384.76)	(1870.62)	(100.81)

*(DEFICIENCY) OF REVENUES OVER EXPENDITURES

APPENDIX E: Report of the *Proceedings* Editors

Volume 77 (2021) of the *Proceedings of the Entomological Society of Manitoba* was produced exclusively in electronic format. It was sent to the Secretary (Jade Tanner) to be distributed to the membership and to the Webmaster (Jordan Bannerman) to be posted to the website. Volume 77 includes three scientific papers. Abstracts from the papers presented at the 2021 Virtual Annual Meeting of the Entomological Society of Manitoba are also included. The abstracts are accompanied by amazing images of study specimens and field sites submitted by the presenters. Annual Meeting Minutes and Committee Reports from the 77th Annual Business Meeting can be found at the end of the volume. Thanks to Jade Tanner for providing committee reports, and to Vincent Hervet for providing the abstracts for this issue.

Volume 77 is the first volume to be produced by co-editors Kelsey Jones and Jason Gibbs. All future Scientific Note and Scientific Paper submissions should be emailed to kelsey.jones@agr.gc.ca or jason.gibbs@umanitoba.ca. In 2022/2023, the *Proceedings* will be coming out with an official “Instructions for Authors” document to aid in the formatting and submission process. This document will be accessible on the Entomological Society of Manitoba website.

We encourage everyone to consider submitting Scientific Notes and full Scientific Papers. The *Proceedings* is a terrific place to publish new distribution records and faunal lists for insects and related arthropods in Manitoba, as well as the results of a wide variety of entomological study. We already have promises from several people to submit a number of very interesting papers, which we hope will appear in the 2022 *Proceedings*. All submitted manuscripts are peer-reviewed; all published papers are available as PDF reprints on the website. Issues of the *Proceedings* are fully accessible using on-line search engines. There are no page charges to authors for published manuscripts, and with our electronic format, colour images can be included in manuscripts. In theory, there are no practical limits to manuscript length. All issues of the *Proceedings* are freely available to entomologists around the world. If you have something of relevance to entomology in Manitoba, we encourage you to consider submitting it to the *Proceedings*.

Respectfully,

Kelsey Jones & Jason Gibbs

Proceedings Co-Editors

APPENDIX F: Report of the Endowment Fund Board for 2021-22

Richard Westwood and Kathy Cano

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 Society activities. The Endowment Fund principal is \$50,000.

GIC 00920196133-0008 will mature on October 30, 2022 and will be reinvested. GIC 00920196133-0001 will mature on November 10, 2022 and will be reinvested

Endowment Fund Guaranteed Investment Certificates

Table 1: Account information as of October 1, 2022.

Certificate No.	Principal	Interest Rate (%)	Term	Maturity Date	Anticipated interest
00920196133-0008	1000	0.15	1 yr	October 30, 2022	15.00
00920196133-0001	9000	2.25	5 yrs	November 10, 2022	1012.00
00920196133-0006	10000	2.0	5 yrs	November 19, 2024	1000.00
00920196133-0007	10000	2.25	5 yrs	December 13, 2024	1125.00
00920196133-0010	10000	2.18	5 yrs	November 30, 2026	1090.00
00920196133-0002	10000	2.18	5 yrs	December 2, 2026	1090.00
Total					50000.00

APPENDIX G: Report of the Regional Director

I have attended all Board of Directors Meetings since the end of the UMFA strike in 2021. Several pieces of news have been passed on to the ESM executive and/or membership through meetings, direct emails from the Secretary, or publication in the Newsletter. These have included positions available on the ESC board, student awards, notifications of the joint annual meeting and encouragement to participate in the national meeting, and changes to *The Canadian Entomologist*.

I have reported back to the ESC on ESM activities through formal reports submitted, notes published in the ESC Bulletin, and during meetings of the board of directors.

Recently, I engaged in a thoughtful discussion regarding mask mandates at the JAM in Vancouver among the ESC board in response to a petition submitted for a mask mandate to be implemented.

I will be participating remotely at the ESC board meetings to be held in association with the JAM.

The next JAM will be between the Entomological Societies of America, Canada, and British Columbia in Vancouver, BC, 13–16 November 2022.

