

Bugs & Diseases

**Name the Newsletter
contest extended !!!**

Vol. 25 No. 2

August 2014

Forest Health & Adaptation Annual Training Session and Integration Meeting

In previous years, the Forest Health section had conducted training sessions for its staff to aid with professional development. This year's training session provided an excellent opportunity to facilitate the integration of staff from Forest Health and those of Alberta Tree Improvement and Seed Centre (ATISC). Therefore, the 2014 edition forest health professional development series focused on the identification and management of pests of concern in genetic trials. On June 24th, Forest Health and ATISC staff gathered at ATISC's Smoky Lake facility. Guest speakers Dr. Herb Cerezke and Canadian Forest Service (CFS) Researcher Dr. Tod Ramsfield delivered presentations on "Pests of Seeds and Cones in Alberta" and "Foliar Diseases in Alberta." Dr. Cerezke and Dr. Ramsfield, accompanied by Colin Myrholm, also from CFS, then led the group on a field tour of the various clone banks and trial stands at the ATISC site to look at some of the types of pests they covered in their presentations, as well as many others. These included: pine clone bank that had previously been treated for severe infection by Red Band Needle Blight; a lodgepole pine trial infected with a yet unidentified foliar fungal pathogen; and a poplar trial affected by many pests (particularly wood borers). The presentations and field tour were very informative.



The next day Forest Health and ATISC staff met to discuss how the two formerly separate entities would fit together as the new Forest Health and Adaptation section. John Quinn led a discussion of ATISC's work that included the types and locations of their trials and work schedules. As well, Forest Health Officers provided information on their major roles, responsibilities, and time lines. Together, the group looked for opportunities to help each other and create synergies within their respective objectives. This meeting, as well as the previous day's training, went a long way to aid Forest Health and Adaptation staff in understanding what will be involved to integrate the work of Forest Health and ATISC. It was only a beginning, but hopefully the seed has been planted that will allow Forest Health and Adaptation to grow into a cohesive, integrated entity.

Tom Hutchison—Lower Athabasca

*Alberta's eye
on forest
health*

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***Dothistroma* needle blight – tracing the source of the outbreak in Alberta using fungal genomics**

Globally, *Dothistroma* needle blight is one of the most destructive foliar diseases in pines. Until recently the disease was significantly affecting pines only in the Southern Hemisphere. Since the 1990s the severity of the disease increased rapidly in Europe and in Canada where serious outbreaks on lodgepole pine occurred in parts of British Columbia. The disease was first found in the Alberta Tree Improvement and Seed Centre (ATISC) near Smoky Lake in 2012 as reported in *Bugs and Diseases* in April 2013. *Dothistroma* infected pine trees were also found in 2013 and 2014 in a genetic test near Calling Lake.

For the purpose of controlling the spread of the disease in Alberta, it would be useful to know if the disease has been recently introduced from BC or if it locally exists in Alberta at an unnoticeable scale until environmental conditions support the outbreak. Application of DNA-based techniques is a quick and accurate way of determining whether or not the *Dothistroma* fungus found in BC and recently identified in Alberta are the same genetic strain. This will inform the monitoring and control strategy — i.e., limiting further transfer of the disease from BC or managing the disease internally in a changing environment.

Foliage samples with suspected *Dothistroma* infections were collected from several sites in Alberta and BC in spring of 2014. The samples were sent for analyses to Dr. Richard Hamelin at the University of British Columbia. He is the project leader of the Tree Aggressors Identification using Genomic Approaches (TAIGA). This is a Canada-wide collaborative effort aiming to increase Canada's capacity in forest disease diagnostics and pathogen detection and monitoring by developing and translating genomics resources into applications. Dr. Hamelin has developed and optimized protocols for *Dothistroma* in-vitro growth, DNA extraction, sequencing and analyses pipeline.

The main goals of this project are to confirm *Dothistroma* infections (the disease is often difficult to diagnose) and determine how similar are the *Dothistroma* strains found in different locations in AB and BC. This information will aid the development of a suitable mitigation strategy and control program. The final results are expected in April 2015.



