

Chemical Control/New Products

Efficacy of MVPII Bt and Spinosad for Control of Filbert Leafroller on Hazelnuts

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This study was designed to evaluate MVPII *Bt* and Spinosad for control of filbert leafroller (*Archips rosanus*) on hazelnuts (*Corylus avellana* L.). Filbert leafroller was introduced into the U.S. over 100 years ago. In heavily infested orchards as much as 50% of the leaves may be rolled, reducing photosynthetic efficiency and reducing crop yields. Insecticide applications to control filbert leafroller have declined from nearly 60% of the acreage 20 years ago to current applications of approximately 30%. Recent work to control insect pests on hazelnuts has been directed toward softer, more environmental friendly compounds.

Methods

Within a large eight-year-old hazelnut orchard a Completely Randomized Design was established with treatments applied to alternate individual replicate trees in alternate rows. Pre-treatment leafroller counts were made during the weeks of April 12 and 19 by counting leafroller larvae on thirty branch terminals of each replicate tree. Treatments were randomly assigned within each of the eight blocks. Treatments of Spinosad (6 and 10 oz./ac.) and a standard control of Lorsban (4E and 75WG at 4 pt./ac. and 38 oz./ac., respectively) were applied to alternate blocks (4 each). There were 32 trees of untreated check, 32 trees treated with MVPII *Bt*, 16 trees treated with Spinosad at 6 oz./ac., 16 trees treated with Spinosad at 10 oz./ac., and 16 trees treated with each formulation of Lorsban.

All treatments were applied using a Rears Nifty-fifty sprayer (15 gal. tank at 40 lbs. pressure) with a hand held wand on April 23, 1999. Approximately 1 gal. of spray was used on each treated tree. Post-treatment counts were made three weeks post-treatment. One-way ANOVA (SAS) was used to analyze the data.

Lab Trials

Two-hundred-forty filbert leafroller larvae were collected in the field and brought into the laboratory. Individual larva were placed on a treated single leaf in 100 x 25 mm Petri dishes lined with a moistened Whatman #1 90 mm filter paper. Treatments were applied by dipping each leaf in an insecticidal solution and placing a single larva on each leaf. All Petri dishes were sealed with Parafilm to prevent desiccation. Forty larvae (4 replicates of ten each) were exposed to each treatment of an untreated control, MVPII *Bt* at 2 qt./ac., Spinosad at 6 oz./ac., Spinosad at 10 oz./ac., Lorsban 4E.

Results

Field Trial Results

Pre-treatment counts show an average of 8-15 filbert leafroller larvae on each replicate tree (Fig. 1).

Three weeks post-treatment *Bt* reduced leafroller infestations by 50%. Both levels of Spinosad and both formulations of Lorsban (standard) had mortality levels near 100% (Fig. 2).

Multiple comparison of the means (Tukey-Kramer Honest Significant Difference) show that the control and *Bt* treatment means are significantly different from the Spinosad and Lorsban treatments (means over the line are not significantly different).

| | | | | | |
|-------|-----------|-------------------------|--------------------------|------------|--------------|
| Check | <i>Bt</i> | Spinosad (6 oz./ac.) | Spinosad (10 oz./ac.) | Lorsban 4E | Lorsban 75WG |
| 7.93 | 3.93 | 0.062 | 0.000 | 0.000 | 0.062 |

Lab Trial Results

Results of the filbert leafroller lab trials. Slight mortality occurred in the control group, >75% mortality in the *Bt* group, and nearly 100% mortality in the Spinosad and Lorsban treatment groups (Fig. 3).

| | | | | | |
|-------|-----------|-------------------------|--------------------------|------------|--------------|
| Check | <i>Bt</i> | Spinosad (6 oz./ac.) | Spinosad (10 oz./ac.) | Lorsban 4E | Lorsban 75WG |
| 9.75 | 2.00 | 0.50 | 0.00 | 0.00 | 0.00 |

Discussion

Initial trials of the two biological insecticides *Bt* (DowAgro MVPII) and Spinosad show very promising results. Each indicates significant reduction of filbert leafroller (*Archips rosanus*) populations in the field and in the laboratory. *Bt* treatment reduced leafroller populations by 50% in the field and by 75% in the laboratory. Although not as effective as the chemical insecticides currently in use, the reduced environmental impact of this historically safer insecticide has high merit for filbert leafroller control.

Each of the Spinosad applications (6 and 10 oz./ac.) reduced leafroller populations to levels comparable to those of the currently used chemical insecticide Lorsban.

