

# Biological control program for balsam fir sawfly

*An unprecedented outbreak of balsam fir sawfly was detected in southern New Brunswick in 2010 and is forecast to continue over a large area in 2011. As a result, the Department of Natural Resources will conduct a limited aerial biological control program against this pest on Crown forest land this summer, likely in early-to-mid July.*

*This program will be carried out using the federally registered biological agent Abietiv™.*

*Abietiv™ is produced in New Brunswick from a naturally occurring virus found in the balsam fir sawfly. With the exception of some other types of sawfly, it does not affect other living organisms and it does not harm the environment.*

*Surveys last summer revealed detectable defoliation over a sizeable area and follow-up egg surveys in the fall revealed populations that are capable of causing moderate to severe defoliation in young balsam fir trees in natural and thinned softwood stands again in 2011. Defoliation leads to reduced growth of trees and reductions in the available wood supply along with lost opportunity for revenue through stumpage and related economic impacts.*

*The following questions and answers are related to the balsam fir sawfly control program.*

*Anyone with any additional questions should contact the Department of Natural Resources at: [dnrweb@gnb.ca](mailto:dnrweb@gnb.ca) or by contacting DNR's Forest Management Branch at (506) 453-2516.*



*Female balsam fir sawfly and her cocoon and male balsam fir sawfly and his cocoon*

Photo: Natural Resources Canada

## Overview of the spray program

### **Q: Describe the area where the spray program will be conducted?**

A: The total program is about 10,000 hectares (24,710 acres) consisting of several blocks of various sizes. All blocks are located in the general vicinity of Saddleback Mountain, approximately 20 kilometres south of Sussex. These are all located on Crown forest land on Crown Timber Licence 7 (Fundy) and primarily include both natural and thinned balsam fir and mixed fir stands.

### **Q: When will this control program take place and how long will it take?**

A: The control program is expected to start in early-to-mid July, 2011, and could take about a week to complete. The precise time required to treat the blocks depends on the insect's stage of development, which is impacted by the type of summer we have, especially temperature.

The daily weather -- visibility, wind speed, precipitation, and humidity -- dictates if conditions are acceptable for spraying. Acceptable conditions generally occur only for a few hours in the early morning and/or evening.

### **Q: Does anyone live in this area?**

A: All areas covered by the DNR program are located on forested Crown land and away from any permanent human habitation.

### **Q: How will people be informed that spraying is going to take place?**

A: Advertisements will be placed in newspapers in the southern part of the province to inform the public when the treatment program is scheduled to begin and provide other relevant information. Daily updates will be placed on the DNR's web site during the program.

## Impact on the Environment and Human Health

### **Q: Who approved Abietiv™ for use in Canada?**

A: Health Canada has approved Abietiv™. Before it could be registered for use in Canada, Abietiv™ had to meet all the human health and environmental safety requirements of the federal regulatory system administered by Health Canada's Pest Management Regulatory Agency. Before use, each batch of Abietiv™ is checked by an independent laboratory to ensure it is free from contamination.

### **Q: What are the known effects of Abietiv™ on humans and other living organisms?**

A. Abietiv™ is based on a naturally occurring virus that only affects the balsam fir sawfly and a few related sawflies. It does not affect humans, other animals, birds, bees, other insects, fish or aquatic organisms, or plants. Organisms other than the sawfly are not affected because they do not have the sawfly-specific physiology that the virus requires to grow.

### **Q: Will it be safe to eat berries, fish or game harvested from the treated areas?**

A: This is a naturally occurring virus that is already present in the environment and has no impact on humans, vertebrates or plants. Therefore, it is safe to eat fish, game animals or berries from treated areas.

### **Q: Will there be any water and/or soil testing conducted before and after the spray program is carried out?**

A. The virus occurs naturally in the environment so there are no plans to sample for the virus in water or the soil as it is almost certainly already present.

### **Q: Will there be any restrictions on accessing these Crown woods while spraying is taking place?**

A. This is unlikely but any restrictions will be advertised well in advance in the general area where the aerial control program is to take place.

## About Abietiv™

### Q: I'd like to know more about the properties of Abietiv™?

A. *Abietiv™* is the registered trade name for the biological agent based on a naturally occurring virus specific to the balsam fir sawfly. The virus belongs to the Baculovirus group and is a **nucleopolyhedrovirus** also known as NeabNPV. The virus has no contact toxicity properties and has to be ingested by the balsam fir sawfly larvae to be effective. Once eaten by a larva, it causes a disease within the insect by invading the cells of the insect's stomach where conditions permit the virus to grow. The disease develops by infecting more and more of the insect's cells. Infected cells containing the virus can be sloughed off and excreted and the dead larvae gradually decompose. This contaminates more balsam fir needles with the virus and these needles can be eaten by other sawfly larvae, which then become sick and die. In the environment, the virus is inactivated by sunlight.

