

Bugs & Diseases

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Does Thinning Help to Manage Spruce Budworm Infestations?

Anecdotal evidence suggests that stand thinning makes host trees resistant to spruce budworm damage. Various research projects on the use of this silvicultural measure to induce budworm resistance to host trees have produced equivocal results.

In 1996, Dr. Jan Volney, who recently retired as a senior research scientist at the Northern Forestry Centre of Canadian Forest Service, implemented a long-term field experiment in white spruce stands located near Zama City in northwestern Alberta to address this question. Unfortunately, the experimental area burned down during the 2012 wildfire season and the experiment was terminated before yielding an answer to this problem.

However, a recent publication in *Canadian Journal of Forest Research* by two scientists, Alvaro Fuentealba and Eric Bauce, with the University of Laval in Quebec, sheds some light on this issue. They reported that three years after thinning, in spite of high pupal mass and better winter survival, heavily thinned (40%) stands of either white spruce or balsam fir had an increase in the amount of current-year foliage remaining (a measure of budworm resistance by these host species). This response was caused by strong foliage production on host trees in response to the thinning treatment. These results suggest that heavy thinning during the low-density phase of budworm populations may be used as a preventive measure against this pest.

Light thinning (25%) did not increase host tolerance to budworm except in white spruce or balsam fir stands growing on wet (hydric) and high moisture (subhydric) sites, respectively. This result perhaps illustrates why some of the previous experiments, where soil water content was not a factor, produced equivocal results.



*Alberta's
eye on forest
health*

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Training Session for Growth and Yield Contractors

On June 21, Lac La Biche/Waterways FHO Tom Hutchison and I conducted a one day training session in conjunction with the Foothills Growth and Yield Association (FGYA) for contractors engaged in re-measurement of the FGYA's Lodgepole Pine Regeneration trial plots. The objective was to ensure identification of damaging agents affecting trees in these plots as accurately as possible.

The Lodgepole Pine Regeneration Trial is a decade old long-term program designed to assess the effects of various environmental and treatment factors on the establishment, growth and survival of young lodgepole pine trees post harvest. Plots are located throughout the range of lodgepole pine in Alberta within the FMA's of 9 forest companies. The trials are now starting to provide data regarding lodgepole pine growth, natural regeneration, mortality and health as well as predictions on regeneration performance and the effects of climate change on all of these attributes. One of the desired outcomes of the trial is to create a series of best management practices for forestry practitioners regarding site preparation, planting and seeding, tending and on-going assessment with forest health being an important component to all of these phases. Another likely outcome will be the timing and site selection of effective management intervention when forest health agent damage is threatening growth and yield targets.

Increases in mortality or significant volume loss attributed to forest health agents potentially due to climate change are now being discerned from the data set. Accurate tracking of biotic and abiotic forest health agents is as such very important. Under trial protocol health/mortality assessments are conducted annually on all tagged trees within trial sites. These assessments include coding all biotic and abiotic damage found. This data is important for meeting the objectives of the trial and needs to be accurate and consistently assessed.



This was the third training session over the last five years and included fifteen contractor field staff going to three different sample plot installations along the Lund Creek Road south of Robb. Most of the damaging agents likely to be found by contract crews were shown. While the crews were all quite knowledgeable, viewing the agents together with them increases the consistency, accuracy, and utility of collected data. We were able to see as a group pine needle cast, needle rust, armillaria root disease, stalactiform rust, root collar weevil, hail damage, gall rust, elythroderma, pitch blister moth and a host of other abiotic and biotic agents. Field crews carry identification tools to the field with them as well. Knowledge of the agents helps tremendously as it is much better to have DRA (armillaria) for example as the captured cause of mortality rather than Unknown due to lack of knowledge. Forest Health diagnostic calls by contractors have noticeably improved since training began and ESRD plans additional future training and assisting in quality assurance checks of forest health field calls whenever possible.

Smoky Scoops the Golden Beetle Award

The Golden Beetle Award recognizes outstanding achievement in forest health. It is passed along each year to a deserving team member who has made an exceptional contribution to the program.

This year the recipient of the award is Devin Letourneau, Forest Health Officer in the Smoky Area.

I had the pleasure of meeting Devin over ten years ago when he began his career with the department as forest health field crew member in Manning. Over time he has honed his skill to become a valued, committed and hard working member of the forest health team.

