

Secton V.
Soil Arthropods

Efficacy of Altacor® 35 WDG, (chlorantraniliprole) for Control of Mint Root Borer Larvae
(*Fumibotys fumalis*) in Furrow Irrigated Peppermint located in Idaho

Bryon Quebbeman and Chris Quebbeman
Quebbeman's Crop Monitoring
2808 N. Fir St. La Grande, OR 97850
541-975-9338
bryonq@eoni.com

ABSTRACT

In the furrow irrigated mint experiments the Lorsban application appeared to control some of the mint Root borer larvae but did not lower the levels below the treatment threshold. Mid to late August, broadcast applications of 4 oz/ac Altacor 35 WDG® were highly effective when rain of over 0.25 inch washed the Altacor in to the soil in late August. Early September applications of 4oz/ac Altacor 35 WDG were only partly effective in controlling the Mint Root borer larvae. The treatments that knifed 4oz/ac Altacor35 WDG into the soil in mid to late August, after the first irrigation, were not effective in controlling the Mint Root borer larvae.

OBJECTIVE: Control of mint root borer larvae in furrow irrigated mint
Using Altacor® 35WDG and Lorsban

MATERIALS AND METHODS

Two nearly identical experiments were conducted for this first objective. Both were located in harvested, 2nd year, furrow irrigated, production peppermint fields infested with natural populations of MRB larvae. The first experiment was located in the Nampa area, and the second was located in the Wilder area. All experimental plots were 12 ft by 20 ft, arranged in a randomized block design, with six replications. Evaluations were made by taking six, 0.75-ft² soil / rhizome samples in each plot. The samples were taken to the depth of the rhizomes which averaged four inches deep. Samples were taken in narrow strips that went across the full width of the row. The row width for both experiments was 30 inches.

The soil was shaken off the mint rhizomes and sifted though a 0.25" screen while the rhizomes were placed in Berlese funnels until dry. The number of MRB larvae recovered from soil sifting was combined with that from Berlese funnel extraction and recorded. Both fields that these experiments were placed in were swathed approximately August 9, 2007.

In experiment one the grower corrugated the field after harvest but before the first post-harvest irrigation. This corrugation cleaned out the furrows or small ditches that irrigate the mint, using small shovels attached to a three point hitch tool bar. This implement scraped the soil out of the

furrows and scattered it onto the rows containing the mint plants. Experiment two was not corrugated after harvest by the grower, but for treatment three only; corrugation was done by hand shoveling the soil out of the furrow and scattering it on the rows in the plot area.

Experiment 1

The following post-harvest treatments were applied: (1) untreated check, (2) Lorsban 4E 2 qt/ac (2 lb ai/ac) broadcast applied before corrugating and irrigating for the first time after harvest, (3) Altacor 35 WDG broadcast applied at 4 oz/ac (0.087 lb ai/a) before corrugating and irrigating for the first time after harvest, (4) Altacor 35 WDG at 4 oz/ac (0.087 lb ai/ac) broadcast applied after corrugating and irrigating for the first time, (5) Altacor 35 WDG 4 oz/ac knifed in each side of the row, after the first irrigation. (6) Altacor 35 WDG 4 oz/ac knifed in the center of the furrow after the first irrigation, (7) Altacor 35 WDG 4 oz/ac broadcast applied with 4 qt. /ac crop oil (Herbimax) at a later date than all the other treatments (see table one for timeline of events). Treatments two three, four and seven were broadcast applied with a CO² powered backpack sprayer. A four nozzle boom was used with 80003XR flat fan nozzles at 15 PSI in 20 GPA water. Treatments two and three were applied on August 11, before the field was corrugated and furrow irrigated. Treatments four five, and six, were applied after the field had been irrigated at least once. Treatment four was applied on August 23 and treatments five and six were applied on August 25. Treatments five and six were applied by knifing 4 oz/ac of Altacor into the soil 3 to 4 inches deep with the knife cuts being placed approximately 4.5 inches on each side of the center of the furrow giving a spacing of 21 inches between the knife cuts in the row, The Altacor was mixed with water and pressurized with CO² gas. For treatment five the Altacor was knifed in with 55 gallons of water per acre, and for treatment six the Altacor was knifed in with 22.2 gallons of water per acre. The injection was done with a knife that had a spray nozzle attached to the end. The knife was placed behind a straight coulter with the knife and coulter being mounted on a four wheel cart that was pushed by hand. The coulter cut the soil and stubble and allowed the injector knife to pass through the soil with minimal soil disturbance. Treatment seven was broadcast applied September 5. All treatments had the water acidified to a pH of approximately 5.5. No other surfactant or adjuvant was added to treatments two through six. Treatment seven had 4 qt/ac of crop oil added to it in an attempt to get the Altacor to be taken up by the mint foliage.