A handwritten signature in blue ink that reads "Jason Gibbs". The signature is written in a cursive, flowing style.

Jason Gibbs

Regional Director (Manitoba), Entomological Society of Canada

APPENDIX H: Report of the ESM *Newsletter* Committee

The *Newsletter* committee has currently published two issues of the 48th Volume of the *Newsletter* in 2022. A third issue will be released following the Scientific Meeting to recap the presentations and give recognition to the awards winners. This year the *Newsletter* received submissions from multiple new authors and has seen the return of many dedicated authors. We would like to thank John Gavloski, Robert Wrigley and Todd Lawton for their continuous contributions to the *Newsletter*. We rely on the contributions of members to be able to produce these fantastic issues of the *Newsletter*. We encourage all of the membership to contribute to the newsletter through articles, announcements and pictures. If anyone is interested in submitting an article to the newsletter, please do not hesitate to contact Kelsey Jones (kelsey.jones@agr.gc.ca).

Kelsey Jones & Kateryn Rochon

Newsletter Co-Editors

APPENDIX I: Report of the Common Names of Insects Committee

1) Common names proposed but not yet accepted by ESC

***Diapheromera femorata* (Say)**

Phasmatodea: Heteronemiidae

Current English names: walkingstick

Suggested English name: northern walkingstick

Current French name: Bâtonnet ordinaire

Criteria of inclusion:

Common name already exists. This is a distinctive taxon, recognized by non-experts.

Reason for suggestion:

Although other walking sticks may not be present to cause confusion, the use of ‘northern walkingstick’ for this species is widely applied (e.g. ESA, bugguide.net, iNaturalist).

Walkingstick is a very generic common name that would apply to many species, like using ‘bee’ as a common name. Using ‘northern walkingstick’ would be more consistent with other venues.

Currently awaiting decision from the Entomological Society of Canada.

Prepared by Jason Gibbs; jason.gibbs@umanitoba.ca

APPENDIX J: Youth Encouragement and Public Outreach Committee December 2021 – October 2022

Presented by Bridget White

This year, the YEPOC was involved in 25 events (see tables below). As the Covid-19 restrictions eased up, there was a lot of interest in our insect presentations and we were able to get out to several schools and events this year. The Winkler Water Festival was the largest event this year, where we had two tables (one led by John Gavloski and the other by graduate student volunteers) and reached over 200 students with aquatic insect collecting and identification.

The other events were mainly school visits in the Winnipeg area, however, there was one family visit to the department, one presentation at a retirement residence, an insect art workshop and two pollinator & beneficial insect workshops at the Farm and Food Discovery Centre. In addition, Danie Wood did a presentation on cockroaches and bed bugs at the SCTC Housing & Climate Change Conference and led three “Bees in Nature & Industry” talks with Cassandra Madden at the MBTI Facility. Most of the events were requested through email to the committee chairperson (Bridget White).

John Gavloski presented 11 times in the past year mainly to youth in Carman, Winkler and St. Claude. In addition to the Winkler Water Festival, John did insect presentations for were several Day Camps, Day Cares and the Carmen Garden Club. There were also two Carman Library Bug Hikes.

Kathy Cano (ESM Treasurer) also did various outreach events in 2022. She did a school visit with an audience of ~60 students in Grade 6. She also did three presentations for newcomers to Canada working with N.E.E.D.S Inc. (Newcomers Employment & Education Development Services), with two presentations for Ukrainian students and the other for newcomer students from various countries.

Date	Presenter(s)	Event	Audience (approx.)	Ages
18 February 2022	Sydney Shukla-Bergen, Victoria Smelko & Bridget White	Online presentation for École Belmont	20	Grade 1-2
4 May 2022	Jordan Bannerman & Bridget White	Fort Whyte Alive Agri-Ecosystems Day	85	Grade 8-11
3 June 2022	Kathy Cano	School Visit @ Arthur A Leach School	60 (2 classes)	Grade 6

