

Presentation Abstracts

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Current insect pest issues in the Southern Interior of British Columbia

Susanna Acheampong, British Columbia Ministry of Agriculture, Kelowna, B.C.

Insect pests of concern in field and horticultural crops are discussed. Pest species include grasshoppers and flatheaded borers.

The spatial and temporal distribution of total drosophilids in a cherry orchard

Amanda Chamberlain, Department of Biology, University of British Columbia–Okanagan, Kelowna, B.C.

This study characterized the distribution of total drosophilids within a cherry block and tree canopy by sampling ca. 1,700 cherries over six weeks in 2015. Our findings promote a better understanding of the spatial and temporal dynamics of drosophilids, including *Drosophila suzukii*, and should be considered in future management programs.

Flipping Phenotype: Creating resistant *Aedes aegypti* to prevent dengue transmission

Heather Coatsworth, Paola Caicedo, Clara Ocampo, and Carl Lowenberger, Department of Biological Sciences, Simon Fraser University, Burnaby, B.C.

Dengue is the most widespread arbovirus, transmitted by *Aedes aegypti*. In Colombia, 30 percent of feral *Ae. aegypti* are resistant to dengue. We used RNA sequencing to compare gene expression in susceptible and resistant mosquitoes. We knocked down gene expression of pro-viral genes and reversed the phenotype from susceptible to resistant.

Preliminary lifetable analysis on diamondback moth (*Plutella xylostella*) in British Columbia

Tina Dancau^{1,2}, Dave Gillespie¹, Peggy Clarke¹, and Eleanor Stewart^{1,3}: ¹Agriculture & Agri-Food Canada, Summerland, B.C.; ²Department of Biological Sciences, Simon Fraser University, Burnaby, B.C.; ³Department of Biology, University of Victoria, Victoria, B.C.

The diamondback moth (*Plutella xylostella*) is a globally distributed pest that infests *brassicaceae*, such as canola, mustards and cabbage. We looked at mortality factors affecting the diamondback moth in B.C. through a preliminary lifetable analysis. A parasitoid assemblage and implications for future management are also discussed.

Development consequences for the diamondback moth (*Plutella xylostella*) in a warming world

Dave Gillespie¹, Tina Dancau^{1,2}, Eleanor Stewart^{1,3}, and Peggy Clarke¹: ¹Agriculture & Agri-Food Canada, Summerland, B.C.; ²Department of Biological Sciences, Simon Fraser University, Burnaby, B.C.; ³Department of Biology, University of Victoria, Victoria, B.C.

Degree-day models are important tools in insect biology, but are mostly developed from constant temperature data. We ask if degree-day models based on constant temperature conditions can predict the performance of insects under variable temperatures. We used the diamondback moth as a research model.

The European fire ant: an update on a growing issue

Rob Higgins, Department of Biology, Thomson Rivers University, Kamloops, B.C.

Since the initial finding of the European fire ant in North Vancouver in 2010, it is now known that the ant is established in almost every municipality in the Metro Vancouver area, in some parts of the Fraser Valley, and on Vancouver Island. The cryptic nature of the nests and polygynous structure of the colonies are two of several attributes that make control a challenge. I present an

update on the distribution of this ant, discuss the impacts of this ant, and provide some initial results at control.

Sexual communication in *Xenos peckii* (Strepsiptera: Xenidae), a parasitoid of the paper wasp *Polistes fuscatus*

Michael Hrabar, Huimin Zhai, Regine Gries, Robert Britton, Paul Schaefer, and Gerhard Gries, Department of Biological Sciences, Simon Fraser University, Burnaby, B.C.

Strepsipterans are peculiar, obligate entomophagous endoparasitoids. The free-living, winged adult males live only for a few hours, in which time they must locate the neotenic, host-bound, females. We identified, synthesized, and field-tested the sex pheromone of *Xenos peckii*, a parasitoid of North American paper wasps.

Balsam woolly adelgid, *Adelges piceae*: slow but deadly

Tracy Hueppelsheuser, British Columbia Ministry of Agriculture, Abbotsford, B.C.

Balsam woolly adelgid (BWA) has been present in North America for more than 100 years, spreading from east to west. It has killed forests of true fir (*Abies* spp.) trees across the continent. British Columbia's interior has been one of the last BWA-free areas. However, there is evidence of incursion. In order to gain a better understanding of the insect's current distribution in B.C., I encourage all practitioners to watch for this pest in interior zones, and report suspicious finds. I share biology, impacts, and what to look for, as well as discuss implications of establishment of this pest.

Population structure in *Diplolepis variabilis*: is *Wolbachia* present at low frequencies?

