From the Editor

This issue is packed with results from our surveys and things to look at for the coming spring. The Canadian Food Inspection Agency (CFIA) wants us all to be on the lookout for the Emerald Ash Borer. They have provided information for the Insect Focus so that we can know what to take note of.

And on a holiday note, Gina has written an article on Valentine’s Day and insects.

To wrap up some of our surveys, the project leaders have presented the data and maps.

‘Til next time,

Jacqui

Editing . . . a Rewording Activity

Say What and Quotes

If you have trouble getting your children's attention, just sit down and look comfortable.

Laughing helps. It's like jogging on the inside.

The human brain is a wonderful thing. It starts working the moment you are born, and never stops until you stand up to speak in public.

Knowledge is knowing a tomato is a fruit; Wisdom is not putting it in a fruit salad.

Did you know that dolphins are so smart that within a few weeks of captivity, they can train people to stand on the very edge of the pool and throw them fish?

A TV can insult your intelligence, but nothing rubs it in like a computer.

We never really grow up, we only learn how to act in public.
Emerald Ash Borer (*Agrilus planipennis*) - Identifying emerald ash borer signs and symptoms

The emerald ash borer (EAB) has killed millions of ash trees in southwestern Ontario, Michigan and surrounding states. It poses a major economic and environmental threat to urban and forested areas in both countries.

EAB attacks and kills all species of ash, except mountain ash which is not a true ash. With artificial spread, where people move infested ash materials and firewood to new areas, this insect can quickly spread to other areas of Canada.

The most tree damage is caused by the larvae of the EAB, which destroy the layer under the bark (the cambium) that is responsible for transporting nutrients and water throughout the tree (Figure 1).

With this transport system blocked, an otherwise healthy tree may die in 2 to 5 years, depending on its age and the extent of infestation. Damage to the tree from the larvae will be apparent under the bark. The feeding larvae create distinctive serpentine (or S-shaped) galleries in the wood as they feed (Figure 2).

Signs of EAB infestation usually only become apparent once a tree has been heavily infested. These signs include the loss of green colour in the uppermost leaves (chlorosis) and thinning and dieback of the crown (Figure 3).

As the infestation continues, the tree may develop sprouts (epicormic shoots) from the roots, trunk or branches, in an effort to find new ways to transport nutrients. Eventually however, with more and more of the crown dying, the tree will starve to death (Figure 4).
Adult EAB beetles typically begin to emerge from the tree in May, creating small D-shaped exit holes. These adults will then fly to the next available ash tree and feed on leaves until they lay eggs on the bark, which eventually become larvae and then the cycle begins again (Figure 5 and Figure 6).

If you see suspected signs of infestation on your ash trees or see ash trees stands in decline contact your local office of the Canadian Food Inspection Agency for more information.

Here's a link to find your local CFIA office . . .
http://www.inspection.gc.ca/about-the-cfia/offices/eng/1313255382836/1313256130232

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**Bits and Pieces**

**Welcome to New Staff**

**Forest Health Specialist**
Steve Delorey

We are happy to welcome Donald Kiezer to the Forest Health group as our new Forest Health Specialist. Don brings to our group a wealth of knowledge from his past experience in forest industry, and also by spending the last three years working for the Department as a seasonal employee in Jeddore.

Welcome to Forest Health Donald, and we look forward to having you and the perspective you will bring to the group.

**Forest Health Supervisor**
Walter Fanning

Please join me in welcoming Steven Delorey as the new Forest Health Supervisor at Forest Protection in Shubenacadie.

Steven has a strong interest in Forest Health issues and he is looking forward to the challenges of the position. He brings a wealth of experience from his time in private industry at NewPage as a Forest Management Coordinator and Area Supervisor, as well as earlier work in Saskatchewan and Ontario.
Valentine’s Day = Roses, Chocolate and Insects??

As I sit down to write this piece I can’t help but notice it’s Valentine’s Day. This is the day that the romantically inclined express their feelings for each other by sending cards and gifts but have you ever stopped to think how very different Valentine’s day celebrations might be if it weren’t for insects?

Every year at this time, millions of flowers are imported into Canada from South America. Along with the flowers can come some unexpected ‘gifts’ - invasive insect species. In the weeks leading up to Valentine’s Day, the Canada Border Services Agency (CBSA) increases their inspections of flower imports into Canada. Millions of boxes of flowers are inspected looking for foreign and dangerous pests/insects that could possibly harm our ecosystem or people.