9 June 2022	John Gavloski	Pen Pal Insect Presentation – grade 3	About 20	8
10 June 2022	John Gavloski, Bridget White, Thilina Hettiarachchi & Victoria Smelko	Winkler Water Festival (2 separate tables)	212	7-11
16 June 2022	John Gavloski	Pen Pal Insect Presentation – grade 6	About 20	11
7 July 2022	Bridget White, Casandra Madden, Danie Wood & Victoria Smelko	School visit @ On the Move Inc.	90	6-11
11 July 2022	Bridget White & Cecil Montemayor	School visit @ Stanley Knowles	15	5-12
12 July 2022	John Gavloski	Carman Garden Club	8	4 youth, 4 adults
12, 26 July & 23 August 2022	Casandra Madden & Danie Wood	MBTI Facility Bees in Nature & Industry	15 (x3)	13-15
18 July 2022	Bridget White & Victoria Smelko	Art City Winnipeg Insect talk and art workshop	30	7-13
22 July 2022	John Gavloski	Carman Library Bug Hike	About 20	About 7-12 plus parents
25 July 2022	Bridget White	Family visit @ the department	3	9-13
27 July 2022	Kathy Cano	Newcomers to Canada (Ukrainian children) @ St Anne Ukrainian Catholic Church	30 (2 presentations)	6-12
28 July 2022	John Gavloski	St. Clade Daycare	23	7-12
3 August 2022	Bridget White, Kirstyn Eckhardt, Thilina Hettiarachchi, Charu Sharma	School visit @ Linwood Centre	25	5-11
10 August 2022	Bridget White and Danie Wood	Bee talk @ Shaftesbury Park Retirement Residence	25	50+
10 August 2022	John Gavloski	Winkler Day Camp	6 kids +3 adults	5-10
18 August 2022	John Gavloski	Carman Day Camp	About 20	5-10

19 August 2022	John Gavloski	Carman Library Bug Hike	15 kids + 5 adults	4-12
23 August 2022	John Gavloski	Wee Care Daycare, Carman	25 kids + 3 adults	7-12
23 August 2022	John Gavloski	TLC Daycare, Carman	16 kids + 4 adults	4- 12
24 August 2022	Kathy Cano	Newcomers to Canada (N.E.E.D.S Inc. Newcomers Employment & Education Development Services)	20	6-10
31 August 2022	Danie Wood	Insects & Climate Change/Bed Bugs & Cockroaches. SCTC Housing & Climate Change Conference	30	40+
1 September 2022	Bridget White	Pollinators and beneficial insect talk @ Bruce D. Campbell Farm and Food Discovery Centre (Global Food Security in the 21st Century “Canadian Agriculture Responds” teacher workshop)	12	Teachers
6 October 2022	Cecil Montemayor	Pollinators and beneficial insect talk @ Bruce D. Campbell Farm and Food Discovery Centre (Global Food Security in the 21st Century “Canadian Agriculture Responds” student workshop)	50	16-18
Total events		28	Total audience	
			915	

APPENDIX K: Entomological Society of Manitoba Fundraising Report 2021-2022

The Entomological Society of Manitoba requested donations this past year from ten potential sponsors. Only Orkin Canada Corporation, the City of Winnipeg Insect Pest Control, and the Canadian Centre for Mosquito Management provided funds, totaling \$800. Now that the ESM is set to resume in-person Annual Meetings, it is recommended that sponsors again be recognized for their contributions at the meeting and a drop-down menu with their names and contact information be added to the ESM website.

Ian Wise
Fundraising Committee

APPENDIX L: Social Committee Report 2022

Entomological Society of Manitoba

September 26, 2022 – Met with Sheila Wolfe to brainstorm ideas for the ESM AGM scheduled to happen on October 28 to 29. We were able to finalize some food and snack items as well as drinks for the meeting and mixer. We also talked about some ideas for gifts and possibly a theme for the mixer to base the gifts upon. We will be meeting again this week and the week after to coordinate further.

Lavanya Ganesan
Social Committee Chair
Entomological Society of Manitoba

APPENDIX M: Report of the Scientific Chair

Entomological Society of Manitoba

Members of the Scientific Committee: *Justis Henault*, *Reid Miller*, Sheila Wolfe

After 2 years of virtual online meetings due to Covid-19 the decision was made to return to in person attendance with no option to view online available. Masking policy was in effect while on U of M campus.

