

Leafminer Control in Cantaloupes

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Abstract

Cantaloupe leaf damage from leafminer activity was minimal to non-existent when evaluated at 6 days after treatment (DAT) following each of the first four weekly application dates. At 13 DAT-4, the number of mined leaves increased tremendously over the previous observation date. The untreated cantaloupes showed an increase from 30.8 to 81.8 mined leaves compared to the previous week. Agri-mek and the alternation treatment of Trigard, Success7, and Agri-mek applied on cantaloupes showed the fewest number of mined leaves at about 22 mined leaves. Trigard and Success treated cantaloupes had increased number of mined leaves ranging from 44 to 56.8. Agri-mek and the alternation treatment consistently had the fewest number of mined leaves during the course of the test period. Trigard and Success treatments performed similarly and reduced the number of mined leaves relative to the untreated cantaloupes. Success at the higher rate appeared to be slightly more active by showing numerically fewer mined leaves than the lower rate of application. Success treated melons yielded nearly twice as much compared to the other treatments and the untreated. Success treated melons also offered a higher number of marketable fruit at better than 80% compared to about 60% for the other treatments. Less stickiness was observed on the Success treated cantaloupes. There appeared to be an effect from Success applications on whitefly to reduce the honeydew stickiness.

Introduction

Leafminers (*Liriomyza sativae* and *L. trifolii*) are troublesome soon after emergence of cantaloupes planted in the summer for fall harvest. The leafminer larvae create serpentine mines through the leaves of melon plants and reduce the photosynthetic capacity of the plant as well as causing defoliation that may expose developing fruit to the sun. Currently, two effective foliarly applied insecticides offer good control of leafminers when applied shortly after crop emergence on the cotyledon leaves. Abamectin (Agri-mek7) and cyromazine (Trigard7) are two products that may require multiple applications during the growing season when there are extremely high leafminer populations. Alternate sprays of the two products are encouraged to minimize the potential of leafminers to develop resistance to the insecticides. Testing was initiated in 1997 to evaluate new products for leafminer control and spinosad (Success7) demonstrated efficacy in the preliminary field testing. This field test was conducted to further evaluate and determine the efficacy of insecticides against leafminers in fall planted cantaloupes.

Materials and Methods

A small plot field test was conducted at the University of Arizona Maricopa Agricultural Center, Maricopa, Arizona. Cantaloupe cv. Topmark was planted on 30 July 1997 on 40-inch beds spaced 10 ft apart and furrow irrigated. Treatment plots were single beds measuring 24 ft long and replicated four times in a randomized complete block design. The insecticide applications were applied with a hand-held boom equipped with four hollowcone TX-10 nozzle tips spaced 20-inches apart. The sprays were applied using a CO₂ backpack sprayer pressurized at 45 psi to deliver 25 gpa water. An adjuvant, Agridex at 1.0% v/v was applied to all treatments. A total of six applications were made during the season:

1st application - 07 Aug, 104°F, clear, no wind, cotyledon stage cantaloupe, Agri-mek applied for alternation treatment;
2nd application - 14 Aug, 84°F, 80% cloudy, 3 mph wind, 2-leaf melon, Trigard applied;
3rd application - 21 Aug, 94°F, 3 mph wind, Success applied;
4th application - 28 Aug, 92°F, 50% cloudy, no wind, high humidity, blooming melon, Agri-mek applied;
5th application - 11 Sep, 80°F, 100% cloudy, 5-10 mph wind, high humidity, first fruit, Trigard applied;
6th application - 18 Sep, clear, no wind, Success applied, esfenvalerate (Asana7) at 0.05 lb AI/A plus endosulfan at 0.75 lb AI/A applied for whitefly control.

Following each application at various intervals, the number mined leaves per 10 ft of row were counted to assess the leafminer damage on the cantaloupes. At the end of the season, cantaloupes were harvested and all of the fruit per 10 ft of row were harvested. The number of visibly marketable fruit were counted and calculated, and the weight of the fruit was determined for each treatment.

Results and Discussion

Cantaloupe leaf damage from leafminer activity was minimal to non-existent when evaluated at 6 days after treatment (DAT) following each of the first four weekly application dates (Table 1). Untreated cantaloupes exhibited increased number mined leaves at weekly rating dates. Agri-mek treated cantaloupes showed no mined leaves after three weekly applications and less than one mined leaf at 6 DAT-4. Mined leaves were observed in the Trigard treated cantaloupes following the first two applications and then declined after the third application. Success treated cantaloupes showed less than one mined leaf through 6 DAT-4 and no difference was evident between rates applied. The weekly alternation of Agri-mek followed by Trigard and followed by Success showed almost no leafminer activity on cantaloupes through 6 DAT-4. A fifth consecutive weekly application of the treatments was skipped due to unfavorable weather conditions. At 13 DAT-4, the number of mined leaves increased tremendously over the previous observation date (Figure 1). The untreated cantaloupes showed an increase from 30.8 to 81.8 mined leaves compared to the previous week. Agri-mek and the alternation of three products applied on cantaloupes showed the fewest number of mined leaves at about 22 mined leaves. Trigard and Success treated cantaloupes had increased number of mined leaves ranging from 44 to 56.8. Leafminer control provided by the treatments declined during the week between 6 and 13 DAT.

