

Bugs & Diseases

Vol. 29 No. 2

August 2018

The Feast of Larch Needles

A few years ago staff began to report that they had noticed stands of dying larch in the Whitecourt area. At first glance these stands appeared to resemble old burns but further investigation revealed that the trees were infested with eastern larch beetle. In early August during an aerial survey, it was noted that one of the larch stands had yellow, red, and grey trees. It was assumed these trees had succumb to the eastern larch beetle, however we were surprised to see the stand crawling with larch sawfly (*Pristiphora erichsonii*) larvae!

Available literature suggests that larch sawfly is considered to be “the most damaging pest affecting larch”. The adult sawfly resembles a small black wasp with an orange band located around its middle section. Throughout May the adult lays approximately 75 eggs at the end of larch branches. The eggs are arranged in rows that are situated in cut slits and hatch about a week later. The branch subsequently shrivels up. These droopy branches can be an early indication of the sawfly’s presence in the stand.

The larvae are fairly distinctive looking, and we had no trouble matching the larvae found on the larch tree to the photos of larch sawfly in resources. They have a shiny circular black head and front legs and an olive-grey body up to 20 mm in length. Young larvae will congregate on the tree trunk, and then disperse and climb into the crowns to consume the foliage. This is the most damaging life stage of the larch sawfly, as the defoliation causes loss of growth and stress to the tree. The branch, and eventually the whole tree may die as a result of the defoliation. However, larch can withstand defoliation better than other conifers, as it acts like a deciduous tree and will grow a new set of needles the following spring.

Once the larvae are mature, they drop from the branches and fall to the ground. There, they will spin their cocoon in the litter layer on the forest floor and using heat available from the ground or insulation from snow cover they will over-winter there.



Larch sawfly larvae. Photo: B. Taylor

Alberta's eye on forest health

Issue highlights:

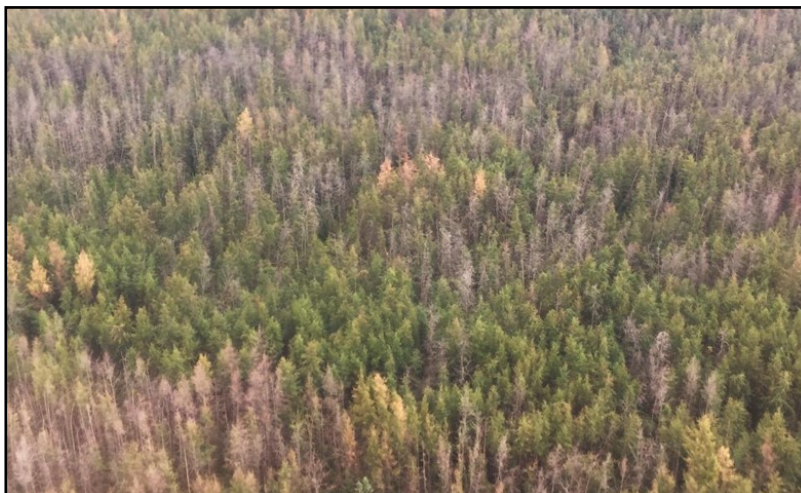
- Larch Sawfly 1
- Willow Leafminer 3
- Invasive Plants Update 4
- Get to know our Info Mgmt. Tech 6
- Mortality in Whitebark Pine 7
- I'd Rather be a Tree Today Poem 8



Forest Health
and Adaptation

Most pupae will emerge as adults the following spring; it's been noted that some will diapause for over 1 year before they emerge.

The jury seems to be out on whether the larch sawfly is a native or introduced pest. Some claim it is native and have found reduced growth rings in trees that they've dated back to the 1700's, while some say it was introduced from Europe. Documents have shown past outbreaks occurred in Eastern Canada in the early 1800's. It was recorded that the larch sawfly destroyed tracts of mature larch and that measures were used to control this outbreak .



