74th Annual Meeting/74t Reunion annuelle

Hugh John Flemming Forestry Centre & Canadian Forest Centre, Fredericton, NB

10-12 August, 2015

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About our Logo:

It has long been discussed that the AES logo was in need of some TLC. Our original design and template was lost years ago and rumor had it, that the version we have been using was scanned from a pin made years ago. A sad state of affairs for such a proud group! In the spring of 2015, the executive commissioned Gillian Goldie from This is Duke, a Saint John based, marketing and creative agency to breathe some life back into our logo which represents *Rhagoletis pomenella*, the apple maggot. Gillian has a Bachelor of Design from the College of Fine Arts, University of New South Wales and can be contacted at Gillian@thisisduke.com

Sponsors and Vendors

A big thank you goes out to all of our sponsors and vendors, whose generous donations have helped make this a successful meeting!

AES 2015 President's Welcome

It is a great pleasure to welcome you all to Fredericton, New Brunswick, for the 74th Annual Meeting of the Acadian Entomological Society!

This year marks the 100th anniversary of the AES, making it a very special year and meeting for our society. It is only through a dedicated executive and general membership that any scientific society can endure. Indeed, AES has been very fortunate over the years to have long-standing members throughout the region that have devoted much time and effort to ensuring AES stays active, vibrant, and relevant to entomologists locally and nationally. I offer sincere thanks and congratulations to all past and present AES executive members, general members, and editors of the Journal of Acadian Entomological Society who have helped us reach this centennial milestone.

Speaking of valued members, it is very fitting that we have Drs. Dan Quiring and Peggy Dixon as plenary speakers. Dan and Peggy have made significant contributions to entomological research and training in Atlantic Canada, and have contributed to the AES in numerous ways over the years. We look forward to their historical perspectives on forest and agricultural entomology within the Acadian Entomological Society.

Of course, this year's meeting would not be possible without the considerable effort of individuals doing lots of legwork behind the scenes. It's easy to forget how much is involved: booking the venue, arranging AV, registration packages, nutrition breaks, and hotel guest rooms, preparing the program, soliciting judges and speakers, contacting sponsors, purchasing T-shirts, and so on. In this regard, we are particularly indebted to Drew Carlton and Andrew Morrison, both who volunteered MANY hours to ensure all the pieces were in place deliver a smooth, stimulating, and fun meeting.

As I have in the past, I'd like to remind you of the importance of the AES as a mechanism for building collegiality, transferring knowledge, generating ideas and collaborations, and training students. Let's all work to ensure that the future of the AES will be as rich as its past.

Thank you all for coming to Fredericton, and for your valued contributions to the Society. Enjoy the meeting and all that Fredericton has to offer!

Chris Cutler
President
Acadian Entomological Society

KEYNOTE SPEAKERS

Peggy Dixon, PhD.

Dr. Peggy Dixon is an entomologist at the Atlantic Cool Climate Crop Research Centre in St. John's, Newfoundland and Labrador. Peggy was born and raised in Newfoundland, received a BSc (1979) from Memorial University of Newfoundland, and a PhD (1987) in Agricultural Entomology from the University of Edinburgh, Scotland, UK. After stints as a Research Scientist with Forestry Canada in St. John's (1987-1989) and Agriculture and Agri-Food Canada in Kentville (1989-1991), and as the Special Advisor in IPM at AAFC in Ottawa (1991-1992), Peggy settled into her current position as a Research Scientist with AAFC in St. John's, where she has been since 1992.

As an entomologist and research scientist, Peggy's primary interest has been in developing integrated pest management programs for insect pests in vegetable and small fruit crops. In particular, Peggy has made important contributions to our understanding of the basic biology, ecology, and phenology of cabbage maggot, *Delia radicum*, an important defoliator of cole crops in Atlantic Canada. As an Adjunct Professor at Memorial University of Newfoundland and Acadia University, many of these contributions involved training of PhD and MSc students, and collaborations with Professors throughout the region. Throughout her career, Peggy has been one of our most staunch ambassadors for entomology in the region, previously serving the Entomological Society of Canada as 2nd Vice-President (2004), President (2006), Past President (2007), Secretary, and as a member or Chair of numerous committees. Of course, Peggy has also served the Acadian Entomological Society as a former Executive member (Vice-President) and conference organizer.

Abstract - Agricultural entomology in Atlantic Canada and Maine has a long and rich history. Past entomological efforts in research, extension and teaching were, as now, directed by the insect species present, which in turn were influenced by cropping patterns and even by the fishery! Research at Agriculture and Agri-Food Canada (AAFC), supported by provincial/state extension and University entomologists, focused on understanding insect natural histories and population dynamics, particularly the importance of natural enemies and the impacts of pesticides. This knowledge formed the basis for the development of "integrated pest management" as a practical concept. I will highlight some of the successes in agricultural entomology in the region over the past century.

Dan T. W. Quiring, PhD.

