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Confusing (and Controlling) Currant Borers Pheromones Show Success in Prosser Red Currant Fields

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In the July 2000 issue of *Agrichemical and Environmental News*, I reported on the potential that pheromone-based mating disruption had for controlling currant borers on Washington red currants. Two field seasons have passed and I am pleased to say we are much closer to having mating disruption available as an effective means for managing this pest. (See *AENews* Issue No. 171, "Pheromones Researched for Red Currant Pest Control,"

<http://aenews.wsu.edu/July00AENews/July00AENews.htm#anchor550320> .)

What is CB? How is It Controlled?

The currant borer (CB) is an attractive, day-flying clearwing moth. Its larvae (less attractive than the adult by any standard) bore inside currant canes, causing progressive dieback and serious economic damage.

Washington red currant growers have historically applied multiple sprays of synthetic



Adult currant borer moth.



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pyrethroid insecticides to control adult CBs, but control was difficult and often resulted in secondary outbreaks of spider mites. Use of mating disruption, also known as mating confusion, presents a softer alternative means of control. Instead of killing existing moths or their larvae, the principle behind this method is to prevent the pest from reproducing. By saturating the atmosphere around a crop with specific pheromones for the target pest, growers confuse the male moths. Ideally, the moths are disoriented to the point where they cannot find mates, leaving the females to die without producing offspring.

Research Program 2000-2001

In summer 2000 we conducted a successful small-scale mating disruption trial in a Prosser red currant field. In 2001, with funding from the Northwest Small Fruits Research Center, we conducted a much larger trial that incorporated the entire acreage of commercial Washington red currant production. Although red currants are a high value crop, they occupy only 78 acres in the state of Washington, all of which are contained in six fields in the Prosser area.

In May 2001 we obtained CB pheromone dispensers from the Shin-Etsu company of Japan through their Pacific Northwest distributor, Pacific Biocontrol Corporation. We tied these to red currant plants and posts at a density of 200 to 275 dispensers per acre on 72 of the 78 acres. On the remaining six acres we used another type of dispenser, a high-release, low-point-source lure from ChemTica Internacional (Costa Rica). These high-rate dispensers were deployed at a rate of 24 per acre.



**Prosser red currant field,
site of mating disruption trials for currant borer.**

Measure #1: Counting Males. To monitor the impact of the pheromone dispensers on mating activity, we placed pheromone-based monitoring traps in the fields at a density of about three per ten acres. If successful mating disruption is taking place, male moths should find it difficult to locate monitoring traps, resulting in a low count.

Measure #2: Counting Larvae. At the end of the season, we measured the incidence of larvae in canes. These counts were taken after the flight period of the adult moths, during winter 2001/2002.

Research Results

Results from weekly monitoring of adult CB flight activity in the fields during 2001 were dramatic when compared to 2000 when insecticides were used (Figure 1). In Field A, an average of one CB was trapped per week May through August 2001, compared to 88 CB per week in 2000. All fields had similar low numbers of CB trapped, indicating males found it difficult to locate females.



Red currant cane cut open to expose CB larva.

Numbers of larvae found in winter canes were very low (0-0.16 larvae per cane) in four of the six fields, indicating pheromones successfully prevented CB mating and egg laying. However, in two fields, larvae were common at densities of 0.76 and 0.48 per cane. In both fields additional sampling of perimeter canes revealed an even higher incidence of larvae (~1.00 per cane). These fields were characterized by having had very high population levels of CB in 2000, compared to the other four fields. Thus, it is likely that while mating was not common within the fields (as indicated by low trap numbers), significant numbers of CB found each other outside the fields and mated. Females then returned to the fields to lay their eggs. This scenario would be consistent with the greater incidence of larvae in perimeter rows.

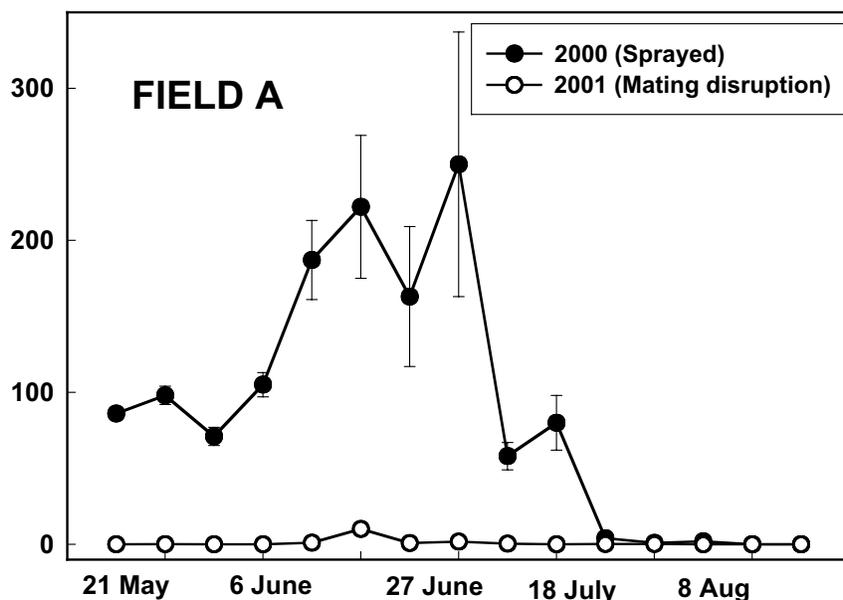


Figure 1. Weekly abundance of adult currant borers trapped in a Prosser red currant field using insecticides (2000) or pheromones (2001) for control.

Moving Ahead: Research 2002

The problems of excessively large populations of CB and of mating outside the pheromone-treated area will be addressed in our 2002 field trial program. We will increase the rate of pheromone dispenser deployment in the two problem fields and use a well-timed early season insecticide application to help bring down CB populations to a level manageable with pheromones alone. In addition we will extend the zone of pheromone activity around the fields by placing dispensers outside the fields' boundaries. It is expected that the combination of these strategies will reduce larval infestation in winter canes to the low levels seen in the other four fields.



Red currants

As I indicated in 2000, the prospects are very good for managing CB in red currants using mating disruption. This potential clearly extends beyond the Prosser acreage and beyond the bounds of Washington State. In 2001, we directed and assisted with concurrent mating disruption trials in currants in British Columbia and Oregon. Mating disruption may prove effective throughout the Northwest on this high-value crop.

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