On August 31 it rained approximately 0.25 to 0.5 inch. This rain apparently washed the Altacor into the soil from treatments two and three. On September 24 it rained over 1 inch and this second rain apparently washed treatment seven into the soil. It rained again on October 19 approximately 0.3 inch.

Experiment 2

The same post-harvest treatments were made in experiment two as in experiment one. The field containing this experiment did not have the furrows corrugated (cleaned out) after harvest however, for treatment number three only, corrugation was done by hand. This

corrugation was accomplished by shoveling soil out of the furrow, by hand, and scattering it on the row. The attempt was to simulate the corrugation that was done in experiment one.

RESULTS AND DISCUSSION

Experiment 1

Treatment two (2 qt/ac Lorsban) which was applied to dry soil and then had the furrows corrugated and irrigated within two days, slightly lowered the MRB levels but not significantly compared to the untreated check (table 1). The two early broadcast applications of Altacor (treatments three and four) provided nearly complete control of the MRB larvae and were very significant compared to the untreated check.

Treatment number seven (Sept. 5 application of 4 oz/ac Altacor) lowered the MRB level but did not significantly reduce it compared to the untreated check. Treatment seven was applied on September 5 when the MRB larvae should have been active, but the Altacor was not washed into the soil until September 24. Even after the Altacor was washed into the soil it had to be taken up by the plants. At this time of the year the plants were growing slower and may have taken up the Altacor at a slower rate. In addition, by September 24, some of the MRB could have stopped feeding and started to form a hibernaculum.

Treatment five was not significantly lower than the untreated check and the MRB levels were significantly higher than the untreated check for treatment six. This unusual result could be caused by variation in the MRB population.

Knifing the Altacor into the soil was clearly not effective in controlling the MRB larvae.

No phytotoxicity was observed on the mint plants at anytime from any treatment.

Table 1 Experiment one

Results of field efficacy trials for mint root borer larvae control in furrow irrigated mint with Altacor® 35 WDG and Lorsban (Evaluated October 19, 2007)

Treatment number	Treatments	Rate (lb ai/a)	Application time	Mean number live mint root borers per ft ² .*
1	UTC			2.1 c
2	Lorsban	2.0	8/11	1.8 bc
3	Broadcast application of Altacor / corrugate	0.087	8/11	0.1 a
4	Broadcast Altacor	0.087	8/23	0.1a
5	Knife in Altacor on sides of row	0.087	8/25	2.4 c
6	Knife in Altacor in furrow	0.087	8/25	5.8 d
7	Broadcast Altacor	0.087	9/5	1.4 abc

Experiment 1: LSD = 1.31, p<0.05

* Includes live mint root borer larvae found in the rhizomes, soil and hibernaculum.

Experiment 2

Applying 2 qt/ac Lorsban to dry soil after the first irrigation did significantly reduce the MRB larvae levels compared to the untreated check; however it did not lower the levels below the treatment threshold of 1 per. ft² (table 2) All three of the treatments of broadcast applied 4 oz/ac Altacor significantly lowered the MRB larvae level below the untreated check level but only one of the treatments lowered the MRB larvae level below the treatment threshold of one MRB larvae per sq. ft. Treatment number three had the Altacor broadcast applied and then hand corrugated immediately. Treatment number four was applied in the same way and on the same day but did not have the soil scattered onto the row. Although the treatment that had the hand corrugation provided the most control of the MRB larvae, all of the broadcast applications of Altacor had statistically similar results. The late broadcast application of Altacor (September 5 application) did not lower the MRB larvae level below the treatment threshold but this may be due to the late application date, and a later rain event, as explained in experiment one. The two treatments that had the Altacor knifed into the soil did not provide significantly more control of the MRB larvae than the untreated check. No phytotoxicity was observed on the mint plants at anytime from any treatment.

Table 2. Experiment two

Results of field efficacy trials for mint root borer larvae control in furrow irrigated mint with Altacor® 35 WDG and Lorsban. (Evaluated October 24, 2007)

Treatment number	Treatments	Rate (lb ai/a)	Application time	Mean number live mint root borers per ft ² .*
1	UTC			4.2 c
2	Lorsban	2.0	8/21	2.8 b
3	Broadcast application of Altacor / corrugate	0.087	8/21	0.7 a
4	Broadcast Altacor	0.087	8/21	1.4 a
5	Knife in Altacor on sides of row	0.087	8/21	3.0 c
6	Knife in Altacor in furrow	0.087	8/21	4.4 c
7	Broadcast Altacor	0.087	9/5	1.3 a

Experiment 2, LSD = 1.12, p<0.05

* Includes live mint root borer larvae found in the rhizomes, soil and hibernaculum.