Dan is an Honorary Research Professor at the University of New Brunswick, where he spent the majority of his research career as a Professor. Dan was born in Vancouver, British Columbia, received a BSc (Hon.) in Biology at Simon Fraser University (1976) and his PhD. from Laval University (1984) under the supervision of Dr. Jeremy McNeil. Dan's early career focus was in Agriculture, spending time with Agriculture Canada (1984-1986) in Harlow, Ontario before settling in to his ultimate career track at the University of New Brunswick in Fredericton in 1986.

During his roughly 25 year career at the University of New Brunswick in the faculties of Forestry and Biology, Dan has seen more than 30 students defend their thesis dissertations, co-authored over 100 peer-reviewed journal publications and countless honors theses, invited lectures, book chapters and so on. Dan's contributions to the entomological community extend well beyond the walls of UNB, he has worn many hats including President of the Entomological Society of Canada, and he has served on numerous editorial boards, review committees, funding committees and workgroups. Above all of these achievements, Dan would place his ability to build successful collaborations between numerous institutes and government agencies as some of his greatest career achievements. Dan retired from academia in 2013, but his contributions continue today as he continues to play an active role in current spruce budworm research as part of the ACOA early intervention strategy program.

Abstract - Entomologists in Atlantic Canada were at the forefront of forest entomological research during much of the past 100 years, due primarily to the extraordinary success of many studies initiated and carried out by researchers at the Canadian Forest Service. Aided by researchers in universities and provincial ministries, intensive and extensive studies of most forest insect pests were carried out throughout Atlantic Canada. These studies advanced our understanding of insect ecology and formed the basis for management of insect pests. I will examine general trends in forest entomological research during the past 100 years and examine several highlights of that research.

Schedule of Events

Monday

18:00 – 19:00 **Registration/Mixer**

The King Street Ale House (www.thekingstreetalehouse.ca)

Tuesday

Hugh John Flemming Forestry Centre (Irving Theatre)

8:30 – 8:45 Registration (main lobby)/ Poster Set-up

8:45 – 8:55 President's Opening Remarks

8:55 – 9:30 Keynote Speaker: Peggy Dixon
Agricultural Entomology in the AES 1915-2015: an historical perspective

President's Prize Session 1 (moderator – D. Carleton) sponsored by Syngenta

9:30 – 9:45 Effects of pest density and modeling technique on heritability of pest resistance
Sara Edwards

9:45 – 10:00 Responses of *Drosophila suzukii* to volatiles produced from fruit of mid and late season cultivars of *Vaccinium corymbosum*
Heather Crozier

10:00 – 10:15 Effect of deadwood volumes and thinning strategies on longhorn beetle communities within spruce plantations
Monic Thibault

10:15 – 10:30 Invasion Success: The Brown Spruce Longhorn Beetle
Allyson Heustis

10:30 – 11:00 COFFEE BREAK/ POSTER SESSION sponsored by Forest Protection Limited

11:00 – 11:15 Comparative Analysis of Pheromone Blend Divergence in Heliothine Moths
Rebecca Rizzato

11:15 – 11:30 Odonate (Anisoptera) population surveys using exuviae and attempts to tag adult Skillet Clubtail (*Gomphus ventricosus*) with VHF radio transmitters in the Lower Saint John River
Zoe G. O'Malley

11:30 – 11:45 Preference of chafer beetles (*Serica* sp.) for various host plants found in lowbush blueberry fields
Alexandre Loureiro

12:00 – 13:00 LUNCH sponsored by BAYER CROP SCIENCE

13:00 – 14:30 President's Prize Session 2 (moderator – Z. Sylvain) sponsored by Syngenta

13:00 – 13:15 Enhancing Agroecosystems for Native Pollinators in Wild Blueberry: Trap Nests for Mason Bees (*Osmia* species)
Robyn MaCallum

13:15 – 13:30 Behavior of *Listronotus oregonensis* in the presence of *Agriotes* spp.
Deney Augustine Joseph

13:30 – 13:45 When outbreaks collide: Interactions between an invasive beetle and a native defoliator on red spruce
Mallory MacDonnell

13:45 – 14:00 Susceptibility of selected boreal fruits and berries to the invasive pest *Drosophila suzukii*
Catherine Little

14:00 – 14:15 Influence of a resource pulse on beetle communities in coniferous plantations
Franck Gandiaga

14:15 - 14:30 Impact of attack by *Eurosta* and *Rhopalomyia* on their ancestral and novel *Solidago* hosts
Yana Shibel

14:30 – 15:00 COFFEE BREAK / POSTER SESSION sponsored by Blueberry Producers Association of Nova Scotia

15:00 – 16:00 Annual General Meeting

19:00 Banquet @ King Street Ale House

Wednesday

Hugh John Flemming Forestry Centre (Irving Theatre)

