Section V.
Soil Arthropods

TIMING OF LORSBAN APPLICATION FOR OPTIMUM CONTROL OF MINT ROOT BORER CONTROL IN EASTERN OREGON

Bryon Quebbeman
Quebbeman's Crop Monitoring
2808 N. Fir Street
La Grande, OR 97850
541-963-7714
bryonq@eoni.com

INTRODUCTION

The mint root borer (MRB), *Fumibotys fumalis*, is a serious pest in Northwest mint production areas. In the last several years, MRB infestation levels have been consistently high in the La Grande, Oregon area. Lorsban is the standard treatment for MRB control, and it has become important to obtain maximum control to reduce levels below the treatment threshold. It would be prudent to determine if better timing of Lorsban could maximize the level of control.

MATERIALS AND METHODS

Two sites, approximately nine miles apart, were located in production peppermint fields near LaGrande, Oregon. At each site, a randomized block design with nine replications was set up on four separate treatment dates. Experimental plots were 12'x 15'sections of the peppermint field with a natural infestation of MRB larvae. On each treatment date, Lorsban 4E at 2 lb ai/a was compared to a water-only control.
Treatments were applied with a CO_2 backpack sprayer (20 GPA at 35 psi) to pre-irrigated plots. The plots were then immediately irrigated with approximately one inch of water using garden sprinklers fed by a water tank via a pump.

The first of the Lorsban treatments was applied as soon after harvest as possible. The four application dates were August 24, September 6, September 20, and October 2. Because the 2004 harvest was delayed by rain, August 24 was the earliest possible treatment date. In a typical year, harvest starts around August 10, making it possible to start treating fields with Lorsban by mid-August. Evaluation of each experiment occurred approximately two weeks after the treatment date. Four 1 ft^2 soil samples were taken in each plot and the soil shaken off the mint rhizomes and sifted through a 0.125" screen. The rhizomes were placed in Berlese funnels until dry and the total number of MRB larvae (combined data from soil sifting and Berlese funnel extraction) was recorded.

Twenty-two MRB larvae from each treatment date were collected and preserved in 70% ethanol. Head capsule widths, measured with a microscope micrometer, were averaged to give an approximation of MRB larval development on each of the four treatment dates.

RESULTS AND DISCUSSION

For the first two treatment dates, MRB control exceeded 80% at both sites compared to the control. At site 1, percent control with Lorsban was 83% and 90% for the first and second treatment dates, respectively (Table 1). The increase in percent control between the first and second treatment dates can be interpreted in different ways. The increase is perhaps coincidental due to the uneven spatial distribution of MRB larvae. Alternatively, MRB control may have improved slightly by a two week delay in the Lorsban application. Unfortunately, data for the last two treatment dates at site 1 is unavailable because the plot area was accidentally oversprayed with Lorsban.

Mean head capsule widths of MRB larvae collected at sites 1 and 2 increased from August 24 to September 20 (Table 2). For the first two collection dates, mean head capsule width at site 1 was smaller than that at site 2, suggesting that MRB larvae were behind in development at the first site. Field observations confirm that MRB development was lagging at site 1. On September 20, mean head capsule widths were the same at both sites; however, there was a difference in the percentage of the population that had formed hibernacula.

Hibernacula are cocoon-like structures in which the MRB overwinters as a prepupa. Once hibernacula form, the MRB has entered a resistant stage and is not affected by Lorsban. Therefore, variability in MRB development within the same growing district is an important consideration in properly timing Lorsban applications. Hibernacula were not found on any of the collection dates at site 1 whereas hibernacula were present at site 2 on September 20. The missing data for site 1 on October 2 was unfortunate in that we would have expected hibernacula to have formed by that date. Nevertheless, the presence of hibernacula at site 2 and their absence at site 1 on September 20 is another indicator that MRB development was accelerated at the second site.

At site 2, good MRB control (~89%) was achieved for the first and second treatment dates; however, percent control decreased to 71.9% and 28.5% on the third and fourth treatment dates, respectively (Table 1). The drop in control is correlated to the presence of MRB hibernacula. Between September 20 and October 2, the portion of the population comprised of hibernacula increased from 18% to 64%. Lorsban applied on these dates were apparently too late in controlling MRB that had already entered the overwintering stage and failed to reduce MRB numbers below the treatment threshold of 2-3 per ft^2.

Table 1
Percent control of mint root borer in field plots treated with Lorsban 4E on four application dates.

Treatment date	Site 1			Site 2		
	Mean number of live MRB per ft^2		Mean % MRB control	Mean number of live MRB per ft^2		Mean % MRB control
	UTC	Lorsban		UTC	Lorsban	
Aug, 24	2.9	0.5	83%	8.4	0.9	89.2%
Sept. 6	4.2	0.4	90%	8.6	1.1	89.6%
Sept 20	---	---	---	8.9	2.5	71.9%
Oct. 2	---	---	---	11.1	7.9	28.5%

Table 2
Mean head capsule widths of MRB larvae and percent hibernacula formation on five sample dates.

	Site 1		Site 2	
Sample Date	Mean head capsule width (mm)	Percent of MRB in Hibernaculum	Mean head capsule width (mm)	Percent of MRB in Hibernaculum
Aug 24	0.73	0%	0.94	0%
Sep 6	0.93	0%	1.15	0%
Sep 20	1.35	0%	1.35	18%
Oct 2	---	---	1.40	64%
Oct 16	---	---	1.43	96%

CONCLUSION

Lorsban applications need to be properly timed for maximum MRB control. Results from this study indicate that optimum timing of Lorsban occurred between late August and mid-September 2004. Because field-to-field variability in MRB development was observed, treatment recommendations should be customized to a certain degree for each field.

This study demonstrates reduction in MRB control when Lorsban is applied too late; however, it was not clear whether control is also compromised if Lorsban is applied too early.