Infested Larch Stand showing mortality of trees. Photo: A. Brown

Entomologists found that natural population checks for the larch sawfly included factors such as heat and predation. Heat can cause mortality to the eggs or the larvae in the cocoon phase. In terms of predation, vertebrate, invertebrate, and small mammals have been known to consume the larvae. High water tables can also keep the population in check, as flooding can cause the larvae in the duff layer to drown.

However, none of these natural checks were enough to reduce growing populations in the early 1900's. At that time entomologists imported the parasitoids *Mesoleius tenthredinis* and *Olesicampe benefactor* to Canada. A release of the masked shrew was also performed in Newfoundland to allow predation on larch sawfly larvae in that area. Each form of control had varying amounts of success, depending on many factors. A release of parasites was even made in Alberta back in the 1970s to knock down the population at that time.

As for the infested stand we found here in Whitecourt, we plan to investigate it further. Our goal will be to quantify the severity of the infestation by surveying the area. Now that this pest is on our radar, we'll be keeping a close eye out for any spread into neighbouring larch areas.

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Willow Leafminer - A Reprise

This summer I have been feeling a sense of déjà vu. Why, you ask? Well, it's because of the number of times I have been asked "what's killing all the willows?" Back in 2010 I wrote an article for this newsletter to address the same question. In the past decade the willows over a vast area of the province have been affected by quite a severe willow leafminer (aka willow leaf blotch miner) infestation. The willow leaf miner (*Micrurapteryx salicifoliella*) is a small moth species (the adult moth has a wingspan of approximately 8mm) that is native to Alberta. I stated in my 2010 article that there was, in most instances, no need to worry about willows being killed by the leafminer. Like most broadleaf species, willows can survive periodic events causing quite a lot of damage to their leaves. In fact willows are quite hardy and tolerant of herbivory. Usually, it takes several consecutive years of severe infestation by willow leaf miners before willows are noticeably impacted. However, I am no longer certain that we should not worry for the willows.



Willow leafminer damage (left) willow dieback (center) and willow leafminer larvae (right).
Photos: T. Hutchison and A. Brown.

The willow leafminer outbreak in Alberta has been extensive and severe for more than a decade now. Over the past couple of years I have been noticing willow die-back and mortality in many areas as I travel around the province. I should stress that this is my observation, and so far as I know there has not been a quantitative assessment of willow damage provincially. Yet, I am certain that it is noticeable because I'm not the only person who has been noticing it – hence my feeling of déjà vu.

Now some may ask why we should care if willows are in distress or dying. They aren't commercial species. In fact, I have heard them described as being like weeds by some people. However, there are many reasons why we should care. Willows are important as an early seral stage colonizer of old river and lake beds, as well as other disturbed areas. As such they are often used to help reclaim industrial sites. They provide habitat for many species of animals. For instance, some of the information I looked at while researching for this article asserts that willows are critically important to the distribution and survival of moose, snowshoe hares, and ptarmigan in Alaska's boreal regions. Willow mortality may alter wildfire behavior. Willow dominated riparian areas that would normally be expected to provide fire breaks, may no longer do so. Finally, the severity and duration of the willow leafminer outbreak as well as subsequent willow mortality may be one more indication of climate change altering our forest ecosystems.

There doesn't appear to be a lot of research on willow leafminer, and much of what has been done for this insect comes from Alaska, where this species has only been noted as a pest since 1991. Wagner and Doak (2018) clearly link rapid climate change to widespread and recursive leaf mining damage from *M. salicifoliella* contributing to declining willow productivity. Another paper, using remote sensing data indicates a general "browning of Alaska's boreal forests due in part to damage from insects, including the willow leafminer (Parent and Verbyla, 2010). Again, the authors state that climate change is a contributing factor.

Clearly, given the relatively recent increase in prominence for willow leafminer, something has changed to make them more noticeable on the landscape. Forest Health & Adaptation has recently begun to try and capture more survey data for damage from insect species previously considered minor, such as *M. salicifoliella*.