Lodgepole pine infected by *Dothistroma* in a genetic test near Calling Lake (photo Ashley Romano).

Andy Benowicz, Forest Genetics Specialist—ATISC

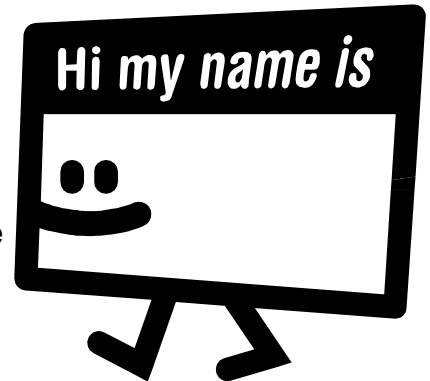
We need YOU to Re-Name the Newsletter

2014 marks the **25th** year that Bugs and diseases has been published! This is quite an Accomplishment, to keep such an informative publication going strong.

The Forest Health Section and the Alberta Tree Improvement and Seed Centre have merged, expanding the scope of articles in our publication. So it's time to re-name the newsletter.

We need suggestions from our readership—the contest has been extended until the next newsletter in December. Think of a name that you think is fitting for the newsletter and email to me at Erica.Samis@gov.ab.ca. Everyone will be able to vote on the new name.

The winning submission will receive a prize.



Erica Samis—Edmonton

New Invasive Plants Technician

The South Saskatchewan Region Forest Health program is pleased to announce the hiring of Megan Evans as Invasive Plants Technician. Megan started this summer in time for the busy contracting season and works in the Blairmore Ranger Station, where she is within easy reach of some of the province's worst weed infestations. Megan is an ecologist by training with an MSc from the University of Calgary and has a strong background in grassland and rangeland health through previous consulting and technician work. We are excited to have Megan on board and continue to evolve and expand the regional invasive plant program.

Welcome Megan!



Brad Jones—South Saskatchewan

Rust Never Sleeps – At least not in Northeastern Alberta

Anyone who has been out and about in the forests of northeastern Alberta has probably noticed that most of the spruce are looking yellowish or orange-ish. It may come as a relief to those noticing this phenomenon that they are not going colour blind. Many spruce over a vast area, are indeed sporting strange hues. The reason is that they have been infected by a fungal foliar disease – spruce needle rust. Needle rusts are common for boreal conifers and tend to be more common in years with wetter springs. According to many sources, two species, *Chrysomyxa ledi* (*C. ledi*) and *Chrysomyxa ledicola* (*C. ledicola*), are the most prevalent in the Prairie Provinces. Infection by these species can be very heavy at times.



I won't guess whether the main culprit in the northeast this year is *C. ledi* or *C. ledicola* - I'll leave that up to the mycologists out there. However, I will state with no reservation that there is a lot of it around this year. Last year was also a big year for needle rusts, but this season is much worse; so much so that our office has been inundated with calls from concerned people. Several have reported "orange goo" floating on some of the lakes and rivers. These fungi have complex lifecycles and can produce copious amounts of orange spores at various stages of their lifecycles, both on the affected trees and the alternate host – Labrador Tea. These spores can be blown by the wind, accumulating in water bodies to form the "goo" reported by some of the public.



Spruce needle rusts infect current year's needles, causing premature needle drop. The damage they cause is largely cosmetic. Even extremely heavily infected spruce tends to recover with few ill effects. That being said, successive years of severe needle rust infection (as we have had in parts of the northeast) cannot be good for the spruce in the areas where this has occurred. Hopefully, conditions next spring will be less conducive for these fungi and the rust will sleep for a season – or two.



It Takes a Community to Measure the Health of Endangered Pine Trees



Orange blister rust canker on tree.