Application of insecticides in this study were made early in the season on first and second instar larvae. Insecticide application was timed to reach the leafroller larvae when they were most vulnerable, before the initiation of leaf rolling. This factor may have increased the efficacy of the insecticides in the trials.

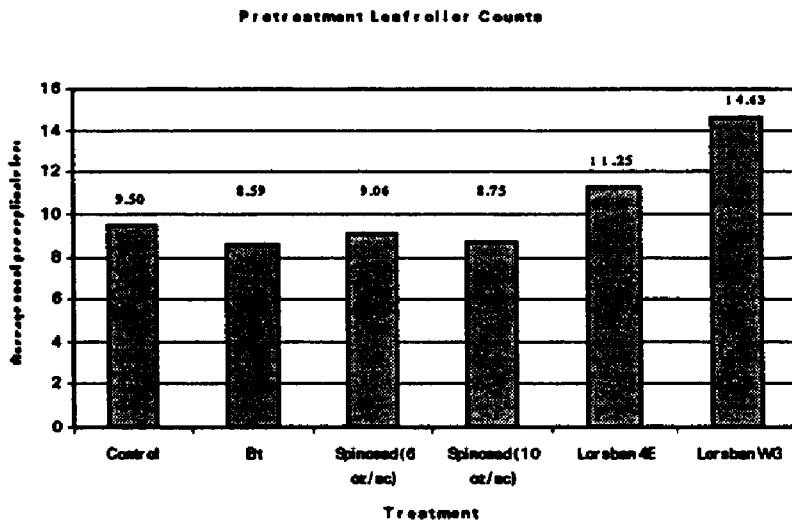


Fig. 1.

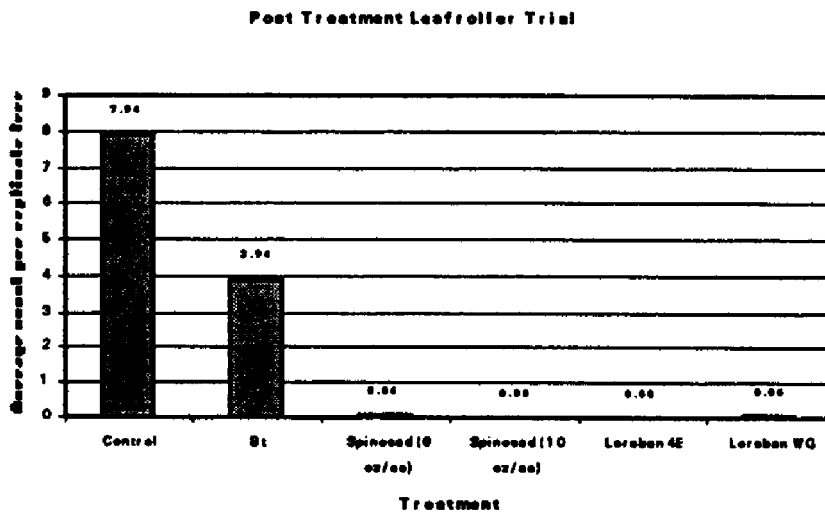


Fig. 2.

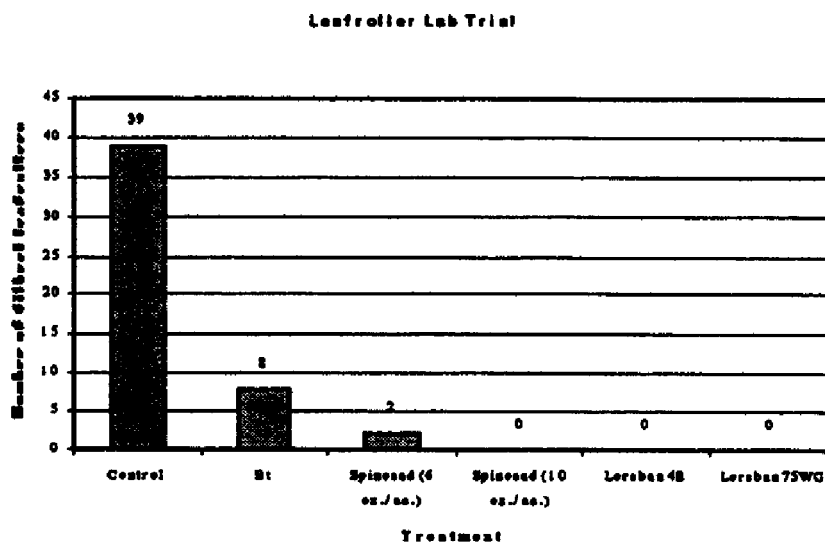


Fig. 3.