Symposium Abstracts: INVASION BIOLOGY!

Entomological Society of British Columbia Annual General Meeting, Douglas College, New Westminster, BC, Oct. 15, 2011

Climate change and invasion potential

David R. Gillespie. *Agriculture & Agri-Food Canada, Agassiz, BC*

Climate change and invasive alien species are two of the very large themes in contemporary biology. Climate change will clearly have impacts on the biology of invasive species. How those impacts will change the threats from invasive species is a real concern. Will we cope with more invasive species, and will those species already present cause more injury? Some of the major trends and ideas surrounding these questions will be presented.

Interpreting the effects of a biocontrol weevil released to control houndstongue (*Cynoglossum officinale*) on its target weed and a native nontarget plant.

Haley A. Catton[1], Rosemarie A. De Clerck-Floate[2] and Robert G. Lalonde[1].
[1]Unit of Biology and Physical Geography, University of British Columbia Okanagan, 3333 University Way, Kelowna, British Columbia, Canada, V1V 1V7 [2]Agriculture and Agri-Food Canada, Lethbridge Research Centre, 5403 1st Ave South, Lethbridge, Alberta, Canada T1J 4B1

Biological control can be a very effective way of reducing the impact of invasive plants, and like any form of pest control includes a risk factor. Non-target attack by a biological control agent is undesirable, but can vary in severity and not always outweigh the damage the invasive host plant would inflict on an area if left uncontrolled.

Approval for release of a weed biocontrol insect is contingent on strong host-specificity. However, feeding and oviposition on related plant species may still occur, and interpreting and predicting this nontarget attack is an important step in assessing potential risks in weed biocontrol. *Mogulones crucifer* (Coleoptera: Curculionidae) is a root-feeding weevil that was approved for release in Canada in 1997 to control houndstongue (*Cynoglossum officinale*, Boraginaceae). Since its release, *M. crucifer* has frequently been successful in suppressing houndstongue, but it also has been observed attacking native, nontarget Boraginaceae in western Canada.

In 2009, groups of 300 *M. crucifer* were released at nine rangeland sites containing the native nontarget borage, blue stickseed (*Hackelia micrantha*), either growing without houndstongue or interspersed with the weed. Release sites were revisited four to seven weeks later and indications of *M. crucifer* attack were observed on both plant species within a 5 m radius of release. When plants from three sites were harvested and dissected 10 weeks after release, *M. crucifer* larvae were found in both species, but were significantly more abundant in houndstongue (Wilcoxon Rank Sum test, p=0.0425). Release sites were revisited in 2010, when attack on houndstongue continued, but indications of nontarget attack were rare. To determine whether nontarget attack observed in 2009 was temporary spillover, or the initial establishment of weevils on nontargets, plants on the 2009 release sites were harvested and dissected in 2011 to quantify the level of target and nontarget attack two years post release. Preliminary results will be presented.

Recent introductions of non-indigenous species in British Columbia

LM Humble[1], MK Noseworthy[1], JR deWaard[2,3] and T. Hueppelsheuser[4]
[1]Natural Resources Canada, Canadian Forest Service, Victoria BC [2]Biodiversity Institute of Ontario, Guelph ON [3]Royal British Columbia Museum, Victoria, BC [4]British Columbia Ministry of Agriculture, Abbotsford, BC

Recent establishments of invasive insect pests such as the emerald ash borer, Asian long-horned beetle and brown spruce longhorn beetle in Canada have highlighted the threat that such incursions pose to the urban and natural forests of the country. The impacts of non-indigenous introductions generally first occur in urban environs, as a direct consequence of the importation of a wide

range of commodities. Once established in the urban environments, pest populations can expand into the adjacent natural forests. We provide a brief introduction to two pathways for the introduction of non-indigenous species of significance to forestry. The generic composition of the urban trees planted in Vancouver is reviewed and results of various surveys of the insect fauna associated with the urban forests are presented.

More than twenty-five non-indigenous herbivores have been discovered in British Columbia during inventories of the fauna of urban parks and street trees or during the construction of DNA reference libraries for species identification. They include: eight species of Lepidoptera; seven sawflies (Hymenoptera: Symphyta); ten beetles (Coleoptera: Cuculionidae and Cerambycidae) and one gall midge (Diptera: Cecidomyiidae). The hosts and the feeding guilds, overwintering biology, life histories, and native and introduced ranges of these introductions are examined and a preliminary analysis of the probable pathways for their introduction is presented. Evidence for the expansion into natural forest habitats are presented for some species. Canadian and international strategies to prevent the influx of alien invasive species are discussed.

Policy, regulation and invasives: role of CFIA

Gabriella Zilahi-Balogh *Canadian Food Inspection Agency, Kelowna, BC*

The Canadian Food Inspection Agency (CFIA) has a long history of mitigating pest introductions resulting from international trade. With increasing trade and increasing movement of plant products internationally, invasive alien species are an immediate and growing threat to Canada's environment and economy. The mandate of the plant health program within CFIA is to protect plant health and production in Canada by preventing the introduction and spread of quarantine pests that threaten Canada's agriculture, forestry and horticultural resources through science based regulation and enforcement. Examples of measures used to mitigate the introduction and spread of regulated pests into Canada will be provided using the grape industry as an example.