8:30 – 9:00 Keynote Speaker: Dan Quiring
Celebrating 100 Years of Forest Entomological Research in Atlantic Canada

Submitted Talks Session 1 (moderator – Andrew Morrison)

9:00 – 9:15 Light trapping of predaceous aquatic insects
Randy Lauff

9:15 – 9:30 The Intertidal Mite *Foveacheles arenaria* (Acari: Rhagidiidae) in New Brunswick, Canada
Allan Crooker

9:30 – 9:45 Diversity and host associations of Astereae (Asteraceae) leaf miners
Julia Mlynarek

9:45 – 10:00 Plant essential oils synergize and antagonize toxicity of different conventional insecticides against *Myzus persicae*
Chris Cutler

10:00 – 10:15 The synthesis of three putative beech leaf-mining weevil (*Orchestes fagi* (L.) kairomones
Peter Mayo

10:15 – 10:30 Conservation Chemical Ecology
Kirk Hillier

10:30 – 11:00 COFFEE BREAK / POSTER session sponsored by Sylvar

11:00 – 11:15 Sylvar Technologies: Safe and Effective Biotechnologies
Presenter John Morrison

11:15 – 11:30 Does the presence of belowground herbivores influence feeding dynamics in the spruce budworm?
Garrett Broderson

11:30 – 11:45 Effects of trap height, lure type and tree species on characterizing temperate forest beetle communities
Zach Sylvain

11:45 – 12:00 Use of synthetic pheromones in monitoring for blueberry spanworm (*Itame argillacearia*) in wild blueberry
Jathinder Sangha

12:00 - 13:00 LUNCH / POSTER tear down: sponsored by Jasper Wyman & Son Canada Inc

Submitted Talks Spruce Budworm (moderator – Chris Cutler)

13:00 – 13:30 An Update on Budworm Semiochemistry
Peter Silk

13:30 – 14:00 A retrospective look at spruce budworm population research: Where do we go from here?
Rob Johns

14:00 – 14:20 Harnessing Citizen Science for IPM
Drew Carleton

Closing Remarks (Irving Theatre)

Poster Session Presenters (*President's Prize submission)

*****Displacement of a native woodborer by its invasive congener **Kenneth Dearborn**

*****The parasitoid communities of *Eurosta solidaginis*: Evidence for enemy escape at range margins or on novel hosts? **Mischa Giasson**

***** Observing competitive interactions of crypitc phloem feeding insects **Allyson Heustis**

* A technical guide to installing beetle traps in the upper crown of trees. **Cory Hughes**

*****Influence of Commercial Thinning on Resistance to and Recovery from Defoliation in Spruce-Fir Forests. **Cathie-Jo Langley**

*****Successive patterns of insect visitation on concealed pig carcasses. **Lena Lutz**

*****Conservation value for beetles of retention patches in mixed forests of Southern New Brunswick **Marie-Soleil Morneau**

*****Coleopteran species associated with beaver ponds and meadows in Kouchibouguac National Park **Alexandre Mourant**

ABSTRACTS (alphabetical order by presenting author)

Does the presence of belowground herbivores influence feeding dynamics in the spruce budworm?

Brodersen, G. D. [1], Moise, E.R.D. [1], Sylvain, Z. A. [1] and Johns, R. C. [1]

[1]Natural Resources Canada – Canadian Forest Service, Atlantic Forestry Centre, Fredericton, NB

Insect defoliators and root herbivores represent important sources of tree damage, yet interactions between these stressors remain largely unknown. We exposed white spruce seedlings to a two-way factorial combination of spruce budworm (control, low, and high density) and soil nematode (control and addition) treatments, and measured defoliation responses. Budworm addition had significant effects on defoliation, but damage in the high budworm treatment was only greater than the low budworm treatment in 1-year old foliage. We observed no nematode effects on defoliation at any budworm density, though we anticipate that this may be due to cancellation effects among the nematode community.

Harnessing Citizen Science for IPM

Drew Carleton, Holly Blaquiere, Evan Shanks, Rob Johns et. al*

Citizen Science programs are rapidly emerging as a solution to the escalating costs of collecting and analyzing large data sets in an era when research programs struggle for diminished funding resources. Examples of successful citizen science are plentiful, however, examples in the context of integrated pest management are scares. Here we discuss the conceptualization, development and implementation of Budworm Tracker, a citizen science program developed to answer questions about spruce budworm migration and population establishment in Eastern Canada.

