

Efficacy of Coragen[®] and Avaunt[®] Insecticides for Pre-Harvest Control of Mint Root Borer in Western Idaho.

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INTRODUCTION

With the introduction of the insecticides Coragen[®] (Chlorantraniliprole) and Avaunt[®] (Indoxacarb), new approaches are possible for Mint Root Borer (MRB) control. Both of these insecticides are known to be effective ovicides as well as larvacides and they have a significant amount of residual activity. This opens the possibility of controlling the MRB in the egg stage. This could be very useful, especially in furrow-irrigated mint where post-harvest MRB control can be difficult. In addition, both of these insecticides also control foliar feeding cutworms.

Materials and Methods

Two identical trials were established in production, furrow irrigated peppermint fields. Experiment one was located near Wilder Idaho; experiment two was in the Deer Flat area of Idaho. Plots were arranged in a randomized block design. Plots of 18'x 20' were replicated five times.

Treatment dates were determined by using local data from the Nampa, ID Agri-met station and the degree-day model found on the IPMP website (mint.ippc.orst.edu). The degree data from the Nampa site was used for both experiments. The four application dates were chosen so they would coincide with the accumulated Degree-Days (DD) of 850 DD, 1000 DD, 1150 DD and 1300 DD. The peak egg-laying time occurs around 1100 DD. These four dates were determined to give a good spread of times that should determine when is the best time to apply the Coragen or Avaunt. In addition, one treatment had the insecticides applied twice, once before and once during the peak egg laying. The fields that contained experiments one and two were swathed on 8-30 and 8-31-2011 respectively.

RESULTS AND DISCUSSION

Due to the very cool spring, the chosen accumulated degree-days occurred approximately thirteen days later than the historical average.

There were no significant foliar feeding cutworm infestations in July so no data was collected on the efficacy of cutworm control from either experiment.

The results of both experiments had similar trends. None of the single applications of Coragen significantly ($p=0.05$) reduced the MRB larvae level, compared to the untreated check (table 1). However, there was a trend in both experiments, where the mean MRB levels were numerically lower or equal to the untreated check. Of these single applications, all were statistically similar to each other, in both experiments. The first application date of July 11 had the lowest mean MRB larvae level compared to the other single Coragen applications (table 1).

The most positive result of both experiments was that the double application of Coragen lowered the MRB levels significantly compared to the untreated check (table 1). It appears that the double application had an additive effect in controlling the MRB eggs and/or larvae.

The applications of Avaunt caused no significant decrease in the MRB levels in either experiment. There are not even any trends that indicate the Avaunt controlled any MRB.

Table 1.

Mint Root Borer levels after harvest from pre-harvest applications of Coragen and Avaunt insecticides near Wilder Idaho (experiment one), and at Deer Flat Idaho (experiment two), Summer 2011.

Trmt. #	Treatment	Amount of product per acre	Applications date(s)	Mean number of live mint root borer (Per sq. ft)	
				Exp. 1*	Exp 2**
1	UTC			8.5 bc	4.59 bcd
2	Coragen	5 fl oz	7-11	4.4 ab	3.47 ab
3	Coragen	5 fl oz	7-18	5.8 abc	3.61 abc
4	Coragen	5 fl oz	7-25	5.2 abc	3.79 abc
5	Coragen	5 fl oz	8-2	5.9 abc	4.59 bcd
6	Coragen	5 fl oz + 5 fl oz	7-11 & 7-25	2.8 a	2.09 a
7	Avaunt	3.5 oz	7-11	9.3 c	5.57 cd
8	Avaunt	3.5 oz	7-18	8.4 bc	5.84 d
9	Avaunt	3.5 oz	7-25	8.1 bc	5.90 d
10	Avaunt	3.5 oz	8-2	8.5 bc	5.31 bcd
11	Avaunt	3.5 oz + 3.5 oz	7-11 & 7-25	9.1 c	4.42 bcd
LSD				4.1	1.98

*Mint Root Borers sampled after September 13.

**Mint Root Borers sampled after September 12.

Experiment one CV=46.8%

Experiment two CV=34.6%

Sample means were compared with Fisher's Protected LSD (p=0.05).

Means with the same letter are not significantly different (Petersen 1985).

This research indicates that Coragen could be an effective way to control MRB in the egg or first instar larva stage. With the unusually cool spring and early summer weather it would be wise to repeat this trial to see if similar results are obtained a second year.

There is at least, a 30-day difference between when the degree-day model shows 50% of the MRB in the hibernaculum stage and when the MRB were actually found at 39% in the hibernaculum stage (table 2). This discrepancy in the timing of the hibernaculum raises the question of how accurate the degree-day model is in predicting the egg-laying times.

The degree-day model states that the model is only "partly validated".

It would also be wise to further calibrate the degree-day model for Western Idaho. If the degree-day model is not accurate the pre-harvest insecticide timing may not be optimal

Table 2

Comparison of untreated Mint Root Borer in the hibernaculum stage at different dates to the IPMP degree-day model for Idaho. (2011)

Sample date (Year 2011)	Actual percent mint root borer in hibernacula stage from samples	Predicted percent mint root borer larvae in hibernacula stage according to DD model*.	Accumulated degree days*
8-23	0	5	1856
9-7	0	50	2156
9-12, experiments 1 & 2	0	50+	2241
10-4, experiments 2 & 3	39	50+	2610
10-24, experiment 3	91	50+	2700

* Temperature data used from the Agri-met station located near Nampa ID.

CONCLUSIONS

Single, pre-harvest applications of 5 oz/ac Coragen did not significantly reduce MRB levels but there was a trend indicating there was some reduction in the MRB levels. A double application of Coragen did significantly reduce the MRB levels. The timing of the pre-harvest Coragen application did not have a significant impact on the effectiveness of the MRB control, but there was a slight trend for the earliest treatment to be the most effective.

Avaunt appeared to have no effect on reducing the MRB levels when applied pre-harvest. The degree-day model may not be completely accurate as indicated by the discrepancy between the degree-day model and the actual time of the MRB entering the hibernaculum stage.