Ontario Forest Health Monitoring

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Ontario Forest Health Program

- Federal Forest health surveys in Ontario (1934)
- 1998 OMNR developed partnership agreement to continue surveys
Current Program

- 10 Provincial Forest Health Techs to implement field program
- Insects, Disease, Abiotics
- Invasive species surveys
- Partner on research projects – Canadian Forest Service, Canadian Food Inspection Agency
- Academics - Universities
- Other Government agencies
• Detection of major forest disturbances through Aerial Surveys
• Delimitation - Ground Proofing
• Quantifying - Collections and Observations sent to lab for confirmation
• Reporting - local updates, internal and external reports, forest health conditions report, outreach
Aerial Surveys
Sketch Mapping
Digital Mapping Technology
Ground truthing
Overview Forest Tent Caterpillar

- Life Cycle
- History
- Monitoring methods
- Natural Controls
- Management options
Larva emerge at bud break and feed for 5-6 weeks, growing to 50 mm long.
Larvae congregate during rest or moulting
Hosts – Sugar Maple, Poplar, Birch, Oak, Ash, Elm, Beech, Basswood
Cocoons and pupae
Larvae spin cocoons between leaves
Cocoons in Beech foliage
Moths emerge 14 days, late June to early August, mate and lay eggs.
Egg Band 100-350 per band
Ontario Forest Tent Caterpillar
Moderate to Severe Defoliation

Year

Defoliation in Hectares
0 5,000,000 10,000,000 15,000,000 20,000,000 25,000,000

Graph showing the defoliation in hectares over years.
Areas within which forest tent caterpillar caused moderate to severe defoliation in 2002

8,245,965 ha
Areas within which forest tent caterpillar caused moderate to severe defoliation in 2003

4,490,042 ha
Areas within which forest tent caterpillar caused moderate to severe defoliation in 2004

1 277 534 ha
<table>
<thead>
<tr>
<th>Midhurst District</th>
<th>2001</th>
<th>54785</th>
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<td>2008</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>2009</td>
<td>Trace occurrence</td>
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</tbody>
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Spray
Area within which Forest Tent Caterpillar caused moderate to severe defoliation in Ontario in 2007

371,494 ha
Area within which Forest Tent Caterpillar caused moderate to severe defoliation in Ontario in 2008.

42,858 ha
Area within which Forest Tent Caterpillar caused moderate to severe defoliation in Ontario in 2009.

8 912 ha
60.424 ha defoliated 2010

Areas within which forest tent caterpillar caused defoliation in Ontario in 2010

MAP 1 of 1

- Communities
- Roads
- MNR Districts

Defoliation

Moderate-to-Severe 60,424 ha

Total: 60,424 ha

Note: This map should not be relied on as a precise indicator of extent or occurrence, nor as a guide to navigation. The Ontario Ministry of Natural Resources (OMNR) shall not be liable in any way for the use of, or reliance upon, this map or any information on this map.
Effect of Defoliation on Host trees

- Vigorous trees tolerate 2-3 years heavy defoliation
- Trees on good sites, in good health ie after 2 years of adequate precipitation will fair better than trees on shallow poor soils or after drought conditions
- With severe defoliation a new second set of less dense leaves may be produced in 5 or 6 weeks, 2/3 size
- After 3 years of moderate to heavy defoliation, radial growth is reduced, requiring 2-3 years to regain pre-infestation growth
- Damage to foliage can reduce sugar content of sap and production the following spring, especially after several consecutive years’ defoliation
- Forest defoliation has profound environmental consequences, ie warming of streams, pools and forest floor
Quantifying - Egg Band Surveys

- Branch sampling to carry out egg band surveys, number of egg bands on twigs of maple or aspen (preferred hosts)
- Destructive sampling (tree removal), or more cost effective observation of egg masses using binoculars or scope
- Sunny, still days are needed
- Branch tips observed should cover the entire upper crown
- Sample with back to the sun
- Sum the cumulative number of NEW egg masses counted
Egg Band Sampling Guidelines

- Trees 15 cm in diameter and larger
  - 1-5 egg bands - Light defoliation
  - 6-9 egg bands - Moderate defoliation
  - 10+ egg bands - Heavy defoliation
Qualifiers

• When using binoculars, multiply numbers of egg masses by 4
• Edge trees may contain less egg masses than interior populations
• Levels of defoliation from previous years numbers of years of previous defoliation
• Heavy defoliation rarely occurs more than 3 years at a given site—extent of defoliation in adjacent areas – length of egg masses
• Average length of $\leq \frac{1}{4}$ inch may indicate lower defoliation than predicted
Natural Controls

- Late spring – starvation, late frosts, wet cool spring, encourages fungal growth
Parasitic Fly

• *Sarcophaga aldrichi*, friendly fly, flesh fly, adult flies deposit live maggots on FTC cocoons, then bore into pupae and feed
Friendly fly giving live birth to maggots

Caterpillars killed by naturally occurring NPV are typically found hanging in place by their midsection.
Fungus, *Furia crustosa*

Caterpillars come into contact with naturally occurring, infectious *furia* spores when they disperse over the ground. The fungus fills the body cavity, killing the caterpillar.
What can the woodlot owner do?

- Consultation with Provincial Forest Entomologist
- Taylor Scarr
- taylor.scarr@ontario.ca
- (705) 945-5723
- Local Forest Consultants
- Conservation Authorities, Counties
Spray Program

- Spray program, *Bacillus thuringiensis* (Btk), (Foray 48BA)
- Bacteria becomes toxic with digestive enzymes in gut of larvae
- Not a contact insecticide, must be ingested by insect so timing is important to reach the insect when heavy feeding is taking place
- Human friendly, our stomachs don’t have the pH to be affected
• **Valent Canada**
  130 Research Lane, Unit 6
  Guelph, ON N1G 5G3
  519.767.9262
• Regina Rieckenberg, Sales and Marketing Manager
• [http://www.valentbiosciences.com](http://www.valentbiosciences.com)
Fertilization is one means of correcting such nutrient imbalances. In practice, however, fertilizing a sugar bush is risky and results of experiments have been mixed. Negative affects usually result from using the wrong fertilizer or combination of elements, and worsening any nutrient imbalance that existed.

Fertilization should be considered only when growth is poor or vigour is low. No fertilization program should be undertaken before a foliar and/or soil analysis has been conducted.
Conclusions

• Infestations can last several years, or collapse sooner from natural causes

• There are control measures to use if necessary
The End