Hopefully, this can contribute to better awareness of changes occurring to Alberta's forests and their agents of disturbance. It may well be that we can expect more noteworthy damage and questions regarding the causes. To paraphrase the immortal Yogi Berra, we should probably ??????

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Tom Hutchison - Edmonton

Update on the Invasive Plant Survey and Control Program

During the summer, many of the forest health staff are in the field surveying for invasive weeds. As the summer season comes to an end, we are busy entering and submitting data and switching gears to our mountain pine beetle program.

Across the district, Canada thistle (*Cirsium arvense*) was noted as one of the most common weeds found. This was not overly surprising as this plant is a professional at propagating from its large root system and controlling it effectively can be challenging. Manual control (pulling them) is practically ineffective since the plant can regrow from broken off pieces of the root. Chemical control, on the other hand, can only be effective if the right herbicide is used. Non-selective herbicides, such as glyphosate simply burn off the leafy part of the plant, but the juicy taproot remains. Selective herbicides are effective, however the application must occur when the plant is transporting nutrients in the early spring and late fall.



Bull Thistle. Photo: B. Taylor

In the northern part of the province, there was a noticeable amount of yellow toadflax. At times, this noxious weed seemed to be as common as Canada thistle. In central Alberta, meadow hawkweed (*Hieracium caespitosum*), a prohibited noxious weed, is gaining ground in Whitecourt. We hope that our rapid response and effective control will give us the upper hand in controlling both these weeds.

A notable plant that has popped up in Hinton and Whitecourt forest areas is bull thistle (*Cirsium vulgare*). Bull thistle is not listed under the *Weed Control Act*, however it is an alien species that does have the potential to behave invasively in the right conditions. This plant was found in the 2nd year of its lifecycle (as opposed to the rosette stage) and had large showy flowers (as seen in photo).

Some unique invasive weeds that have popped up in Alberta’s forested area in the past couple years have been wooly burdock (*Arctium tomentosum*) in Slave Lake (2018), creeping bellflower (*Campanula rapunculoides*) in Peace River (2016), and knapweed (*Centaurea spp.*) in Hinton (2017). In addition, orange hawkweed has made appearances in various locations throughout the province over the past couple of years. Creeping bellflower and the knapweed plants have since been controlled, and have not been spotted in the same area since. The wooly burdock plants and orange hawkweed infestations have received treatment and will be monitored in the years to come.

Preventing the spread of invasive plants will reduce the severity of infestations. Informative talks about the importance of prevention have been incorporated in startup meetings with lookout tower personnel and Dozer bosses. In addition, some areas have really invested their time into engaging the public by attending events across the province. Ultimately, we hope that all the effort that goes into survey, control and public education will pay off in the near future and that Alberta will benefit from the increase in native biodiversity as a result of the reduction of alien species on the landscape.

FOREST AREA	TWO OF THE MOST COMMON WEEDS	
Whitecourt	1. Tall Buttercup	2. Meadow Hawkweed
Peace River	1. Perennial Sow Thistle	2. Canada Thistle
Hinton	1. Oxeye Daisy	2. Canada Thistle
Athabasca	1. Scentless Chamomile	2. Common Tansy
Slave Lake	1. Canada Thistle	2. Perennial Sow Thistle
Fort McMurray	1. Canada Thistle	2. Perennial Sow Thistle
Rocky Mountain House	1. Scentless Chamomile	2. Oxeye Daisy
Calgary	1. Canada Thistle	2. Oxeye Daisy

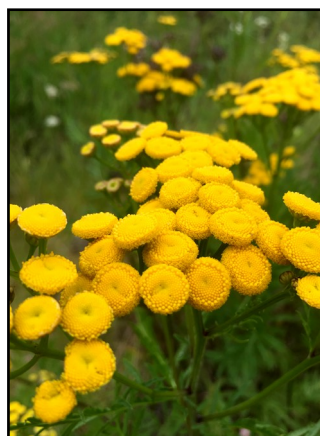
Some weeds that have been found in the Whitecourt Forest Area in 2018. Photos: B. Taylor



Canada Thistle



Scentless Chamomile



Common Tansy

Get to know our Information Management Technologist

It is time once again to get to know a relatively new Forest Health staff member. On March 1st 2018 David Tellier joined our Forest Health (FH) team.