Whitebark and limber pines are listed as Endangered in Alberta under the Wildlife Act. Whitebark pine is listed as Endangered federally under the Species at Risk Act with limber pine anticipated to follow in 2015. These high elevation five-needle pines are both under threat across their range by an invasive fungus (white pine blister rust), mountain pine beetle, fire exclusion and climate change. Loss of these species is expected to have adverse effects on the ecosystems in which they occur due to their important roles in colonizing disturbed sites, retaining snowpack, and providing high-energy food for wildlife due to their large seeds.

One of the cornerstones of species at risk recovery is monitoring species health. Monitoring plots for whitebark and limber pine were first established in Alberta in 1996 and the network was subsequently expanded and re-measured in 2003 and 2004 and again in 2009, by various agencies. A large portion of the data collected has been published by Parks Canada and the Canadian Forest Service (e.g., Smith et al.,

2013a, 2013b). This year, all agencies with plots in their jurisdictions collaborated for a reassessment of the complete network of 282 plots. Plots extend from Waterton Lakes National Park to the Willmore Wilderness Park, as far east as the Porcupine Hills, and there are several plots in protected areas in eastern British Columbia.

Parks Canada took a lead role in the project through coordinating and planning, collating data, and hiring three summer students out of Waterton Lakes National Park. Staff from all of the mountain national parks contributed time and labour to the project.

Environment and Sustainable Resource Development (ESRD) provided funding through the Fish and Wildlife Species at Risk program to hire two staff through the Forest Health program based out of the Calgary office. ESRD Forest Health staff across the province also provided help to the crews and planning and logistical support for helicopters and camps. Alberta Parks provided staff to help the crews across the province and facilitate work in the numerous parks and protect areas. The Canadian Forest Service did not provide staff this time around but were available to consult and provide expertise. This truly collaborative project was only successful through the hard work and commitment of these agencies and their staff.



Evan Esch



Kenley Bzdel

Smith, C. M., B. Shepherd, C. Gillies and J. Stuart-Smith. 2013a. Changes in blister rust infection and mortality in whitebark pine over time. *Canadian Journal of Forest Research* 43:90-96.
Smith, C.M., D. Langor, C. Myrholm, J. Weber, C. Gillies, and J. Stuart-Smith. 2013b. Changes in blister rust infection and mortality in limber pine over time. *Canadian Journal of Forest Research*: 43: 919–928.
Brad Jones—South Saskatchewan

Ch-Ch-Ch-Changes...

Daniel (Dan) Lux was the successful candidate in 1999 to fill the FHO position in the Southern East Slopes Region. Dan, a native Albertan, earned a B.Sc. degree specializing in Zoology at the University of Alberta in 1992 and a Master of Pest Management degree at Simon Fraser University in 1995. After a brief career with Phero Tech Inc. he worked as a contractor in Forest Health in Kamloops, BC till 1999.

As an FHO, Dan initiated several field studies in his region: trials on use of “stumping” logging to mitigate *Armillaria* root disease in young pine plantations, study of young plantations on the impact of and recovery from herbivore browsing, and, mountain pine beetle (MPB) attacks on wildfire-affected pine stands. He also carried out a field test on use of Verbenone as a repellent to protect pine trees from beetle attack. With the early onset of MPB infestations in his area, Dan was at the forefront to meet the challenge posed by this pest. In 2003, his first MPB control program achieved a 98% success. In spite of this control effort, MPB continued to spread with influx of beetles coming from areas west of Alberta. In 2004, Dan led the Inter-agency Cooperative MPB Management Team that won Premier’s Silver Award. In 2005, Dan moved to Edmonton to assume the Provincial Mountain Pine Beetle Coordinator position that directly reported to the Director of Forest Management. In the following years, a science-based MPB control program was formulated and implemented. The MPB management program was improved by producing several MPB Management Guides and a Decision Support System (DSS) that helped forest managers to prioritize areas for MPB management. These guides facilitated MPB identification, standardized aerial surveys of MPB infestations, ground surveys on Green: Red ratios as well as r-value surveys that forecasted trends in MPB populations. In 2008, Dan succeeded Hideji Ono as the Senior Manager of the Forest Health Section. In this capacity Dan introduced regular communications between Forest Health staff in Edmonton and in the regions.