I specifically chose to award Devin this year for his contributions to the provincial mountain pine beetle management program. The experience he has gained over the years makes his input extremely valuable for the purpose of adaptive management. Each year Devin commits much of his time working with myself and others to improve field procedures, contracts and processes. As well he is often relied on by other Forest Health Officers for advice and assistance with their own programs.

Since 2009, Devin has coordinated the destruction of approximately 586,000 MPB-infested trees. I am quite certain that no other Forest Health Officer can come close to touching this statistic.

Devin once told me "Sometimes my mouth gets me into trouble." In this case his words and his actions have earned him the most prestigious award in forest health.

Although Devin does deserve credit for his outstanding work, this award is also dedicated to all of the staff in the Smoky Area who very effectively work together to consistently deliver the largest MPB survey and control program in the province.

I would like to thank all of the people who contribute through field work, contract supervision, and finance/administration. Devin could have not done this without you!



Mike Undershultz—HQ

Tell us how we're doing

Forest Health's mission is to capture Forest Health Team's enthusiasm, experience, and skills to effectively integrate the best science and professional judgment into the forest health program through effective communication and partnerships with government, academia, stakeholders, and the public.

In line with our mission statement, we will be reconnecting with our key partners, stakeholders, and clients over the next few months. Many of you will receive a survey to gauge how we're doing, and to solicit ideas on new projects and services you would like us to consider taking on. A similar exercise was conducted in 2001 and the results helped compass the Unit's program and goal setting. This exercise will be just as important.



In this survey, we will be asking questions about our Mountain Pine Beetle Program; survey and control work for both biotic and abiotic agents; our budworm projects; the quality and usefulness of our data and analysis; field presence; usefulness of our pest management forums; feedback on FH courses and other programs. This survey will be comprehensive and the feedback received will influence our programs moving forward.

A final summary of findings will be made public in a following issue of the Bugs and Diseases newsletter.

Taking time to engage in meaningful introspection is absolutely critical when pursuing excellence. We would love you to be part of this exciting time. You can expect to see your survey invitation soon.

Please take the time to give us feedback – this is your opportunity to help shape the vision and strategic direction of our unit.

Naomi Jehlicka—Edmonton

Q: What game do MPBs play with FHOs?

A: Squash!

Anina Hundsdorfer - Edmonton

SBW Spray Project – One Year Later

In June 2011, a spray project for the control of Spruce Budworm (SBW), the first in Alberta since 1999, was conducted in over 2750 ha of budworm infested white spruce stands near Fort McMurray. Second larval instar (L2) surveys conducted the previous winter had indicated that SBW populations would be high in the areas chosen for the spray project.

Among the area sprayed were 104 ha of certified reclaimed land just south of Syncrude's main plant – "Gateway Hill." Post-spray sampling indicated that a mean larval mortality rate of 83.1%. One year later, no evidence of budworm activity was visible at this site and the spruce trees were happy campers. A picture is worth a thousand words, so here are some before and after shots taken at the same locations at Gateway Hill. SBW caused defoliation clearly evident on June 21, 2011, but none could be seen July 4, 2012.



Defoliated understory crown—2011



Defoliated mature spruce—
2011



Mature spruce—2012



Understory crown—2012

Tom Hutchison—Athabasca

Eastward Ho! Just How Far East Has the Mountain Pine Beetle Established Itself In Alberta?

The older I get, the more I find out just how little I know for sure. Now, I think I can add another thing to my list, and that is just how far east the Mountain Pine Beetle (MPB) has managed to establish itself - to maintain a population (however small) over a number of years. In 2009 a massive influx of MPB from BC spread out over much of Northern Alberta. At this time the beetle was introduced to new areas, many of which could be considered fairly marginal habitat for them. Would they be able to survive and establish populations for years beyond their initial invasion?

Farther to the west (closer to the BC border), MPB enveloped pine stands, leaving in their wake many red and fading trees. Traditional detection efforts focus on red or fading pines—find these trees and then look for currently attacked trees close to them. Heading east, however, the signature of their presence becomes less apparent. These beetles can exist in low, endemic, levels that are very hard to detect through ground and aerial surveys, and other means must be employed. One tool that is proving effective is the use of pheromone baited trees.

