

# Branching out

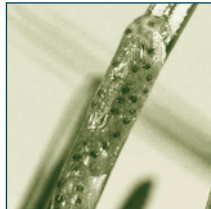
from the Canadian Forest Service ■ Laurentian Forestry Centre

Number 43  
2008

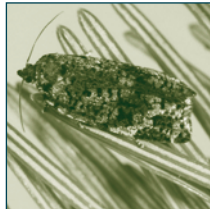
## A tool for evaluating mating disruption in SBW: CFS forges ahead!

The North Shore region of Quebec currently faces the threat of a spruce budworm (SBW) outbreak. This looming threat has catalyzed efforts by researchers with Natural Resources Canada's Canadian Forest Service (CFS) to diversify the tools available to control this insect pest and, more specifically, to test a mating cage design developed to evaluate a control strategy based on mating disruption.

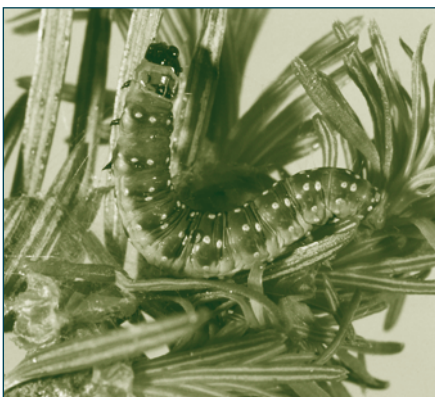
The SOPFIM<sup>1</sup> conducted mating disruption trials as part of a study carried out on new tools for controlling SBW in summer 2008 near Baie-Comeau. Mating disruption is



Egg mass.  
Photo: T. Arcand (CFS)

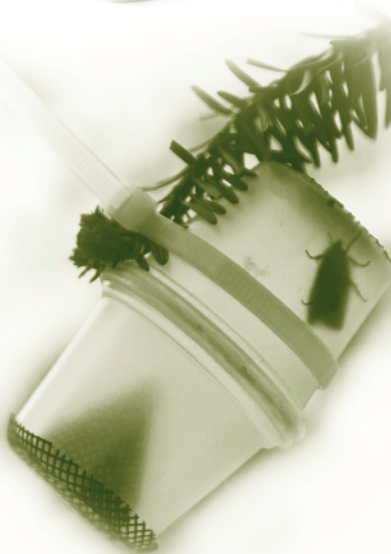


SBW adult.  
Photo: T. Arcand (CFS)



SBW larva.  
Photo: T. Arcand (CFS)

an approach that aims to prevent insect reproduction through the release of synthetic pheromones that interfere with the males' ability to locate females. Since mating disruption leads to a decrease in the larval population, the level of damage caused to trees should also be reduced<sup>2</sup>.



The cage: making and setting up.  
Photos: D. Boivin-Delisle (CFS)

**A healthy forest ■ A strong forest sector ■ Knowledge at your fingertips**

<sup>1</sup> Société de protection des forêts contre les insectes et les maladies (Quebec's forest insect and disease protection agency).

<sup>2</sup> For more information on mating disruption, see Branching Out No. 28: "Use of the mating disruption approach: protecting trees by tricking insect pests".



Natural Resources  
Canada

Ressources naturelles  
Canada

Canada

But how can we be sure that mating has been prevented? In most mating disruption studies, mating trials are carried out with cages containing males and females. However, the close proximity of the insects promotes mating, even if the surrounding environment is saturated with synthetic pheromone. The use of sentinel females tied to tree branches by means of a string affixed to their backs is a much more effective way to confirm mating disruption success in the field. However, this is a time-consuming technique and the females may fly away, especially if weather conditions are unfavourable.

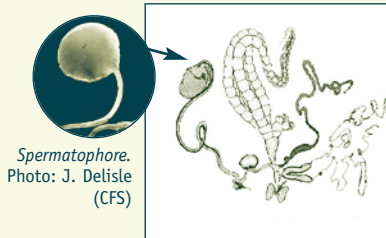


*Sentinel female.*  
Photo: J. Delisle (CFS)

To remedy this problem, CFS researchers have designed a mating cage consisting of two plastic cups glued together at the open end with non-toxic glue. One of the two cups houses the female, while the other cup permits the entry of males responding to calling females. The base of the cup housing the female

## An easy way to check for mating!

In most insect species, mating can be confirmed by the presence of a spermatophore deposited by the male during copulation. The spermatophore is a rigid structure that holds the male's ejaculate, and it remains practically intact inside the female as long as she lives. Dissecting females to check for a spermatophore is a simple and rapid technique that can be applied in the field.



*Spermatophore.*  
Photo: J. Delisle (CFS)

*Female reproductive system.*

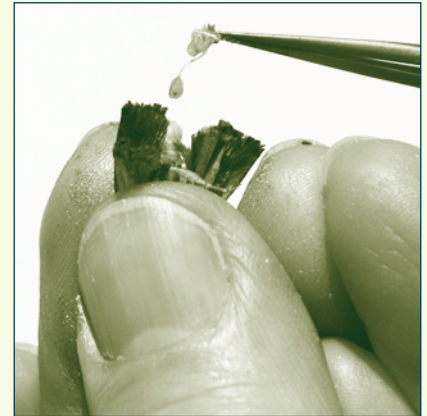


Photo: D. Boivin-Delisle (CFS)

can be removed and replaced with a screen through which the pheromone can be diffused. The other cup holds a screen cone whose tip, perforated with a few small holes, is directed toward the female (like the funnel in a lobster trap). Males, being smaller than females, can enter and leave the cone freely, but the female remains trapped.

To confirm that mating has occurred, it is necessary to dissect the caged females either on site or in the laboratory (see text box). It is also essential to check whether egg density and defoliation rates are lower at the trial sites than at the control sites, since a trial site can be invaded by mated females from other infested sites following pheromone treatment.

## FOR MORE INFORMATION, PLEASE CONTACT:

### Johanne Delisle

Natural Resources Canada  
Canadian Forest Service  
Laurentian Forestry Centre  
1055 du P.E.P.S.  
P.O. Box 10380, Stn. Sainte-Foy  
Québec, Quebec G1V 4C7  
Phone: 418-648-2526  
Fax: 418-648-5849  
E-mail: [johanne.delisle@nrca.gc.ca](mailto:johanne.delisle@nrca.gc.ca)  
Web site: [cfs.nrcan.gc.ca/regions/lfc](http://cfs.nrcan.gc.ca/regions/lfc)