Dan is moving on. *“In June, I decided to take a new position within the Department. I am now the Executive Director of Forest Industry Development. This is quite a change from my Forest Health job. I took the new challenge because it was time for me to gain more experience and to learn a new business. I was ready for a change. I loved Forest Health. The passion of the people involved in the program is what makes it successful. We had (continue to have) an excellent program that is based on open communication, trust, and a desire to ensure that we are the best. We always challenged ourselves to find a better, cheaper, more efficient way of doing business. The Alberta Forest Health program, in particular the mountain pine beetle program, is truly world class and is looked upon as the best program in North America. We set the standard for how to manage mountain pine beetle. I am proud of what we accomplished. We have had some heated, active, loud forest health officer meetings over the last 10 years. Everyone has an opinion (and is willing to share it), and everyone has the right intentions. The result is a fantastic, agile program. I wish you all the best.”*

Dan set the bar high for us in doing our forest health work, but he also always made sure we took time to have some fun on the job. **All the best in wherever your road takes you, Dan!**

And the New Senior Forest Health & Adaptation Manager is...

In 1998, Erica Samis joined the Forest Health Program as the Forest Health Officer in the Northern East Slopes Region. Erica, born in Saskatchewan, earned a B.Sc. degree in Environmental and Conservational Sciences at the University of Alberta in 1996 and worked as a Provincial Park Ranger at Pigeon Lake Provincial Park. In 1997, she became a Range Technician with Land and Forest Service.

As an FHO, Erica was the first with SRD to establish field trials on biological control of invasive plant species. During her tenure in the Northeast Slopes Region, she dealt with the one and only outbreak of the black-army cutworm in the Green Area and was instrumental in setting up field trials on Bruce spanworm egg masses. At the initial stages of the MPB



outbreak in early 2000s, Erica was involved in getting risk assessment and predictive models developed, in collaboration with Canadian Forest Service scientists. She detected the MPB outbreak at Holmes River Valley in British Columbia, which was the source of beetles that infested pines at Willmore Wilderness Park in the late 1990s. She was a member of the Inter-agency Cooperative Mountain Pine Beetle Management Team that won the Premier's Silver Award in 2004.

In 2006, Erica moved to Edmonton to lead communications related to the MPB Management Program, as a member of a team that directly reported to the Director of Forest Management. She became a dynamic member of the MPB management team that formulated, updated and continuously improved the program. In 2008 Erica was selected as the Provincial Coordinator of the MPB Management Program and promoted as a Senior Forest Health Officer. Erica was also involved in the National Forest Pest Strategy (NFPS) project that was launched to standardize and improve forest pest management in Canada. She led a project on MPB risk assessment and management as part of the NFPS program. Recently, Erica has been managing red ring blight affecting high value pine stands at the Alberta Tree Improvement and Seed Centre.

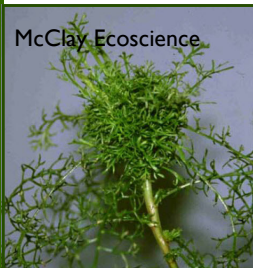
On July 28th Erica succeeded Dan Lux as the Senior Manager of the Forest Health & Adaptation Section. *"The past year has seen a lot of changes for forest health. The biggest change was the merger of Forest Health with the Alberta Tree Improvement and Seed Centre to create the Forest Health and Adaptation Section. Another big change was our manager, Dan Lux, accepting the position of Executive Director for Forest Industry Development Branch. These changes have provided us the perfect time and opportunity to explore and develop our section so that we can meet the needs of Albertan's now and in the future. FH&A staff and Forest Health Officers are leading climate change initiatives, seed usage guidelines, mountain pine beetle management, invasive species programming, endangered tree species recovery and many others. As the new manager of the section I am excited about where we are headed and the things we are doing. Make sure to keep up with us by following the newsletter."*



Congratulations Erica!