Responses of *Drosophila suzukii* to volatiles produced from fruit of mid and late season cultivars of *Vaccinium corymbosum*

Heather Crozier (1), Debra Moreau (2), and N. Kirk Hillier (1)

(1) Acadia University, Wolfville, NS, B4P 2R6 (2) Agriculture and Agri-Food Canada, 32 Main Street, Kentville, NS B4N 1J5

Drosophila suzukii Matsumura (Diptera: Drosophilidae) are an invasive and newly established pest of soft bodied fruit, such as blueberries and strawberries in Nova Scotia. Methods for early detection are required to improve integrated pest management of this species. Evidence suggests that certain cultivars may be attacked more frequently by *D. suzukii.* Are *D. suzukii* differentially attracted to different volatile compositions emitted from mid- and late-season

cultivars of highbush blueberries *Vaccinium corymbosum?* This study used electroantennography and two choice bioassays to determine which volatile compounds produced by Bluecrop or Jersey cultivars are the most attractive to *D. suzukii.*

The Intertidal Mite *Foveacheles arenaria* (Acari: Rhagidiidae) in New Brunswick, Canada

Allen Crooker and Heather Taylor

Hartwick College, Oneonta, NY USA

Foveacheles arenaria (Willmann) is a small (800 um) orange prostigmatic mite that can be seen under rocks or running rapidly over rocks and algae in the intertidal zone. A member of the family Rhagidiidae, cosmopolitan predatory soil mites, *F. arenaria* was discovered in New Brunswick approximately 20 years ago when M. Zacharda examined specimens collected by I. Smith at Kelly's Beach, Kouchibouguac National Park. Further observations indicate that this species is widespread in coastal New Brunswick and is also present in coastal Nova Scotia and Maine. This report provides additional information about distribution, biology and structure of the mite.

Plant essential oils synergize and antagonize toxicity of different conventional insecticides against *Myzus persicae*

Nicoletta Faraone (1), N. Kirk Hillier (2), **G. Christopher Cutler** (1)

Department of Environmental Sciences, Dalhousie University, Truro NS, Canada. Department of Biology, Acadia University, Wolfville NS, Canada

Essential oils (EO) from lavender (*Lavandula angustifolia*) and thyme (*Thymus vulgaris*) and their main constituents, linalool and thymol, respectively, were evaluated for insecticidal and synergistic activity against green peach aphid, *Myzus persicae*. The EO and their main constituents exerted similar insecticidal activity when aphids were exposed by direct spray. In synergism experiments, the toxicity of imidacloprid was synergized 16- to 20-fold by lavender and thyme EO, but far less synergism occurred with linalool and thymol. In contrast to results with imidacloprid, the insecticidal activity of spirotetramat was antagonized by EO, linalool, and thymol. Our results demonstrate the potential of plant essential oils as synergists of insecticides, but show that antagonistic action may occur.

Displacement of a native woodborer by its invasive congener

Kenneth W. Dearborn, Stephen B. Heard, Deepa Pureswaran, and Jon D. Sweeney

Tetropium fuscum (TF) (Cerambycidae) is a European spruce borer established in Nova Scotia since at least 1990. We tested whether TF displaces a native congener, *T. cinnamopterum* (TC), in red spruce. Stressed trees, 24 girdled and 24 felled, were selected for natural colonization: 28 inside the invaded zone and 20 outside. Both *Tetropium* species emerged exclusively from felled trees. *Tetropium* density did not differ inside vs. outside the invasion zone ($P = 0.150$), but TC density was significantly greater outside the invasion zone ($P = 0.002$), suggesting TF may displace TC where they are sympatric.

Effects of pest density and modeling technique on heritability of pest resistance

Sara Edwards and Linley Jesson

Heritability estimates help determine how genetics and environment influence offspring's resemblance to their parents. However, these estimates can be influenced by many effects and misleading when interpreted incorrectly. We used simulations of different pest densities in a stand to examine the effect on estimates of heritabilities calculated by different statistical modeling methods. Our findings suggest that heritability estimates are strongly influenced by environmental factors such as insect density as well as the type of statistical model employed.

Influence of a resource pulse on beetle communities in coniferous plantations

Franck Gandiaga and Gaétan Moreau

Université de Moncton, Moncton, NB, Canada

The commercial thinning of plantations generates large volumes of woody debris, creating a resource pulse that could affect saproxylic beetle communities. The purpose of this study is to determine how the newly available resource influence beetle abundance and diversity and to follow the evolution of beetle communities up to four years after the treatment. Data was collected in coniferous plantations and unmanaged, older forests. Results suggest that the pulse in beetle abundance and diversity that occurred following thinning declines in time, and that beetle communities changed with the time since the treatment, tending towards an equilibrium.

The parasitoid communities of *Eurosta solidaginis*: Evidence for enemy escape at range margins or on novel hosts?

Mischa M. Giasson, Chandra E. Moffat, Stephen B. Heard

University of New Brunswick, Fredericton

The goldenrod ball gall fly *Eurosta solidaginis* (Diptera: Tephritidae), known to form cryptic host associated races, experiences heavy mortality from two parasitoids, *Eurytoma obtusiventris* and *E. gigantea* (Hymenoptera: Eurytomidae) and the inquiline *Mordellistena convicta* (Coleoptera: Mordellidae). We tested the hypothesis that *Eurosta* may escape natural enemies by expanding its niche into novel habitats. Specifically, we asked if mortality from enemies was lower when *Eurosta* were isolated - at range margins or on novel hosts - by comparing the frequency of attack by all enemies on both ancestral and novel host species, in both the centre and at the margins of *Eurosta*'s distribution in North America.