ESRD has established a grid of pheromone baited trees in most of the province's pine forests. These 'long-range dispersal monitoring baits' are set out at an intensity of one site per township, three baited trees per site. The sites are located in pine stands whose characteristics (age, percentage pine, diameter, density, etc.) make them attractive and susceptible to MPB. Marked release and recapture studies conducted by scientists employed by the Federal government indicated that the effective range of these baits is approximately 250m. Certainly, outside of 500m their chance of attracting beetles is slim. Therefore, if beetles attack a baited tree, it is likely they came from nearby. For the past 3 seasons MPB has been detected at a number of dispersal bait sites north of Lac la Biche up to approximately 30 Km west of Ft. McMurray. The fact that they keep being detected in these areas could indicate that they are established over a fairly large portion of the north eastern Alberta – albeit, likely in very low numbers. Extensive aerial surveys in 2012 over areas where dispersal baits had indicated the beetle's presence did not find many red or fading pine trees that could be attributed to attack by MPB. Without the use of pheromones, MPB presence would be largely undetectable. One totally unexpected result from the 2012 dispersal bait program was the detection of MPB 40 km south east of Ft. McMurray. Three hits on one tree is not a lot, but definitely a surprise considering this site is located only 50 km west of the Saskatchewan border.

So, just how far east has the Mountain Pine Beetle established itself in Alberta? Our dispersal bait results indicate that MPB could be established (at low population levels) over much of the province's north east. Is it established as far as 50 km west of the Saskatchewan border? My personal bias is to suspect that this is not the case. However, only continued detection efforts and time will tell for sure. The older I get, the more I find out how little I know for sure.

Tom Hutchison—Athabasca

MPB Survey & Control Program Underway

The vast majority of the ground surveys and control work is undertaken by contracted manpower. This year there were sixteen survey contracts and four quality inspection contracts awarded through a competitive bid process.

Approximately 10,000 sites will be ground surveyed to identify control trees this winter. The location of ground survey sites is based on red tree locations identified during aerial surveys this past fall.

Ground surveying is expected to be completed early in the new year. At that time, control contracts will be advertised with the intention of completing control treatments before the end of March.

This year the majority of the sites to be surveyed, and where the majority of the control work will take place, is in the Smoky Area south of Grande Prairie. A significant portion of the work will also take place in the Woodlands Area; other parts of the province where beetle control will take place this winter are within the Foothills and Lesser Slave areas.

Mike Undershultz—Edmonton

Frankincense tree facing uncertain future

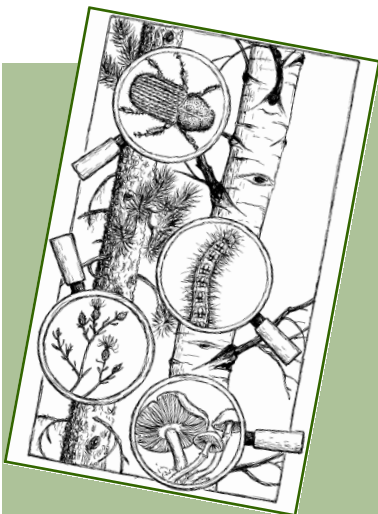
The fragrant resin comes from trees of the *Boswellia* genus and these trees are under threat. *Boswellia* trees generally grow no more than 5m in height and provide cover for other plant species. Each year about 3 kg of resin can be extracted from a single tree.

Boswellia forests are declining because of habitat decline and lack of rejuvenation. In some places the trees are cut down systematically and the land use converted to agriculture. Encroachment of other tree species is also affecting the long term survival of these forests. An ecologist from the Netherlands has been studying seedling survival and disturbance factors. He predicts that in fifty years these forests may be decimated under the current management practices. For more, click the link below.

BBC News—Science & Environment <http://www.bbc.co.uk/news/science-environment-16270759>



Marian Jones—Clearwater



I Saw Pine Trees with Dwarf Mistletoe

(Sung to the tune of "I Saw Mommy Kissing Santa Claus")

I saw pine trees looking all deformed
Gotta be Dwarf Mistletoe, all right
I didn't need to guess
Or use Hawksworth to assess
So plain to see, it
Was clearly, quite a brooming mess.

Why does no one kiss or makes merry
Underneath this piney parasite?
It really seemed unfair to me.
So I took some off a tree.
Maybe I'll start a new trend tonight!

Tom Hutchison—Athabasca

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Merry Christmas from Everyone
in Forest Health