The 78th annual general meeting for the Entomological Society of Manitoba was held on Friday October 22 and Saturday October 23, 2022. The Friday sessions were held at The Department of Fisheries & Oceans Large Conference Room - 501 University Crescent Winnipeg, Manitoba. The Saturday morning symposium was held at the University of Manitoba, Department of Entomology Room 219 - 12 Dafoe Road Winnipeg, Manitoba.

This years theme was “From the Inside Out”. On Friday morning the invited keynote speaker was Dr. Shelly Adamo from Dalhousie University. Her talk was titled: Parasitic Mind Control: How the Parasitic Wasp, *Cotesia Congregata*, Manipulates the Brain of it’s host. There were 13 presentations; 4 of which were competing in the student paper competition and there were also 2 student poster entries. The Saturday morning symposium had 4 invited speakers who were: Dr. Terry Galloway, Katherine Dearborne, Dr. Neil Holliday, and Ashley Westphal.

Attendance was approximately 39 people for the AM sessions and 33 for the PM portion. Coffee, snacks and refreshments were provided by the ESM Social Committee throughout both days. The mixer was held in a private function room on Friday evening at TransCanada Brewing Co. 1290 Kenaston Blvd. To encourage members to come out / reconnect, the executive had preapproved paying for room cost, snacks and 1 complementary beverage per person. The mixer had approximately 35 people in attendance.

Awards were presented at the mixer. The ESM Awards Committee acknowledged scholarship and other winners which were presented by co-chair Desiree Vanderwel. (Please see Awards Committee report for winner names and more details) The winners of the student awards were presented by myself, Sheila Wolfe. Student entries were all excellent and the decision was made to award 2 winners in each category. For oral presentations 1st place was awarded to Bridget White in the amount of \$75 with 2nd place awarded to Charu Sharma in the amount of \$25. The student poster award was a 2 way tie between Madeleine Dupuis and Mireille Krul each receiving \$50. Certificates were also presented.

The Saturday morning symposium had approximately 30 attendees. Prior to the start of the symposium ESM president Dr. Kateryn Rochon presented 2 of our members lifetime achievement awards to the Entomological Society of Canada. The ESM Social Committee brought in lunch which was catered by Coffee Culture. Eating was permitted in designated classrooms. Immediately following the lunch, our AGM business meeting took place.

I would like to thank everyone who helped make this meeting possible, and will include a detailed list below. Small thank you gifts were presented to DFO staff, keynote speaker and all symposium speakers. It was wonderful to see such a great turn out and meet together again. This was a tricky meeting to plan as we had to plan for Covid-19 safe in person and also be prepared to pivot last minute to online depending upon recommendations from Public Health. It was essentially planning 2 different meetings. I will also submit a separate report with highlights and areas that could be improved. Thank you to the board for entrusting me to plan this meeting I appreciate the opportunity, have gained valuable skills and enjoyed getting to know many of our members on another more personal, in depth level.

Respectfully submitted;

Sheila Wolfe

Profound Thank You to the following individuals / organizations:

- Justis Henault and Reid Miller – Scientific Committee
- All of the presenters
- Lavanya Ganesan – Social Committee and her helpers Ramya Wijesundara, Roxanne Georgison, Terry Galloway
- Kelsey Jones – suggestions, IT, computer, survey, email and moral support
- Crystal Almdal -organizing student judging committee and many, many other tasks
- Chaminda Weeraddana – logistics, planning
- Bridget White – designing of mixer invites and ESM logo name badges
- Jordan Bannerman – programme / posting online notices
- Cheryl Podemski, Erica Smith meeting room booking – The Department of Fisheries and Oceans
- ESM Board Members *Kateryn Rochon President* / All ESM Committee Chairs and members
- Many others who went above and beyond to make this meeting possible
- TransCanada Brewing Company and staff
- University Of Manitoba room booking
- ESM Members for support and attending the meeting

APPENDIX N: Election Report 2022 – 2023

Elections closed November 15, 2022 for the Entomological Society of Manitoba offices of President-Elect and Member-at-large. There were 85 ballots issues, 53 ballots returned, and there were no spoiled ballots.