### Q: Has Abietiv™ been used previously in New Brunswick?

A. *Abietiv™* has not been used in New Brunswick in the past. This is the first time the sawfly's population has reached this level of infestation in the province.

### Q: Where has it been used in Canada and for how long?

A. The virus was gradually developed in the late 1990s and was used experimentally in western Newfoundland from 2000 to 2005 before being registered as *Abietiv™* in 2006. It was subsequently used operationally from 2006 to 2009 by the Government of Newfoundland and Labrador to treat balsam fir sawfly infested areas in that province.

### Q: Is it true this biological agent was developed here in New Brunswick?

A. The developmental work for the registration of *Abietiv™* was primarily done by researchers with the Canadian Forest Service at the Atlantic Forestry Centre in Fredericton. It took about 10 years of research and development and about \$5 million of investment to bring this biological control agent to registration. *Abietiv™* is produced in Fredericton by Sylvar Technologies Inc.



Photo: Natural Resources Canada

*Feeding balsam fir sawfly larvae*

### Q: Who will carry out the spray program?

A. Forest Protection Limited (FPL) will be engaged to carry out the aerial operations. FPL is a privately owned company whose major shareholder is the Government of New Brunswick. The company has decades of experience providing forest fire management, pest management and aerial surveys in New Brunswick. The Department of Natural Resources' Forest Pest Management Section will do the biological timing and assessment of the program.

## Alternatives to a biological control program

### Q: Have you considered other alternatives to using Abietiv™?

A. There are no other biological agents registered for aerial application against the balsam fir sawfly. Harvesting the affected area would not be a practical way to combat the infestation.

### Q: What happens if you do not spray the balsam fir sawfly?

A. There is no way to predict with certainty what will happen over the next few years. However, an egg survey conducted last fall revealed moderate to high populations of the balsam fir sawfly affecting 30,000 hectares (74,100 acres) of Crown forest land and a total area of detectable populations that covered about 182,000 hectares (450,000 acres). Whether population growth will be minor or major depends on the overall effects of natural biological

controls such as parasitoids, predators and diseases that affect the sawfly on an annual basis.

An analysis of the outbreak's potential impact on Crown forest land revealed:

- 15 to 20 per cent reduction in the average merchantable wood yield of balsam fir stands by 2017;
- 20 to 25 per cent reduction in the average merchantable wood yield of pre-commercially thinned balsam fir stands by 2017;
- maximum reduction in standing merchantable volume of 135,000 to 250,000 cubic metres;
- reductions in allowable cut from 2012 to 2036 of 100,000 to 220,000 cubic metres;
- reductions in the market value of wood harvested between 2012 and 2036 of between \$2 and \$4 million.

**Q: How much will the control program cost?**

A. The control program is expected to cost \$1 million. This will be paid by the Government of New Brunswick from existing DNR funding as all the areas selected for treatment are on Crown land.

**Q: Will any private land be sprayed and, if so, who will pay for it?**

A. Our control program will be conducted entirely on Crown land. Any private landowner wishing to conduct a control program against the balsam fir sawfly would have to obtain the necessary permits from the Department of Environment and would be responsible for all related costs.

## The longer term

**Q: How will you determine if this has been successful in controlling the balsam fir sawfly infestation?**

A. To measure the success of the program, data will be collected to compare changes in egg densities in the treated blocks against changes in untreated areas, as only a portion of the total infested area is being treated. In addition, data will be collected to compare defoliation levels in treated and untreated



Photo: Government of Newfoundland and Labrador

*Balsam fir sawfly damage*

areas. Larval samples will also be taken to compare the levels of virus infection in treated and untreated areas.

**Q: Are you looking at expanding the program beyond this area this year?**

A. Government approval for the aerial biological control program is for this area only.

**Q: Do you plan to spray the same area or other areas of the province in the future?**

A. Government approval for the aerial biological control program is for this area and this year only. Whether another treatment program will be considered in future will depend on what happens to the sawfly population in 2011 and beyond, and analysis of related information such as the size and severity of the forecast and expected impacts.

For further information on the use of Abietiv™ to control the Balsam fir sawfly, please visit the Natural Resources Canada website at:

<http://cfs-scf.nrcan-rncan.gc.ca/news/587>

or the Sylvar Technologies Inc. website at:

<http://www.sylvar.ca/content/13058>