Observing competitive interactions of crypitc phloeophagous insects

Allyson A. Heustis, Deepa S. Pureswaran[1*], Richard W. Hofstetter[2], Brian T. Sullivan[3], Kristen A. Potter[2], and Stephen B. Heard

When phloem-feeding insects colonize a resource, the level of interspecific competition could be high. However the interactions among individuals in this cryptic habitat may be difficult to observe. By rearing insects in arenas sandwiched between plexiglass plates we can observe competitive interactions, various behaviours, chemical signals, and survival rates of these cryptic species. We are using a section of red spruce pinned with brown spruce longhorn beetle eggs and reared in 20°C climate under natural lighting to observe interactions.

Invasion Success: The Brown Spruce Longhorn Beetle

Allyson A. Heustis, Stephen B. Heard, Deepa S. Pureswaran, and Rob C. Johns

Darwin's Naturalization Hypothesis suggests that non-indigenous species closely related to native species in the invaded community are likely to be less invasive. Using community composition data from red spruce and Norway spruce trees with various densities of the invasive brown spruce longhorn beetle in Nova Scotia as a model system we may be able to link phylogenetic community structure to the potential invasion success of introduced species. I will be presenting analyzed results from the 2014 field season.

Conservation Chemical Ecology

Hillier, N.K.[1], Evans, R.[1], House, D.[2], Kollipara, R.[1], Luck, T.[1], and Hermanutz, L.[3]

1. Department of Biology, Acadia University, Wolfville, NS
2. Limestone Barrens Habitat Stewardship Program, River of Ponds, NL
3. Department of Biology, Memorial University of Newfoundland, St. John's, NL

Chemical ecology has played an important role in pest management strategies in crops and forestry for decades. More recently, the application of such technology to new realms such as species conservation has been explored for potential use in protected habitats. I will use examples from current studies exploring pest impacts on endangered and threatened plant species to discuss the future role of pheromones and other semiochemicals in conservation strategies.

A technical guide to installing beetle traps in the upper crown of trees.

C. Hughes, R. Johns and J. Sweeney

Natural Resources Canada, Canadian Forestry Service, Fredericton, NB Canada

As the intercontinental movement of goods increases in Canada, so are the possibilities that non-native bark and wood boring beetles will accidentally be introduced into its urban and rural forests. Some agencies will screen for these potential invasive beetles (i.e. become established and create significant ecological and economical damage) by monitoring insect traps installed only at chest level (1.5m above ground). However, in the past several years observations have shown that the number and species of beetles can vary between the lower and upper reaches of the tree crown suggesting that we should adopt new ways to monitor at varying heights. In this poster we describe the steps required to install an insect trap in the upper crown of trees using the 'slingshot method' and the equipment needed while avoiding the many pitfalls we encountered when testing these technics. We also present the cost and time needed to install 'high' traps compared to 'low' traps and experienced vs. inexperienced personal.

A retrospective look at spruce budworm population research: Where do we go from here?

Rob Johns, Veronique Martel, Deepa Pureswaran

An epidemic of the spruce budworm is currently raging in eastern Quebec and is expected to soon spread through Atlantic Canada. The strategic basis for managing spruce budworm has been historically grounded in our understanding of population dynamics, which has itself evolved over more than a half century of intensive study. I will discuss ongoing collaborative work to better understand spruce budworm outbreaks in eastern Canada and how we might harness this knowledge to limit their impact.

Behavior of *Listronotus oregonensis* in the presence of *Agriotes* spp.

Deney Augustine Joseph, Christopher Cutler, Suzanne Blatt

Carrot weevil (*L. oregonensis*) can be a major pest of carrot throughout Eastern Canada. Monitoring of carrot weevil is achieved using modified Boivin traps. It was observed that click beetles (*Agriotes* spp.) are also attracted to these traps in the field. The occupancy of Boivin traps by click beetles (*Agriotes* spp) has raised the question of a potential interaction between carrot weevil and click beetle. To date, no studies have been done on this topic. The present study was carried out to test whether carrot weevils are deterred from traps occupied by click beetles. Laboratory two choice bio-assays were carried out having three treatments: no click beetles (control), 10 click beetles and 30 click beetles.

Influence of Commercial Thinning on Resistance to and Recovery from Defoliation in Spruce-Fir Forests.

Cathie-Jo (CJ) Langley

The spruce budworm has plagued spruce-fir forest ecosystems for decades, causing widespread loss of productivity and mortality. Outbreak patterns are influenced by stand composition and commercial thinning has been shown to have a complicated effect on outbreak severity and duration. A tree's capacity for recovery after a defoliation event is linked to the pool of non-structural carbohydrates (NSC) available to stimulate grown of latent buds to recover leaf area. Three locations were established throughout Maine in order to test and compare the NSC concentration of spruce and fir from thinned and unthinned stands.