TH: Tom Hutchison, Senior Forest Health Officer;
DT: David Tellier, Information Management Technologist

TH: Hello David, I'm glad we can have this little chat. Thanks for making yourself available.

DT: Always at your service, Tom!

TH: Can we start off by getting a little bit of background information about you? Tell us a little bit about your past, and how it is that you came to work for forest health in Alberta.

DT: Most of my background is in using GIS for forest management planning as a consultant and in forest industry. I've also worked in government for some years - at the Ontario Ministry of Natural Resources as a resource analyst, and at BC Timber Sales as a GIS technician. I was lucky to be offered this job in a triumphant return to my home town.

TH: That's interesting. Big T., how has your experience with Agriculture & Forestry been to date?

DT: It has been very positive. The Forest Health & Adaptation staff have been welcoming and supportive. I'm learning some exciting new things, like working with the tablets and laptops used for field data collection. I've even gone out to the field a few times!

TH: D-ster, now that you have, more or less, gotten your feet underneath you in your new position – what do you see as the biggest challenge you will be faced with?

DT: It's right in my job title "data management". It's a challenging process to organize and archive all the historical project data on our servers. There's a lot of bytes there.

TH: Wow, that sounds like a challenge. But I'm sure you'll be up to it. Have you any thought about the most rewarding aspects of your new job?

DT: It's all about the people, Tom. I find it most rewarding to contribute to all the great work our team is doing.

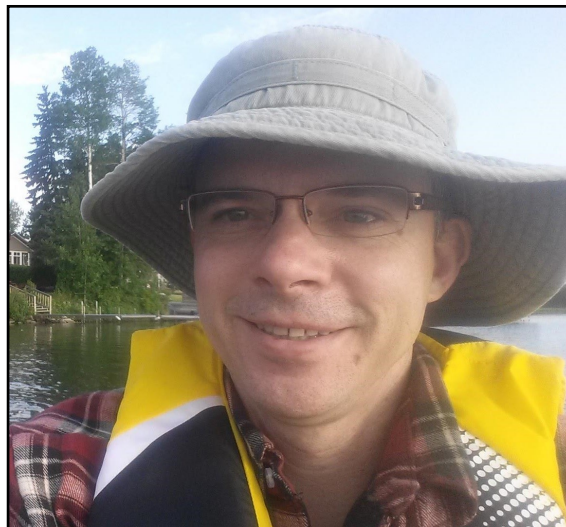
TH: Excellent – so, D-bomb, on a personal note can you tell us about the kind of things that interest you outside of work?

DT: This summer I have found myself fishing a great deal. I've also enjoyed paddling my kayak, as well as paddling in the Ceyana Canoe Club. You may occasionally also find me sampling beer where it is offered.

TH: Ah, you're sort of a renaissance man. That's really good to hear. I just have one final question for you, Telly Meister. You seem to go by a lot of nicknames. Can you tell us how that came about?

DT: This has a lot to do with the vibrant imagination of my co-workers. I'm sure they will settle on something more permanent once I've been caught in an embarrassing or otherwise vulnerable moment!

TH: Ha...too funny! Well thanks again for taking the time to do this. Welcome aboard David!



David Tellier enjoying the outdoors

Better Red Than Dead?

If you've been exploring Alberta's beautiful southwest this summer, you might have noticed pockets of young Douglas-fir mortality, and in the same areas, 5 needle pine with red foliage. In some areas, even trees over 100 years old have been killed. This has affected individual trees in some areas and whole stands in others. What's going on?

None of the affected areas had evidence of current mountain pine beetle attack, foliage was intact with no signs of infection or insects, and increment cores showed sound heartwood. Often older foliage was dead but some younger needles were still green. Cones of limber and whitebark pine had started to develop in 2017, but aborted before they matured in 2018.

