Dogwood Borer Research

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Apples grown on dwarfing rootstocks, such as M.26 or M.9, often develop aggregations of root initials, commonly known as burrknots, on the rootstock portion of their trunks.

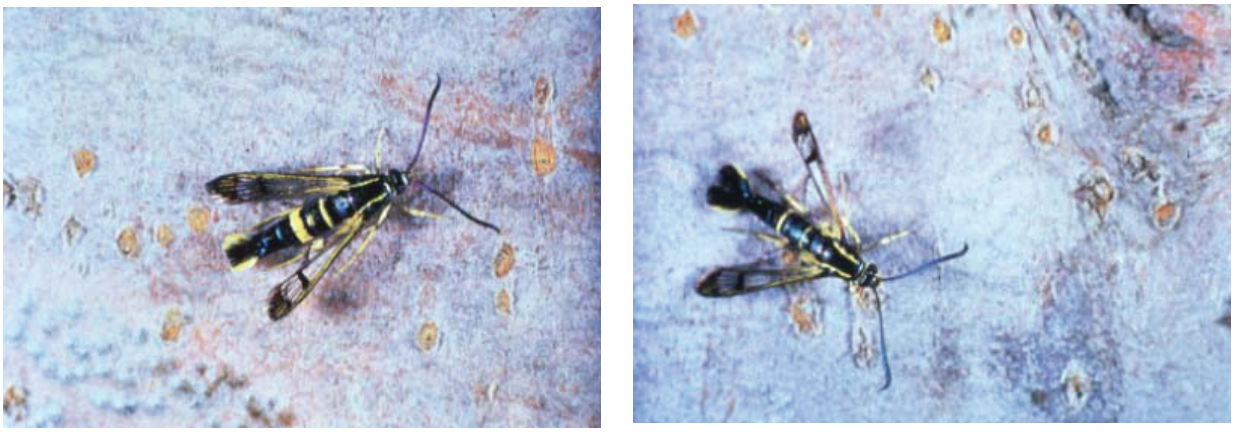
Dogwood borer females find these burrknots to be an attractive medium on which to lay their eggs, in order to provision their offspring. Burrknots apparently provide an ideal environment for dogwood borer larvae and easy entry into the trunk. The larvae feed on the root initials that make up the burrknot, but as this tissue is consumed, they may move into the bark of the trunk, where their feeding may eventually cause a decline in the vigor and thriftiness of the tree, and possibly even girdling and death.

The most common signs that borer larvae have been actively feeding on these burrknots are reddish brown frass or translucent, golden-brown, empty pupal cases. Because of the recent increase in acreage of apple trees grown on dwarfing rootstocks that are prone to the development of burrknots, we have seen an increase in dogwood borer populations.

Dogwood borer occurs throughout New York state, as well as in other states. On average, about half of the trees in an orchard on dwarfing rootstock will have burrknots and about a third of those burrknots will be actively infested by dogwood borer larvae.

One control possibility is Isomate-LPTB, which disrupts dogwood borer mating by repelling male moths rather than confusing them. Researchers discovered this phenomenon while searching for an improved dogwood borer pheromone formulation. They found that a contaminant in a blend being tested repelled male moths, and that this contaminant was a constituent of lesser peachtree borer sex pheromone. In field tests, trap capture of male dogwood borer moths was almost completely shut down; a strong indication that mating disruption had taken place. We tested this promising approach, evaluating trap capture and actual burrknot infestation in commercial orchards over the course of three growing seasons.

Results of mating disruption trials using Isomate-LPTB in 2008 and 2009 were recorded in the fall of 2010. The recent data indicate that borer infestation steadily decreased. Relatively low trap capture numbers in the check plots adjacent to treated plots in 2010 suggest that the effect may have even carried over into the untreated trees. In short, Isomate-LPTB achieved mating disruption of dogwood borer. However, because of the registrant's decision to pursue a label for Isomate-DWB for this use, we have started another



Adult dogwood borer female (left) and male (right). From: A. Seaman, H. Riedl, and J. Cummins. Dogwood Borer (http://nysipm.cornell.edu/factsheets/treefruit/pests/dwb/dwb.asp).

Dogwood borer larva. From: A. Seaman, H. Riedl, and J. Cummins. Dogwood Borer (http://nysipm.cornell.edu/factsheets/treefruit/pests/dwb/dwb.asp).

three-year trial to confirm the efficacy of the new product and examine the best way to use it.

As in the Isomate-LPTB trial, three orchards on size-controlling rootstocks were selected for this trial, all with abundant burrknots exhibiting varying levels of dogwood borer infestation. We selected younger orchards with populations that were relatively low compared with those used in the Isomate-LPTB trials, to see if beginning mating disruption early in the life of the orchard, before infestation reached high levels, would be more effective and possibly prevent infestation from occurring.

Each orchard was divided into a treated plot of 10 acres and an adjacent untreated plot of differing size. Orchards were treated at a rate of 150 Isomate-DWB dispensers per acre on May 25 and 27, before the dogwood borer flight began. Additionally, in untreated orchards, five subplots, with 10 trees in a row in each subplot, were sprayed with Lorsban 4EC at a rate of 1.5 quarts per 100 gallons as a standard treatment. Sticky traps were baited and hung in treated and untreated plots, prior to the beginning of the dogwood borer flight, and monitored weekly until Sept. 1.

Capture of male dogwood borer was substantial in the untreated plots, but completely shut down in the treated plots, indicating that mating disruption had taken place. In addition, in early fall, when larvae that will spend the winter in burrknots are actively feeding, burrknots were examined for the fresh reddish-brown larval excrement (frass). One hundred tree trunks were sampled in each treated and untreated plot. Results indicate that infestation was reduced by about 50 percent. Where infestation was highest initially, the percentage of burrknots infested in the treated plot, while reduced, was still relatively high. This supports the idea that treatment with Isomate-DWB will work best when infestation is low or moderate. However, using Isomate-LPTB, higher populations can be reduced to a manageable level by treating with the pheromone for more than one season. We would expect the same would be the case using Isomate-DWB; results from the next two seasons' trials will address this question.

From other trials that have been conducted, indications are that Isomate-DWB should work at least as well as, and maybe better than, Isomate-LPTB. Results from the first season of our trial suggest that, at this early stage, it has been comparable in efficacy to Isomate-LPTB.

We have estimated the cost of applying chlorpyrifos (Lorsban 4E) based on a plant density of 800 trees per acre, $8 per hour for labor and a price of $30 per gallon for Lorsban 4E, at approximately $25 per acre. Treatment with Isomate-DWB dispensers at a rate of 150 per acre the first season, followed by 100 per acre thereafter, using the same labor rate, costs approximately $63.60 per acre for the first season and $42.40 per acre in subsequent seasons.

Assuming that the efficacy of Isomate-DWB is equal or superior to that of Isomate-LPTB, then the ease with which pheromone dispensers are applied, the fact that no special equipment is needed and, presumably, the improved worker safety, may make the use of this product an attractive alternative for some growers.