Weevil Fight Them on the Beaches...

Invasive plant infestations that are beyond traditional control measures are the prime targets for biological control agents, and biocontrol agents are a self-reproducing and self-dispersing form of IP control. Many of these agents have been in Canada for many years or tens of years, but in Alberta operational biocontrol programs have been small and localized. Biological control of invasive plants (IP) was incorporated into the Forest Health program plans in 2012. An operational biocontrol program has been slowly ramping up since that time.



Galled shoot.

Scentsless chamomile has two agents available for release in Alberta – a gall-forming midge, *Rhopalomyia tripleurospermi*, and a seedhead-eating weevil, *Omphalapion hookeri*. In 2013 galled plants (July) and weevils (late August) were released at two locations in an old public gravel pit on vacant Crown land in the Wandering River area. Monitoring this year found no evidence that the galled plants had survived (it was a hot, dry August last year) but the weevils from the other release site had dispersed into this chamomile patch. The weevil release site showed positive signs of establishment. An additional *O. hookeri* release was made west of Whitecourt this season on a vacant Crown site adjacent to re-growing cutblocks. These agents were obtained from McClay Ecoscience.



Weevils in seedhead.



Hound's tongue has one agent - a root mining weevil called *Mogulones crucifer* (formerly *cruciger*). One release of these agents was made in 2008 and again in 2009 in the south end of the Porcupine Hills. Monitoring of these releases last season found the weevils still present and the plant population greatly reduced. *M. crucifer* is a very successful agent in that they will decimate a hound's tongue population before dispersing. Four more releases of this agent were made this year – two in the Castle and two more in the Porcupine Hills. These releases will be monitored annually and eventually collected from for redistribution. These agents were obtained from Agriculture and Agri-food Canada (AAFC), Lethbridge.



Root damage from larvae.



There have been repeated attempts to establish a toadflax stem-mining weevil, *Mecinus janthinus*, in Alberta but the warm temperatures associated with chinooks have played havoc with insect emergence. Small populations have become established in central Alberta. In an attempt to mass rear these insects, common toadflax plants were collected from the Castle area near the Crowsnest Pass and insects collected from established sites have spent the summer in a tent in Sundre. Females oviposit into the stems and the larvae feed in the stems during development and then emerge as adults the next growing season. Stems of the tent plants will be collected in the fall and refrigerated over the winter. Next season the emerging weevils will be released in the Castle area.



Larvae stem damage



Rearing tent.

Once a population is established, agents from this 'nurse' site will be redistributed. These agents were obtained from McClay Eco-science.

In 2013 an "Assessment of the prospects for biological control of tall buttercup, *Ranunculus acris*, in Alberta" was completed by McClay Ecoscience. Indications are that a couple of buttercups native to North America may make finding an agent specific to *R. acris* difficult. New Zealand is also interested in biocontrol of tall buttercup and



has asked for an *R. acris* plant from Canada to compare to NZ tall buttercup to determine if they are indeed the same species. Molecular botany and genetics are starting to play a big role in defining species of both plants and any potential biocontrol agents. Once this is sorted out, a consortium may be formed to fund a preliminary agent search. A tall buttercup plant has been collected, pressed and will be shipped soon.

Other potential biological control agents are currently undergoing searching and screening that would be useful in Alberta on the following invasive plants: common tansy, oxeye daisy, and a few species of hawkweed. Not all biocontrol agents are insects—pathogens such as rusts are used also.

Biocontrol agent procurement occurs via a funding consortium of parties who desire an agent for a particular plant. When new biocontrol agents enter Canada they are first handled by AAFC's Lethbridge Research Station. The research scientists there are experts in weed biology and ecology, insect-plant interactions, insect ecology, mass-propagation of insect biocontrol agents, insect rearing, and risk assessment and impact of biological control agents. Once they have established nurse sites, the agents are re-distributed to the consortium partners who set up their own nurse sites, and so on.