R.G. Lalonde, D. Bartkiewicz, J. Bannerman, Department of Biology, University of British Columbia–Okanagan, Kelowna, B.C.

The commonest gall on *Rosa woodsii* in the Okanagan is formed by *Diplolepis variabilis*. Prior assaying for the presence of *Wolbachia* in this species failed to find the symbiont. Our earlier work showed some sites have high frequencies of female emergents. Accordingly, we screened samples taken along a north–south gradient and found partial infestation by *Wolbachia* at some sites.

How climate and host behaviour influence nucleopolyhedrovirus infection dynamics in the western tent caterpillar

Paul R MacDonald¹, Judith H Myers², Jenny S Cory¹: ¹Department of Biological Sciences, Simon Fraser University, Burnaby, B.C.; ²Department of Zoology, University of British Columbia, Vancouver, B.C.

Western tent caterpillar (WTC) populations display cyclical dynamics with 8- to 11-year periodicity in southwestern B.C. Long-term population data show that nucleopolyhedrovirus (NPV) is an integral component of these dynamics, with high incidence of viral mortality coinciding with substantial population decline. Our research involves two areas of NPV transmission that remain unclear. Firstly, how climate influences NPV transmission, and; secondly, how host behaviour contributes to transmission and the eventual formation of an epizootic. Using historical population and weather data, we have shown a correlation between warm springtime temperatures and heightened levels of NPV infection. We conducted a series of laboratory and field-based experiments that suggest possible mechanisms for this observation. Additionally, we conducted experiments that reveal whether infected hosts differ from uninfected hosts in their behaviour, and discuss how these differences could facilitate NPV transmission at the population scale. We conclude by discussing how empirical evidence and theoretical modelling may be used to predict how WTC population dynamics behave under various climate and behavioural scenarios.

Do multi-modal foraging cues attract mosquitoes (Diptera: Culicidae) to flowers?

D. Peach, R. Gries, H. Zhai, and G. Gries, Department of Biological Sciences, Simon Fraser University, Burnaby, B.C.

Mosquitoes of both sexes feed on plant sugars, including from floral and extra-floral nectaries. However, the cues they use to locate these flowers are not well understood. Attractive floral volatiles were identified, and their interaction with other multi-modal cues was investigated.

Trypanosomatid parasites of *Drosophila*

Steve Perlman and Finn Hamilton, Department of Biology, University of Victoria, Victoria, B.C.

Trypanosomatids are ubiquitous and diverse eukaryotic parasites of arthropods, and include the causal agents of human diseases, such as African sleeping sickness and leishmaniasis, that are vectored by blood-feeding arthropods. Yet very little is known about trypanosomatids that are not associated with blood feeding. It has long been known that *Drosophila* harbour diverse trypanosomatids, but these are poorly studied, which is especially surprising since *Drosophila* are major animal models of host–parasite interactions and animal immunity. We present our recent work characterizing *Jaenimonas drosophilae*, a newly described lineage of *Drosophila*-parasitic trypanosomatids, including experiments aimed at understanding its host range, transmission and infection dynamics, and effects on host fitness.

Host-tree selection by adult spruce budworm

Ward Strong, British Columbia Ministry of Forests, Victoria, B.C.

Western spruce budworm, *Choristoneura occidentalis*, is a major pest of Douglas-fir (*Pseudotsuga menziesii*) in the interior of British Columbia. Deploying budworm-resistant trees on a landscape scale would be a desirable means of limiting damage. No-choice larval performance trials on 83 known Douglas-fir genotypes indicated a wide range of host suitability, with defoliation ranging from 0% to more than 90%, suggesting a strong possibility of selecting trees resistant to larval damage. Resistance to adult host selection may also be a possibility; avoiding oviposition in the first place could be an effective management tool. A screening program for adult host preference of the same 83 tree genotypes was established. Two years of trials using insects from a laboratory colony on cuttings from the parent trees in a greenhouse were unsuccessful. For future trials we will use grafts of the parent trees, growing in soil with a screen house constructed around them, and will collect wild pupae for release inside the screen house.

Seasonal dynamics of spotted wing *Drosophila*, *Drosophila suzukii* (Diptera: Drosophilidae), on cherries and non-crop plants in British Columbia interior valleys, 2010–2014

Howard Thistlewood, Pacific Agri-Food Research Centre, Agriculture and Agri-Food Canada, Summerland, B.C.

D. suzukii was monitored in and around fruit orchards and in fruit from non-commercial plants nearby. A pattern of succession in host plants is related to recorded population dynamics, and to new analyses of landscapes and weather data, for understanding its overwintering, ecology, and crop damage, in the Columbia–Okanagan basins.