At 6 DAT-5 and 10 DAT-6, the number of mined leaves decreased slightly for the Trigard, Success and the alternation treatment. At 13 DAT-6, the number of mined leaves began to increase slightly compared to the previous rating date. It appeared that leafminers increased more between 10 and 13 DAT. Agri-mek and the alternation treatment consistently had the fewest number of mined leaves during the course of the test period. Trigard and Success treatments performed similarly and reduced the number of mined leaves relative to the untreated cantaloupes. Success at the higher rate appeared to be slightly more active by showing numerically fewer mined leaves than the lower rate of application. The alternation of Agri-mek, Trigard, and Success appears to be highly effective and future integrated pest management strategies could be enhanced with the availability of multiple products to control leafminers.

Cantaloupes were harvested at the end of the season and Success treated melons yielded nearly twice as much compared to the other treatments and the untreated (Table 2). Success treated melons also offered a higher number of marketable fruit at better than 80% compared to about 60% for the other treatments. Prior to harvest, visual observations of the vine vigor indicated that the Success treated cantaloupes were more vigorous and had darker green vines compared to the other treated vines. More fruit appeared to be set on the Success treated vines and the fruit appeared slightly larger. The Agri-mek, Trigard, and the alternation treatment treated melons appeared more chlorotic and less vigorous. The Agri-mek and

alternation treatment had melon leaves that were more sticky due to a severe whitefly infestation. An application of esfenvalerate plus endosulfan was included with the 6th application to minimize whiteflies. Less stickiness was observed on the Success treated cantaloupes. There appeared to be an effect from Success applications on whitefly to reduce the honeydew stickiness.

Table 1. Leafminer Control in Cantaloupes. (Umeda)

Treatment	Rate (lb AI/A)	Number mined leaves / 10 ft row			
		6 DAT-1	6 DAT-2	6 DAT-3	6 DAT-4
Untreated check		7.5	22.0	22.3	30.8
Agri-mek	0.02	0.0	0.0	0.0	0.3
Trigard	0.125	5.8	6.5	1.0	1.0
Success	0.09	0.3	0.3	0.3	0.0
Success	0.12	0.5	0.3	0.3	0.0
Agri-mek + Trigard + Success ¹	0.02+ 0.125+ 0.09	0.0	0.0	0.3	0.0
LSD (p=0.05)		3.9	5.6	7.3	6.7

Applications made on 07, 14, 21, 28 Aug, 11, 18 Sep 1998.

Adjuvant Agridex at 1.0% v/v added to all treatments.

¹ Treatments alternated at each application date.

Table 2. Leafminer Control in Cantaloupes. (Umeda)

Treatment	Rate (lb AI/A)	Yield	
		Wt/plot lb	Marketable %
Untreated check		24.7	58
Agri-mek	0.02	23.8	55
Trigard	0.125	28.7	68
Success	0.09	48.4	86
Success	0.12	47.2	80
Agri-mek + Trigard + Success ¹	0.02+ 0.125+ 0.09	24.2	60
LSD (p=0.050)		12.4	30.6

¹ Treatments alternated at each application date.

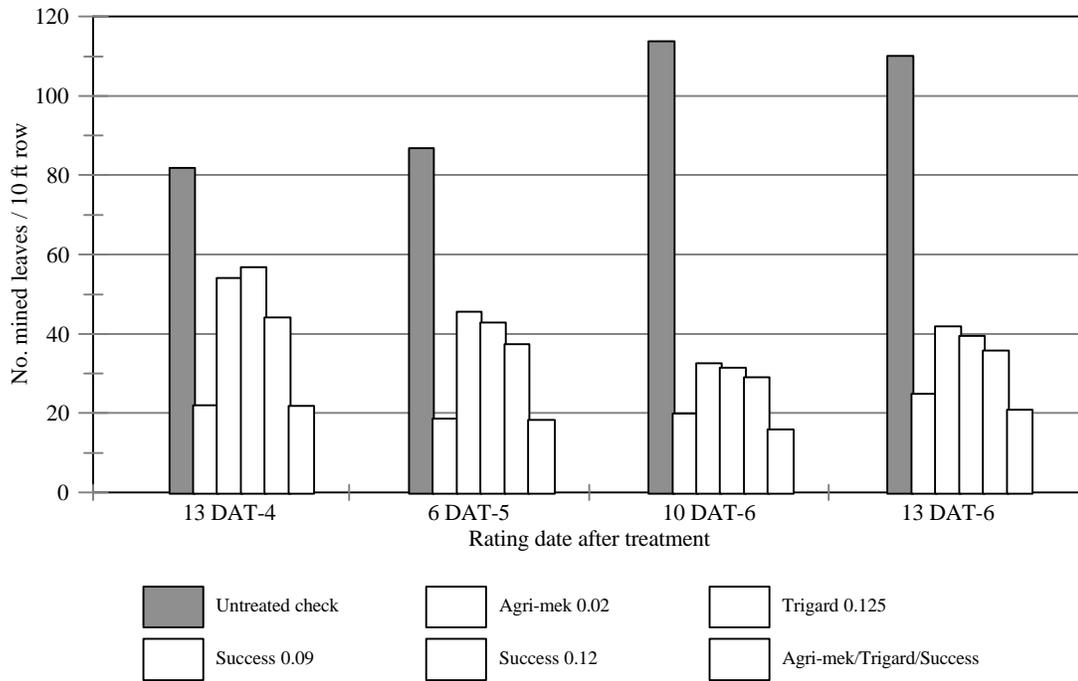


Figure 1. Leafminer control in Cantaloupes. (Umeda)
 Leafminer populations increased at 13 DAT after the 4th application and subsequent control following 5th and 6th applications.