The European fire ant (*Myrmica rubra*) in British Columbia

Robert Higgins *Thompson Rivers University, Kamloops, BC*

The identification of the European fire ant (*Myrmica rubra*) in North Vancouver in the fall of 2010 marks the first determination of this pest ant west of southern Ontario, in Canada, and above 49°N latitude in North America. Since this first identification, this ant has also been confirmed in Burnaby, Vancouver, and Victoria. The European fire ant is anthropogenic, most likely being introduced in landscaping plants and then spreading densely through lawns, raised garden beds, small homeowner cold-frames and greenhouses. This ant swarms rapidly when disturbed (e.g., lawn mowing) and, unlike most ant species in BC, readily and noticeably stings. In this presentation, the introduction of this species to North America will be reviewed. The natural history of this ant will be discussed, especially where this differs from that of its native range, and helps to explain the manner in which colonies spread once established. Further, management strategies will be considered, particularly in the context of urban neighbourhoods.

Spotted wing Drosophila (*Drosophila suzukii*): Update for coastal British Columbia, Oct 15, 2011.

Tracy Hueppelsheuser *British Columbia Ministry of Agriculture*

Spotted wing Drosophila (*Drosophila suzukii*, SWD) has been present in British Columbia fruit growing areas and the Western United States since 2009. SWD is a temperate fruit fly, which infests ripening fruit before harvest. Infested fruit is not unmarketable. SWD infests a wide range of thin-skinned fruit including blueberries, strawberries, raspberries, blackberries, cherries and grapes.

There are several non-crop hosts of SWD in BC; the primary concern in coastal BC is Himalayan blackberry *Rubus discolor*.

2011 Fraser Valley trapping results indicate that the SWD population was lower and later than in 2010. In 2011, presence of larvae in harvested fruit was not detected until mid August, compared to late July in 2010.

Harvested raspberry and blueberry fruit can be evaluated for larval infestation by submerging a known amount of fruit in a

solution of sugar or salt of adequate concentration.

SWD flies were caught throughout the winter of 2010/11, with the highest catches in hedgerows – unmanaged mixed vegetation adjacent to commercial fields. The lowest catches were at building sites. Trap catches dropped considerably after January, and remained low to nil through the spring. Flies caught from January onward were mostly female.

Spotted wing *Drosophila* in the southern interior valleys of British Columbia, 2010-2011

Acheampong, S.[1], Thistlewood, H.[2], Leaming, C.[3], Thurston, M.[4], Krahn, G.[5], & Holder, D.[6]
[1]Ministry of Agriculture, Kelowna, BC, Canada [2]Agriculture and Agri-Food Canada, Pacific Agri-Food Research Centre, Summerland, BC, Canada [3]Okanagan Tree Fruit Cooperative, Penticton, BC, Canada [4]Okanagan Tree Fruit Cooperative, Kelowna, BC, Canada [5]Okanagan Tree Fruit Cooperative, Vernon, BC, Canada [6]Farmquest Consulting Ltd., Creston, BC, Canada

Spotted wing drosophila, *Drosophila suzukii*, was first detected in the interior of British Columbia in September 2009. Adult populations were monitored with extensive networks of apple cider vinegar-baited traps in 2010 and 2011. In 2010, *D. suzukii* was widespread in the Okanagan and Similkameen valleys, present in the Creston Valley, and damage was reported in cherry, peach, nectarine, apricot and berry crops as well as domestic small fruit. In 2011, lower population levels were recorded in the Okanagan and Similkameen valleys than in 2010, none was found in the Creston valley and there were no reports of economic damage in commercial fruit. New hosts recorded in the southern interior valleys of B. C. to date are Oregon grape, blue elderberry, northern black currant, honey suckle, Mahaleb cherry and ornamental elderberry.

Presentation Abstracts

Entomological Society of British Columbia Annual General Meeting, University of the Fraser Valley, Abbotsford, BC, Oct. 14, 2011

Olfactory responses of *Micromus variegatus* (Neuroptera: Hemerobiidae) to pepper leaves infested with *Myzus persicae* and *Aulacorthum solani* (Homoptera: Aphididae).

Rob McGregor & Chloé Hemsworth *Institute of Urban Ecology, Douglas College*

Micromus variegatus (Neuroptera: Hemerobiidae) is being evaluated for biological control of pest aphids on greenhouse-grown peppers in BC. Responses of adult females to the odours of pepper leaves infested with *Myzus persicae* and *Aulacorthum solani* (Homoptera: Aphididae) were conducted using y-tube olfactometers. *M. variegatus* females show a slight preference for the odour of *M. persicae*-infested leaves vs. clean plant odours. No similar preference was recorded for the odour of *A. solani*-infested leaves vs. clean plant odours. Results are discussed as they relate to the use of *M. variegatus* for biological control of *M. persicae* and *A. solani* in BC pepper greenhouses.

Cryptic diversity of a candidate weed biological control agent

Chandra E. Moffat, Robert G. Lalonde & Jason Pither *Department of Biology, University of British Columbia, Kelowna BC*

We surveyed host plant use of a candidate weed bio-control agent (a gall wasp), for invasive hawkweeds, in its native range of Central Europe. Despite gall occurrence on multiple host species, when suitable species co-occurred we found that host use was significantly non-random, with only the most abundant species being utilized.

Update on Balsam woolly adelgid in BC

Gabriella Zilahi-Balog *Canadian Food Inspection Agency, Kelowna, BC*

The balsam woolly adelgid was accidentally introduced into North America