Light trapping of predaceous aquatic insects.

MacDonnell, ME, BR Taylor, **RF Lauff**

The trappability of large, predaceous, aquatic beetles (Coleoptera) and bugs (Hemiptera) in freshwater, lentic systems was investigated using light-baited, submerged traps.
The Giant Water Bug (*Lethocerus americanus*) was not preferentially caught with any colour lure; in contrast, the Water Scorpion (*Ranatra fusca*) was caught significantly more with a green lure than with other colours. The predaceous diving beetle, *Dytiscus verticalis* was caught significantly more than expected with a red lure and significantly less with a green lure than expected. These results will help others collect insects of choice with less by-catch or explore aquatic ecosystems more easily.

Susceptibility of selected boreal fruits and berries to the invasive pest *Drosophila suzukii*

Catherine M. Little, Tom Chapman, Debra Moreau, & N. Kirk Hillier

Drosophila suzukii has moved aggressively across much of N. America since its first detection in California in 2008 and has now spread to Atlantic Canada. Female flies damage fruit crops and cause significant crop losses across N. America and Europe. An increasingly broad range of fruits are potentially now at risk of infestation. In boreal regions, *D. suzukii* populations increase over summer months and peak in early fall. We tested *D. suzukii* host preference and suitability of boreal fruits, including blueberries, raspberries, lingonberries, and seabuckthorn. Although *D. suzukii* are opportunistic generalists, determining host preference may help identify at-risk crops

Preference of chafer beetles (*Serica* sp.) for various host plants found in lowbush blueberry fields.

Alexandre Loureiro, Jatinder Sangha, G. Christopher Cutler

Chafer beetles (genus *Serica*) are common in commercial lowbush blueberry fields, but little is known about their impact on blueberry plants. In no-choice experiments, beetles fed to some extent on both blueberry leaves and blueberry flowers. In another no-choice test, beetles caused little damage to sheep sorrel, a common weed found in lowbush blueberry fields. In choice-test experiments, the settling tendency of beetles was examined on blueberry and three other plants commonly found in blueberry fields. Beetles tended to settle mostly on blueberries, although some settled on sheep sorrel. Few beetles favored bunch berry or hairy vetch.

Successive patterns of insect visitation on concealed pig carcasses

Lena Lutz[1,2], Jens Amendt[2] and Gaétan Moreau[1]

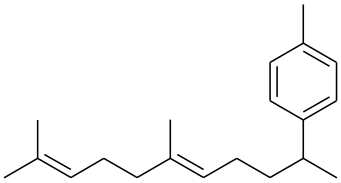
[1]Université de Moncton, Moncton, New Brunswick, Canada. [2]Institute of Forensic Medicine, University of Frankfurt, Germany

Although most forensic studies have examined insect succession on animal carcasses that are readily accessible to insects, often, cadavers happen to be concealed in homicides. In this study, we examined insect colonization on 15 domestic pigs placed in trashcans, drums, and suitcases. Results indicate that the successional arrival at, and departure from the carcass by blowflies and silphid beetles was profoundly altered by the type of unit used to conceal carcasses. The impact of these results on forensic investigation and the theoretical framework of ecological succession will be discussed.

The synthesis of three putative beech leaf-mining weevil (*Orchestes fagi* (L.) kairomones

Peter Mayo, Peter Silk and Deepa Abeysekera.

The beech leaf-mining weevil, *Orchestes fagi* (L.), also known as the beech flea weevil, is a common and widespread pest of beech, *Fagus sylvatica* L., in its native Europe and now appears to be well established in Nova Scotia. We would like to report the synthesis of 9-geranyl-*p*-cymene **1**, 9-geranyl-α-terpinene **2** and 1,1-dimethyl-3-methylene-2-vinylcyclohexane **3**, all 3 of which are found in beech leaf volatiles and / or wood, and are putative kairomones of this insect.



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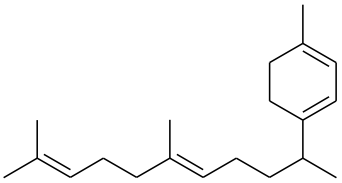

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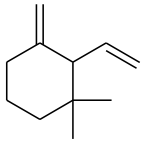

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When outbreaks collide: Interactions between an invasive beetle and a native defoliator on red spruce.

Mallory MacDonnell, Rob Johns, Stephen Heard, & Deepa Pureswaran

Insect herbivores can have a negative influence on plant growth and development, particularly during outbreaks. An example of host-mediated interactions involves outbreaks of spruce budworm and brown spruce longhorn beetle (BSLB), two important pests of spruce in Atlantic Canada. My overall goal is to investigate the effects of BSLB on interactions between spruce budworm and red spruce. I will approach this question through field experiments in Nova Scotia, focusing on determining the effects of beetle attack on relationships between spruce budworm density and associated defoliation. My research will provide insight to the potential impacts of these two systems outbreaking in the same temporal and spatial region.