Also, large, showy flowers such as roses wouldn’t even exist if it wasn’t for insects. This is because these colorful flowers are dependent upon insects to pollinate them, rather than non-colorful plants, such as some trees and most grasses, which are wind pollinated. So, in the absence of insects, there would be no beautiful flowers for our valentine’s bouquets.

If flowers aren’t your gift of choice then there’s always chocolate. Chocolate is made from the seeds of the cacao tree. Cacao seeds are produced when the cacao flower is pollinated. This pollination is performed primarily by midges (tiny gnat-like insects) and occasionally bats. So no insects would mean no cacao seeds and no cacao seeds means no chocolate hearts to give away.

These chocolate hearts however might not be as appetizing as thought upon first glance. The United States Food and Drug Administration (USFDA) has imposed Food Defect Action Levels that specify the allowable limits for insect and rodent filth, and mold, for various food types. The Health Protection Branch of Health Canada also has guidelines for the general cleanliness of foods, which specify the allowable amounts of insects in various food products.

Defect action levels are the limit at or above which the USFDA will take legal action against the product and remove it from the market. For chocolate the defect action level is an average of 60 or more insect fragments per 100 grams when six-100 gram subsamples are examined or anyone subsample containing 90 or more insect fragments.

Insect parts in your food don’t simply stop at chocolate. All of those red and pink candies you see popping up around Valentine’s Day, well it’s possible that their colour comes from a food dye known as carmine or cochineal. This bright red dye is extracted from the guts of a tiny scale insect (Dactylopius coccus) and is used to dye everything from fruit juices to paint and make-up.
Left with no flowers or chocolate what about some intimate apparel made of silk? The silk used to make fabric is produced from the salivary glands of caterpillars of the silkworm moth (*Bombyx mori*). The caterpillars use this silk to construct cocoons; their shelter when they are in the pupal stage. It is in this stage that the insect changes from a caterpillar to an adult moth. According to Chinese records, the discovery of silk production by silkworms occurred about 2,700 B.C. The best quality silk is produced by rearing the insects and unwinding their cocoons by hand. It takes approximately 500 cocoons to make a necktie or 8,000 cocoons to produce an evening dress.

So this Valentine’s Day you could always give your sweet heart something besides chocolates, flowers or silk but it’s insects we have to thank for these most traditional gifts.

**Valentine’s Related Insects**

**Kissing bugs** – there are a number of different species of kissing bugs in North and South America, all in the genus *Triatoma*. These bugs usually bite people or pets near their mouth during the night while they sleep.

**Lovebugs (*Plecia nearctica*)** – these small black flies with red thoraxes are members of the family Bibionidae. During and after mating, adult pairs remain coupled, even in flight, for up to several days.

**References**

Anonymous. 2012. *Insects and Food*. University of Guelph Food Science Department Food Safety Network. [www.uoguelph.ca/foodsafetynetwork/insects-and-food](http://www.uoguelph.ca/foodsafetynetwork/insects-and-food)


United States Food and Drug Administration. 2011. *Defect Levels Handbook The Food Defect Action Levels:* Levels of natural or unavoidable defects in foods that present no health hazards for humans. [www.fda.gov/food/guidancecomplianceandregulatoryinformation/guidancedocuments/sanitation/ucm056174.htm#CHPT3](http://www.fda.gov/food/guidancecomplianceandregulatoryinformation/guidancedocuments/sanitation/ucm056174.htm#CHPT3)
Rants from the Bug Box Part II

Jeff Ogden

In the past I have been often asked what is the importance of maintaining the Insectary Reference Collection. I have heard that it just takes up space and no one looks at it besides me . . . well, this isn’t actually the case.

Initially the reference collection was used for just that, reference. When an inquiry was received and couldn’t be readily identified, the insect could be compared to the pinned identified specimens to find the answer. The collection began in the mid 1980’s and was based primarily on the specimens retained from the province-wide light trap survey, a system initiated by the now defunct Forest Insect and Disease Survey (FIDS). When I started with the Department in 1993 the collection consisted of 23,000 specimens and comprised, not surprisingly, primarily of nocturnal moths. Through various biodiversity studies and by retaining more specimens from other forest pest surveys, such as those based on the results of flight intercept traps, the current collection stands at approximately 70,000 specimens and is one of the fastest growing entomological collections in the province.