The successful candidate for President-Elect is **Vincent Hervet**.

The successful candidate for Member-at-Large is **Justis Henault**.

This was the fifth year using an electronic voting process. All votes were done through Election Runner this year, rather than Survey Monkey which was used the previous three years. Responses are anonymous. The source of the vote is not visible or collected. Election Runner is also set to only allow one vote per respondent.

We thank all candidates for their willingness to participate in the election.

John Gavloski, Chair

Scrutineer Committee

APPENDIX O: ESM Website/Archivist Report 2021 – 2022

In the past year I have managed the ESM website and updated it based on various requests from the Executive committee.

Two notable additions have been added to the archives:

1. ESM Financial records documents previously stored by Kathy Cano, ESM treasurer
2. Documents from the prior ESM secretaries from 2006 – 2021 (some include physical copies, some are only digital).

I do not believe the society is currently well equipped to securely/permanently maintain digital copies of documents that should be archived, I am currently storing them on my cloud-based university OneDrive, in a similar manner as the website files.

Jordan Bannerman, ESM Webmaster and Archivist

APPENDIX P: Report of the ESM Student Awards and ESM Scholarship Committee 2022

The selection process for the 2021 Orkin Award was interrupted by the UMFA Strike last November, and so the winner was not named until January, 2022, after the ESM AGM (see below for details).

For 2022, applications were accepted for four scholarships and awards offered: Orkin Student Award; the ESM Student Achievement Award; the ESM Student Leadership and Service Award (note name change from 2021); and the ESM Graduate Student Scholarship. The work of the committee was exceptionally difficult this year since there were a large number of extremely high quality applicants/nominees. The committee would like to thank the referees and nominees who participated in the process: your input was invaluable.

The committee would also like to thank Richard Westwood, who stepped in to help to make the decision for the Student Leadership and Service Award (since one of us had a conflict of interest and so did not participate in the process).

ESM Student Achievement Award: Awarded to a student who is in or recently completed a Bachelor's degree 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 ESM Student Achievement Award is **Denice Geverink** (University of Manitoba). Denice is an outstanding student, and is working towards a B.Sc. in Environmental Science at the University of Manitoba, with a minor in Entomology. In the words of her nominator, Denice has been the "heart and soul" of the Costamanga lab (Department of Entomology, University of Manitoba) for the past five years, and has been involved in many entomology-related projects, both as a technician and as a researcher. Denice has also been an important contributor to the ESM Youth Encouragement program for many years, and has served as an undergraduate student representative for the Department of Entomology for the past four years. Denice has also assisted in the maintenance of various insect colonies at the Department of Entomology, used for teaching and extension activities.

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.

2021 Orkin Award Winner (announced January, 2022): The winner of the 2021 Orkin Award was **Denice Geverink**. Denice is working towards a B.Sc. in Environmental Science at the University of Manitoba, with a minor in Entomology. She has worked in the Costamanga lab (Department of Entomology, University of Manitoba) since May 2017, and has been involved in many entomology-related projects. She has even co-authored a paper in the *Proceedings of the Entomological Society of Manitoba*. Academically, Denice is a very strong student, and has been on the Deans Honor List for the Faculty of Arts (2016-18), Faculty of Agriculture and Food Science (2019-20), and the Faculty of Environment, Earth, and Resources (2021). Denice has excelled in her Entomology courses (A in all of them) and has superb insect identification skills. After her graduation, Denice plans to head directly into the workforce and look for careers that emphasize entomology, either with private consulting firms or with the provincial or federal government. She is particularly interested in studying different ecosystems, exploring biological diversity, and/or monitoring ecosystems for invasive species.