Enhancing Agroecosystems for Native Pollinators in Wild Blueberry: Trap Nests for Mason Bees (*Osmia* species)

Robyn S. McCallum[1], G. Chris Cutler[2] and Nancy L. McLean[3].

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Wild blueberry (*Vaccinium angustifolium*) requires cross pollination and depends largely on bees for this service. With increasing costs of pollination services, and growing interest in native bees, investigating habitat management for pollinators including mason bees (*Osmia* species) is important. Mason bees are native to the region and nest in cavities, mainly in stems and trees. Artificial habitats, or 'trap nests', have been experimented with in other crops for *Osmia* conservation with hopes to boost pollination. We constructed milk carton and wooden trap nests to encourage nesting by *Osmia* along blueberry field edges. Factors affecting nesting success and parasitism are being compared.

Diversity and host associations of Astereae (Asteraceae) leaf miners.

Julia J. Mlynarek and Stephen B. Heard

Three orders of insects mine the leaves of Asteraceae plants: Diptera, Coleoptera and Lepidoptera. Most of these leaf mining species are considered to be generalists. We first investigated morphological diversity of leaf miners on the species rich tribe of Astereae (Asteraceae) to determine to what extent the leaf mining species are generalists. We then tested host associated genetic differentiation (HAD) on the most generalist species, the leaf mining fly *Nemorimyza posticata*. Ten leaf mining species were collected from 15 plant species; all but one leaf miner was collected from more than one host plant. HAD is occurring in *Nemorimyza posticata.*

Conservation value for beetles of retention patches in mixed forests of Southern New Brunswick

Marie-Soleil Morneau and Gaétan Moreau

Université de Moncton, Moncton, NB, Canada

To maintain habitats and biodiversity, patches of trees can be left behind in clearcuts. However, the conservation value of those patches is lacking for several taxa. In this study, we examined the effects of patch retention on the abundance and diversity of beetles caught using flight intercept traps in patches located in the middle of clearcuts and similar patches located in

unharvested areas. A preliminary analysis of beetle abundance and species richness in unharvested areas and retention patches will be discussed.

Sylvar Technologies: Safe and Effective Biotechnologies

Author: Sylvar Technologies Inc. Presenter: **John Morrison**

Sylvar Technologies manufactures and distributes effective and environmentally safe technologies for pest management across various markets including: agriculture, forestry and urban forestry. Sylvar offers three main product lines to their target markets: Baculoviruses, Pheromones, and Bio-stimulants.

Coleopteran species associated with beaver ponds and meadows in Kouchibouguac National Park

Alexandre Mourant and Gaétan Moreau

Université de Moncton, Moncton, NB, Canada

Beaver ponds and meadows constitute large open areas with distinctive features that have the potential to support a complex of species that would not be encountered in the absence of beaver damming activity. In this study, we sampled coleopteran species using flight intercept traps located in the vicinity of streams that support, or not, beaver dams and meadows, within Kouchibouguac National Park and on the park periphery. The amount of dead wood in the study sites was also measured. A preliminary analysis of coleopteran abundance and species richness in the different conditions will be discussed.

Odonate (Anisoptera) population surveys using exuviae and attempts to tag adult Skillet Clubtail (*Gomphus ventricosus*) with VHF radio transmitters in the Lower Saint John River.

Zoe G. O'Malley, Jessica M. Orlofske, Wendy A. Monk, R. Allen Curry

The purpose of this study was to determine the population sex ratio and the relative body size of each sex at emergence for several Odonate species using exuvia. We collected exuvia over 21 days in June 2014 from 12 sites near Grand Lake and along the lower Saint John River. Over 2000 exuvia were collected and represent at least 27 species of Odonata. Using exuvia we can examine Odonate populations without collecting adult individuals, which is important for studying the Skillet Clubtail (*Gomphus ventricosus*), a local species at risk. We also attempted to tag Skillet Clubtail with VHF radio transmitters.

Comparative Analysis of Pheromone Blend Divergence in Heliothine Moths.

A. Rebecca Rizzato and N. Kirk Hillier

Stabilizing selection optimizes sex pheromone blends of a population; the most commonly produced pheromone blend is detected by olfactory systems narrowly tuned toward that blend. Female Heliothine moths (Noctuidae: Heliothinae) release similar sex pheromone components in different ratios to create species-specific pheromone blends. It is currently unknown whether sex pheromone blends vary as a result of speciation or if speciation occurred as a consequence of pheromone blend divergence. Comparative examination of neuroanatomy, electrophysiology, and pheromone blend composition of four Heliothine species allows us to hypothesize broader mechanisms of pheromone blend and species divergence in this subgroup and other insect species.