During that time there have also been several valuable relationships formed with other research institutions, museums and scientist, each contributing to the value of the collection with much needed identifications as well as literature sources for future work. Individuals such as Tracy Lenfesty of DNR Library services in Halifax have been invaluable with regards to locating obscure identification keys and older journal articles. Several local experts such as Paul Brunnelle (Odonata), Cory Sheffield (Hymenoptera) and Christopher Majka (Coleoptera) have contributed greatly as well to the identification of certain groups, adding to knowledge of not only the reference collection but the over all knowledge of provincial fauna in the process. From this work has come numerous peer-reviewed articles on groups such as Orthoptera, Hymenoptera, Coleoptera, Plecoptera and Lepidoptera, more than 90 in total (primarily authored by C. Majka ), referring directly to specimens held within the NS DNR Reference Collection. There have also been close to a dozen papers authored or co-authored by myself and other Forest Health staff relating to this collection’s holdings.

So who looks at the collection . . . obviously not just myself. It holds as wealth of knowledge with regards to the distribution and biodiversity of the insect species of this province, many found no where else in the province. Continued support of this collection is essential to continue the work previously started not only by my predecessors and myself but for future Forest Health staff as well.
It was how cold?

Tanya Borgal

Table 1. NS DEPT. OF TRANSPORTATION AND INFRASTRUCTURE RENEWAL WEATHER STATION DATA. COLDEST RECORDED TEMPERATURES (°C) FOR WINTER 2003/04 TO WINTER 2011/12.

<table>
<thead>
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<th>Location</th>
<th>Winter 03/04</th>
<th>Winter 04/05</th>
<th>Winter 05/06</th>
<th>Winter 06/07</th>
<th>Winter 07/08</th>
<th>Winter 08/09</th>
<th>Winter 09/10</th>
<th>Winter 10/11</th>
<th>Winter 11/12</th>
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<td>-14</td>
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<td>-15</td>
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<tr>
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<td>-17</td>
<td>-18</td>
<td>-19</td>
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<td>-31</td>
<td>-34</td>
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<td>-27</td>
</tr>
</tbody>
</table>

** n/a indicates that data was not available from this tower because it was a newly established tower.

The weather has been a topic of discussion quite a bit this season. Discussions on the weather could be heard amongst strangers in the grocery store, considered at the beginning of the day when deciding how to prepare (umbrella versus scarf and mitts), or here at forest health thinking about temperature as the limiting factor for overwintering forest pests (e.g., balsam woolly adelgid).

Weather is an important factor for many things. When considering the balsam woolly adelgid, temperatures below -20 degrees Celsius are detrimental to the population, decreasing the amount of surviving overwintering nymphs, but beneficial for example to Christmas tree growers. This winter overall did not show record-breaking cold temperatures (Table 1) which is good or bad, depending on where you stand.
Balsam Fir Sawfly
Donald Kiezer

In response to inquiries from forestry stakeholders and in conjunction with annual field surveys Forest Health conducted aerial surveys for Balsam Fir Sawfly province-wide. As a result, no defoliation was positively identified.

Forest Health also sampled for egg niches more than 123 points. Of these points 29 had a predicted level of high defoliation, 11 a moderate level, 32 a low level and 51 with zero.

Fig. 8  Balsam fir sawfly overwintering egg survey results, 2011.
The information on this map may have come from a variety of government and non-government sources and is subject to change without notice. The NS Dept. of Natural Resources accepts no liability for errors, deficiencies, or faults on this map.

Fig. 9  Balsam fir sawfly overwintering egg survey results, Eastern Region, 2011.
The information on this map may have come from a variety of government and non-government sources and is subject to change without notice. The NS Dept. of Natural Resources accepts no liability for errors, deficiencies, or faults on this map.
**Project Updates (contd.)**

**Hemlock Looper**
Tanya Borgal

**Pheromone Traps**

For the 2011 field season, we placed a total of 150 pheromone traps across the province. The highest moth catches per trap occurred at one point in Inverness County (Figure 9). There were also moderate catches in Inverness and Victoria County. Majority of the province showed low population levels of Hemlock Looper.

![Fig. 10  Hemlock looper pheromone trap results, 2011.](image1)
The information on this map may have come from a variety of government and non-government sources and is subject to change without notice. The NS Dept. of Natural Resources accepts no liability for errors, deficiencies, or faults on this map.