2022 Orkin Award Winner: In an unusual development, this year's winner of the Orkin Award is a duo that was co-nominated in a joint nomination letter by two supervisors: the committee is pleased to announce that the winners this year are **Madeleine Dupuis** and **Mireille Krul**. Orkin Canada will graciously cover the full award for both students this year. Both Madeleine and Mireille have made the Dean's Honour List every year since beginning their degree programs. Both students show a keen interest in entomology, and plan to minor in entomology. Both students secured prestigious summer research awards, and were extremely industrious in their summer projects in veterinary entomology. Towards the end of the summer, Madeleine and Mireille collaborated on a project focusing on pigeon arthropod parasites. On their own initiative, they divided the project so that Mireille analyzed the data related to chewing lice, while Madeleine did the same for the nasal mites. They presented their work as posters at the scientific meeting this morning. In their joint nomination, the two supervisors commented that they cannot "say enough about the collaboration and initiative of these two students, who were able to accomplish so much together in a remarkably short time."

ESM Student Leadership and Service Award: The name of this award was changed this year to better reflect the qualifications of the applicants/nominees. This award recognizes a student (at the graduate or undergraduate level) who has promoted the goals of the Entomological Society of Manitoba (i.e., to foster the exchange of information on entomology and to further the spread of entomological knowledge) through their volunteer activities.

This year's winner of the ESM Student Service Award is **Megan Colwell** (Department of Entomology, University of Manitoba), who recently defended her Ph. D. on the topic "A Study on Novel Transmission Routes of Honey Bee (*Apis mellifera* L.) Viruses With a Focus on the Epidemiological Role of Wax Comb", co-supervised by Professor Robert Currie (UofM) and Dr.

Steve Pernal (Agriculture Canada). Megan's list of contributions is too long to list here, but highlights include serving as the Department of Entomology councillor for the UofM Graduate Student Association (three years) and President of the Department of Entomology Graduate Student Association (four years), during which time Megan was involved in many initiatives to promote entomology, within the Department of Entomology and beyond. Megan was also awarded the Canadian Association of Professional Apiculturists Student Award of Merit for her contributions to bee research and service to the industry.

The ESM Graduate Scholarship: This scholarship is awarded to students in a M.Sc. or Ph.D. program related to entomology at the University of Manitoba, University of Winnipeg or University of Brandon. 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, and excellent communication skills.

This year there is a tie for the winner of the ESM Graduate Scholarship: **Daniel Heschuk** and **Michael Killewald**. The ESM Executive has graciously agreed to fully fund both winners with the \$2,000 award.

Daniel Heschuk (Department of Biology, University of Manitoba), is working towards his M.Sc. in the Department of Biological Sciences (University of Manitoba) under the supervision of Dr. Steve Whyard. The title of his thesis is "Elucidating female-specific differentiation genes in the mosquito, *Aedes aegypti*." Daniel earned his B.Sc. in Genetics (Honours) from the University of Manitoba in 2020, and already had extensive research experience before starting his graduate work, working on different projects with three different supervisors (including one stint as a field technician on a game research in South Africa, studying the ecology of cap ground squirrels). Daniel is an excellent student, and has earned multiple NSERC USRAs as well as an NSERC CGS-M award, amongst many other prestigious awards. Daniel is a talented and productive researcher, with contributions to four publications while still an undergraduate. According to one of his references, Daniel's fundamental research has some exciting potential applications, and so is now participating in a Lab2Market West program.

Michael Killewald (Department of Entomology, University of Manitoba) is working towards his Ph.D. in the Department of Entomology (University of Manitoba) under the supervision of Dr. Jason Gibbs. Michael is studying the ability of wildflower plantings near crops to increase the biological diversity of beneficial insects for improved pest management, pollination, and crop yield. Michael worked in the lab of Professor Rufus Isaacs at Michigan State University during his undergraduate degree, obtaining extensive experience on integrated pest management and pollination of small fruit crops. Michael co-authored three refereed publications during this time period (one first-authored). Since starting his graduate work in 2019, Michael has already co-authored two manuscripts (one has been accepted by the prestigious *Journal of Animal Ecology*,

and a first-authored manuscript is still undergoing the review process). Michael has also coauthored 11 presentations. Michael is also active in outreach events, participating in citizen science activities, and serving as Treasurer for the Department of Entomology Graduate Students Association.

Respectfully,

ESM Student Awards and ESM Scholarship Committee

Jeffrey Marcus

Taz Stuart

Richard Westwood (alternate)

Désirée Vanderwel (Chair)



ISBN 0315-2