Section V.
Soil Arthropods

Efficacy of Altacor® 35 WDG, (chlorantraniliprole) for Control of Mint Root Borer Larvae (*Fumibotys fumalis*) in Sprinkle Irrigated Peppermint at Different Rates and on Different Soil Types, located in Idaho

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OBJECTIVE 2: Efficacy of Altacor in controlling mint root bore larvae when sprayed on and overhead irrigated in later, on different soil types, and at four rates.

INTRODUCTION

Lorsban (chlorpyrifos) is the only chemical insecticide that is registered for control of mint root borer larvae. Lorsban can be effective only if it is chemigated however, sometimes Lorsban appears ineffective. It is assumed that one problem with chemigating Lorsban is that the sprinklers do not deliver the Lorsban evenly on the field, or that wind effects the distribution of the Lorsban. If an effective insecticide could be applied uniformly with a ground applicator and then later watered in, control could possibly be more consistent. Studies done in 2004 and 2005 in the La Grande Oregon area, found that the new DuPont Crop Protection insecticide, registered with the name of, Altacor® 35 WDG (chlorantraniliprole), formerly known as DPX-E2Y45, controlled MRB as well as Lorsban when applied by chemigation.
In 2006 Altacor® 35 WDG was tested for MRB control in Idaho, in sprinkle and furrow irrigated mint. Altacor® was applied with a sprayer, at the rate of 4 oz/ac, on dry soil. Later the Altacor was incorporated into the soil with overhead irrigation or rain. All experiments done in 2006 showed Altacor controlled most of the MRB larvae even when it was incorporated by rain thirteen days after being broadcast applied.

It has been speculated that when Altacor is applied to dry soil that the soil type could affect the efficacy of Altacor in controlling the MRB larvae. This trial in 2007 was designed to test Altacor on two different soil types as well as test it at a range of rates.
The Altacor rates varied from a high rate of 4 oz/a (0.12 lb ai/ac) to a low rate of 1 oz/a (0.03 lb ai/ac).

MATERIALS AND METHODS

These two experiments were each located in production peppermint fields. Experiment one was located in a field in the Dry Lake, Idaho area, on a Scism Silt loam soil with 3-7% slopes. Experiment two was located in the Kuna Idaho area on a Power-McCain Slit loam soil with 2-4 % slopes. Both soils have similar texture according to the soil maps but the Scism soil is derived from calcareous mixed mineral material while the Power McCain Silt loam is formed in loess or silty alluvium. The actual soils in the plot areas appeared different from each other. The soil in experiment three (Dry Lake) appeared very siltly while the Power-McCain soil (Kuna) appeared to have some clay and some sand mixed with the silt.

In both experiments the plots were 12 ft by 20 ft sections of peppermint fields containing a natural infestation of MRB larvae. The following treatments were arranged in a randomized block design and replicated six times: (1) Untreated check, (2) Lorsban 4E chlorpyrifos, 2 qt/ac (2.0 lb ai/ac), (3) Altacor 35 WDG, 4 oz/ac (0.88 lb ai/ac), (4), Altacor 35 WDG, 3 oz/ac (0.066 lb ai/ac), (5) Altacor 35 WDG, 2 oz/ac (0.044 lb ai/ac) , (6) Altacor 35WDG, 1 oz/ac (0.022 lb ai/ac)

All treatments were broadcast applied with a CO_2 backpack sprayer (20 GPA at 15 psi). Spray water was buffered to an approximate pH of 5.5.

Evaluations of all treatments were made by taking six, 0.75-ft^2 soil / rhizome samples in each plot. The samples were taken to the depth of the rhizomes which averaged four inches deep. 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.

Experiment 1 (Dry Lake area)

For experiment one, the field was swathed approximately August 11 and then irrigated once before the all the treatments were applied on August 22. The soil surface was dry when the applications were made and there was approximately 0.5 inch of regrowth on the mint. Solid set irrigation sprinklers watered in all the treatments approximately 24 hours after they were applied.

Experiment one was evaluated October 1, 40 days after treating (DAT)

Experiment 2 (Kuna area)

The field was swathed approximately August 19. All treatments were applied on August 25 before the first post-harvest irrigation. The plot area was irrigated with wheelines approximately seven days after the applications were made but, approximately six days after applying the treatments, it rained approximately 0.3 inch. This experiment was evaluated on October 10, 44 DAT.

RESULTS AND DISCUSSION

The application of 2 qt. /ac Lorsban did not significantly reduce the MRB larvae levels compared to the untreated check in either experiment but there were exact opposite trends in both experiments with the Lorsban treatment. In experiment one the Lorsban application slightly lowered the mean number of MRB larvae, but in experiment two the Lorsban application slightly increased the mean MRB larvae level. A possible explanation for this difference could be that in experiment one, the Lorsban was washed into the soil with solid set irrigation just one day after being applied while in experiment two there was no rain or irrigation for at least six days after the Lorsban application. It is possible that the Lorsban was slightly effective in experiment one when irrigation occurred one day after the application, while in experiment two it was totally ineffective because it was not watered for six days.

All rates of Altacor provided significantly more control of the MRB larvae than the untreated check; however not all the treatments lowered the MRB levels below the treatment threshold. In both experiments, the rate of 1 oz/ac Altacor did not lower the MRB level below one per sq. ft. In addition the 3 oz/ac rate, in experiment two did not lower the MRB level below the treatment threshold either. There is a clear trend in experiment one that shows a decreasing amount of MRB control with decreasing the rate of Altacor. The same trend occurs in experiment two except for the 3 oz/ac rate of Altacor provided less control than the 2 oz/ac rate. This is unusual but is most likely caused by variation in the MRB population.

There were no apparent differences in the total amount of control of the MRB larvae between the two types of soil.

No phytotoxicity was observed on any mint plants at anytime.

Table 1. Experiments on and two

Results of field efficacy trials for mint root borer larvae control in sprinkle irrigated by applying Altacor 35 WDG before overhead irrigating

Treatment	Rate (lb ai/a)	Experiment 1 40 DAT Mean number live mint root borers per ft^2.*	Experiment 2 39 DAT Mean number live mint root borers per ft^2.*
UTC		10.7 c	10.7 c
Lorsban (2 qt/a)	2.0	8.7 c	13.3 c
Altacor 35 WDG 4 oz/a	0.088	0.2 a	0.3 a
Altacor 35 WDG (3 oz/a)	0.066	0.6 a	1.5 ab
Altacor 35 WDG (2 oz/a)	0.044	1.4 a	0.9 ab
Altacor 35 WDG (1 oz/a)	0.022	4.2 b	3.6 b

Sample means were compared with Fisher's Protected LSD (p=0.05). Means with the same letter are not significantly different (Petersen 1985).

Experiment 1: LSD = 2.3, $p<0.05$

Experiment 2: LSD = 3.3, $p<0.05$

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