**Overwintering Egg Survey**

For the 2011 field season, branch samples were taken at 46 sample points mainly in Victoria and Inverness Counties. These branches were taken back to the lab and processed for detection of Hemlock Looper overwintering eggs. There were 13 positive sites that showed low populations of overwintering eggs (Figure 10).

![Fig. 11  Hemlock looper overwintering egg survey, 2011.](image2)
The information on this map may have come from a variety of government and non-government sources and is subject to change without notice. The NS Dept. of Natural Resources accepts no liability for errors, deficiencies, or faults on this map.
Jack Pine Budworm
Mike LeBlanc

JPBW Traps

Thirty traps were placed in the western region during June in 2011 and were picked up in late fall; 4 of these were found on the ground and 2 were missing. 12 Traps contained 0 moths; 4 traps contained 1 moth; 5 traps contained 2 moths; 1 trap contained 3 moths; 1 trap contained 4 moths; and 1 trap contained 11 moths.

Fig. 12  Jack pine budworm pheromone trap survey results, 2011.
The information on this map may have come from a variety of government and non-government sources and is subject to change without notice. The NS Dept. of Natural Resources accepts no liability for errors, deficiencies, or faults on this map.

JPBW Overwintering Larvae Survey

Five L-2 washes were done and 0 larvae were found.

It should also be noted that no defoliation was observed in white pine during the Aerial Overview Survey.

Fig. 13  Jack pine budworm overwintering L-2 survey results, 2011.
The information on this map may have come from a variety of government and non-government sources and is subject to change without notice. The NS Dept. of Natural Resources accepts no liability for errors, deficiencies, or faults on this map.
Whitemarked Tussock Moth  
Tanya Borgal

Thanks to the joint efforts between Pest Detection Officers within the Districts and Forest Health staff, there was information collected at 343 points across the province for the 2011 field season. From these sample points there were 37 positive finds for WMTM egg masses for a total of 84 egg masses found. Compared to the results from last year, there is low defoliation predicted for WMTM in Lunenburg, Guysborough, Richmond, and Cape Breton Counties. No new egg masses were found in Cumberland or Shelburne County.

Spruce Budworm  
Donald Kiezer

Forest Health continued monitoring of spruce budworm population with 52 points sampled. The results of the L2 washes showed no positive points.
The teacher was warning the class about the dangers of going to in cold weather improperly dressed.

"There was one a boy," he said, "who was so eager to go out and play with his sled that he didn't put a coat or scarf on. He caught a chill, the chill led to pneumonia, and he was sick for two weeks!"

The teacher paused to allow the moral of this story to sink in, when a small voice asked, "What happened to the sled?"

Phil and Will built a skating rink in the middle of a pasture.
One day a shepherd leading his flock decided to take a shortcut across the rink. The sheep, however, were afraid of the ice and wouldn't cross it. Desperate, the shepherd began tugging them to the other side.

“Look at that,” remarked Phil to Will. “That guy is trying to pull the wool over our ice!”

When Albert Einstein was making the rounds of the speaker's circuit, he usually found himself eagerly longing to get back to his laboratory work. One night as they were driving to yet another rubber-chicken dinner, Einstein mentioned to his chauffeur (a man who somewhat resembled Einstein in looks & manner) that he was tired of speechmaking.

"I have an idea, boss," his chauffeur said. "I've heard you give this speech so many times. I'll bet I could give it for you."

Einstein laughed loudly and said, "Why not? Let's do it!" When they arrive at the dinner, Einstein donned the chauffeur's cap and jacket and sat in the back of the room. The chauffeur gave a beautiful rendition of Einstein's speech and even answered a few questions expertly.

Then a supremely pompous professor asked an extremely esoteric question about anti-matter formation, digressing here and there to let everyone in the audience know that he was nobody's fool. Without missing a beat, the chauffeur fixed the professor with a steely stare and said, "Sir, the answer to that question is so simple that I will let my chauffeur, who is sitting in the back, answer it for me."

When the mother returned from the grocery store, her small son pulled out the box of animal crackers he had begged for. Then he spread the animal-shaped crackers all over the kitchen counter.

"What are you doing?" his mom asked. "The box says you can't eat them if the seal is broken," the boy explained. "I'm looking for the seal."