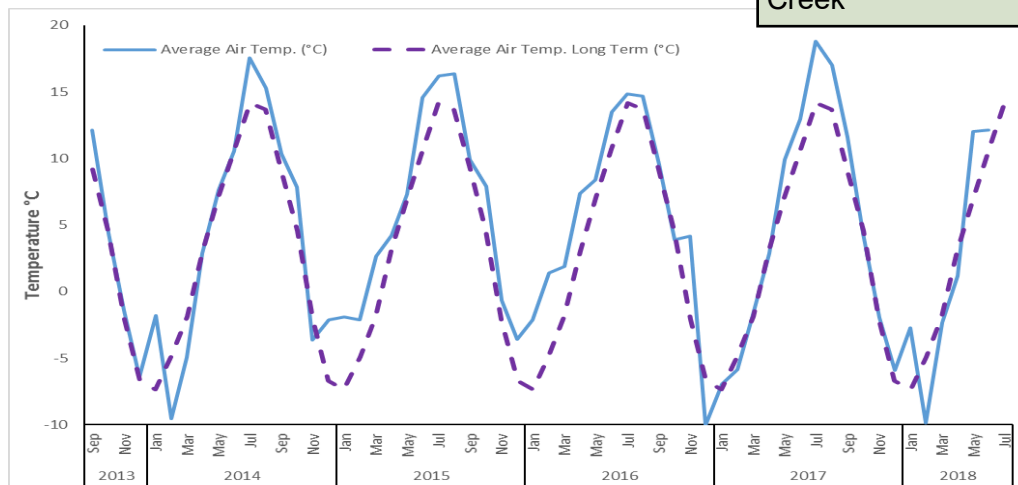
Looking at a couple representative climate stations, affected sites were hotter than usual all year in 2015 and 2016, and from May to September in 2017. Cones did get pollinated in 2017, but likely aborted during a 2018 winter cold snap, exacerbated by the anomalous January 2018 warm period in that melted insulating snow from roots and foliage, increasing the risk of desiccation and frost damage. This combined cumulative summer and winter stress could account for the mortality observed both in cone production and foliage, and killed trees that were already stressed.



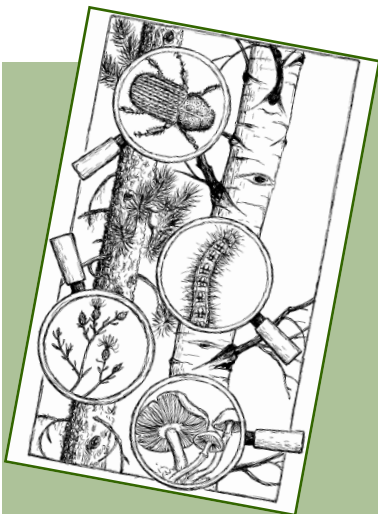
Dead limber pine in the Castle – off the plus tree list



Limber pine NW of Pincher Creek



Climate data from Chapel Rock, one of the affected areas, comparing climate normals vs observed temperatures 2013-18. Precipitation data not available.



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ISSN No. 1499-5859 (print)
ISSN No. 1499-5867 (online)
Published Apr., Aug. & Dec.
Editor: marian.jones@gov.ab.ca
Bugs & Diseases informs forestry
-related personnel about current
forest health issues.
Articles are welcome.

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I'd Rather Be a Tree Today



*Just look outside you'll plainly see
That everything is quite hazy
It also looks at times I'd say
Like we've somehow swapped our night for day*

*The smoke, the smoke it's everywhere
It's almost more than I can bear
It burns my throat and stings my eyes
It blocks the sun, it clogs the skies*

*Since I'm a human, I can tell
The smoke is making me unwell
But if, for instance, I were a tree
Would smoke affect me adversely?*

*If it doesn't, then I'd say
I'd rather be a tree today*



Tom Hutchison - Edmonton