Impact of attack by *Eurosta* and *Rhopalomyia* on their ancestral and novel *Solidago* hosts

Zoryana Shibel and Stephen Heard

Host races of insect herbivores may fall in a class of host-parasite interactions where close relationships lead to potential coevolution. New host pairs form through host shifts, and may lead to increased insect virulence and decreased plant tolerance on a novel plant host compare to the ancestral host. *Rhopalomyia solidaginis/capitata* (Diptera: Cecidomyiidae), and *Eurosta solidaginis* (Diptera: Tephritidae) are specialist gallmakers that possess an ancestral and novel association with *Solidago altissima* and *S. gigantea* respectively. We measured the above ground biomass of both plant species to assess herbivore impact. We found evidence of higher herbivore impact on the novel host plant compare to the ancestral, which is consistent with the coevolutionary hypothesis.

Effects of trap height, lure type and tree species on characterizing temperate forest beetle communities.

Zachary A Sylvain, Jon D Sweeney, Cory C Hughes, Rob C Johns and Reginald P Webster

Conventional trapping methods often fail to accurately estimate beetle diversity and community/functional structure in temperate forests as a consequence of targeting mostly understory species. This may lead to a reduced understanding of ecosystem functioning as well as under-sampling or non-detection of exotic species (some of which may become invasive). We established 12-funnel Lindgren traps at two heights (understory, upper canopy) baited with two lure types (ethanol, ethanol + C6 + C8 ketols) in two forest types (rich Appalachian hardwood, Linden/butternut). We demonstrate how tree species, trap height and lure type affect estimates of beetle abundance, species/functional diversity and community structuring.

Use of synthetic pheromones in monitoring for blueberry spanworm (*Itame argillacearia*) in wild blueberry.

Jatinder S. Sangha, G. Christopher Cutler

Blueberry spanworm (*Itame argillacearia*) is a common pest of lowbush blueberry in Atlantic Canada. Pheromone-based monitoring for spanworm could be useful in protecting blueberries as accurate predictions of pest infestations can help with management decisions. We examined the use of synthetic pheromone blends in capturing spanworm moths and predicting larval incidence. Blends of the epoxy and triene components of the pheromone in ratios of 75:25 and 99:1 were both effective in capturing moths. We will also discuss results of studies examining whether or not spanworm larvae populations can be predicted by moth traps capture data from the preceding year.

An Update on Budworm Semiochemistry

Peter Silk and Eldon Eveleigh

Work is in progress in completing the spruce budworm sex pheromone blend. Chemical analysis of sex pheromone glands and body scales of male and female budworm have revealed new short range components of the sex pheromone blend. The behavioral analyses in a wind tunnel of upwind orientation to various blends are underway and will continue with reared and feral insects.

In addition, work is underway to determine the possible chemical role of the male hair pencils in the mating process and whether this can be exploited for disruption purposes.

Effect of deadwood volumes and thinning strategies on longhorn beetle communities within spruce plantations.

Monic Thibault and Gaétan Moreau

Université de Moncton, Moncton, New Brunswick, Canada

Deadwood is an essential substrate for many forest insects but this resource can be scarce in managed plantations. This study examined the effects of different thinning regimes, including typical commercial thinning (CT), CT with biomass extraction, and CT with snag supplementation, on longhorn beetles (Coleoptera: Cerambycidae) and deadwood. Flight intercept traps were used to collect beetles and deadwood volume was measured along transects. Results indicated that thinning strategies and fresh woody debris had a strong

influence on the structure of longhorn beetle communities. Strategies that could be used to mitigate the negative effects of biomass extraction will be discussed.

Things to do in Fredericton

Outdoor Activities:

Fredericton is home to 88km of paved and unpaved walking trails. The paved waterfront trail follows the Saint John River offering a beautiful scenic route for walkers, bikers, or for a relaxing day along the green. Bike rentals are also available downtown Fredericton at Savage's Bicycle Center (441 King St) starting at $15/half-day.

Odell Park is approximately a 400-acre park located in central Fredericton, home to many flora, fauna, and wildlife. On site are many trails, a duck pond, arboretum and botanical garden. The main entrance to Odell is located on the corner of Rockwood Ave and Waggoners Lane, parking available, and a park map can be found online.

Downtown:

If you are interested in history, check out downtown Fredericton! Officers Square on the corner of Queen and Regent Street, was once the centre of military activities in Fredericton. The downtown core is also home to numerous boutiques, coffee shops, restaurants, art galleries, and museums.

For those so inclined, Fredericton is also home to two craft breweries. Picaroons Brewtique located at 422 Queen Street, and Grimross Brewing Co. located at 600 Bishop Drive, a short drive or walk from the Hugh John Flemming Forestry Complex and the Amsterdam Inn.

Taxis:

Loyal Taxi: (506) 455 – 6789
Checker Cab: (506) 450 – 8294
Trius Taxi: (506) 454 – 4444