Marian Jones—Red Deer & North Saskatchewan



**Forest Health
and Adaptation**

Monitoring MPB Spread

The Spread Management Action Collaborative (SMAC) working group is a joint initiative between the Governments of Alberta and Saskatchewan and the Canadian Forest Service (CFS). The goal is to stop the eastward spread of mountain pine beetle (MPB) through boreal pine forests in Alberta and into Saskatchewan and beyond. As part of this collaboration, Saskatchewan has been supporting an expanded MPB detection program in north-east Alberta. A total of 88 pine stands were baited with MPB pheromones in order to identify early signs of spread into Saskatchewan. During initial checks ESRD staff found MPB attacks on baited and surrounding trees at seven sites. The SMAC committee wanted to know whether beetles are persisting at these far eastern locations in the endemic population phase where few beetles survive in weakened trees. This January, Marty Robillard from Lower Athabasca Region, Anina Hundsdorfer from the ESRD Forest Health Section in Edmonton and Jim Weber from the CFS revisited the sites that had beetle attacks to confirm MPB presence and assess in greater detail whether beetles had successfully produced brood.



This trip also supported the Total Risk Information to Action Mountain Pine Beetle Network (TRIA-Net). TRIA-Net investigates how genetic structure in beetles, host trees and fungi influence the beetles' ability to spread through Canada's pine forests. In support of this research we also collected foliage samples from attacked trees for genetic analysis. This is part of a more comprehensive sampling effort to identify geographic variation in the beetle, host tree and fungal genome. Such genetic analysis will inform risk models that predict beetle spread through boreal pine forests.

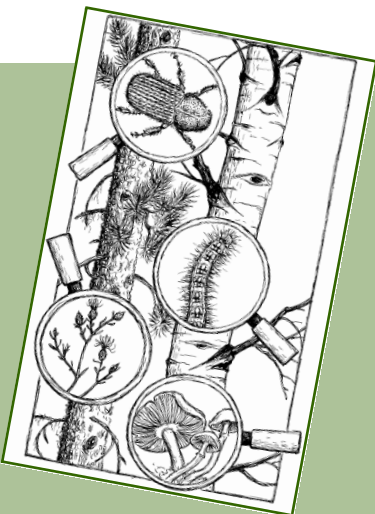
At both sites in townships 81-07-W4 and 82-07-W4 we found low level beetle activity but none of the attacks resulted in successful beetle brood. In most cases the trees had successfully defended themselves and flushed the beetles out of the entrance holes with increased sap flow. Where beetles were able to construct galleries they were short, lined with resin and had no larval galleries extending from the parent gallery. We were able to confirm MPB presence as close as 60 km from the Saskatchewan border but presently there are too few beetles at these isolated infestation spots to sustain a population.

Alberta, Saskatchewan and the CFS will continue to collaborate to prevent further spread of the MPB infestation. We will continue to monitor for beetle activity on the far reaches of the infestation to identify where the beetles are and how fast they are spreading.

Anina Hundsdorfer



The Anina Hundsdorfer Memorial Graduate Scholarship will be awarded to a graduate student enrolled full-time in either an MSc or a PhD programme, in the last year of their studies, who is conducting research in the area of conservation of natural Canadian forests. For more information or to donate contact: Janice Cooke, University of Alberta 780.492.0412, E-mail: janice.cooke@ualberta.ca



Rust Tsunami Whammy

Needle rust, Spruce Needle Rust

This year you have us quite nonplussed

Your profuse, copious sporulation

Has led to public consternation

Folks are asking “what is this crud;

That’s on the trees, the lakes, and the mud?”

I know Fungi can have “wave” years

But now’s a “tsunami,” it appears

You’ve covered spruce from far and wide

All over the whole darnn country side

I hope next year you’ll be on retreat

Be gone you pesky basidiomycete!

Tom Hutchison—Lower Athabasca Region

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