Leafminer Control in Cantaloupe

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Abstract

In a small plot field test on cantaloupes, abamectin (Agri-mek®), cyromazine (Trigard®), spinosad (Success®), and pyriproxyfen (Knack®) demonstrated efficacy to reduce the number of mined leaves caused by leafminers (Liriomyza sativae and L. trifolii). Multiple applications of Agri-mek and Trigard resulted in melons having the fewest number of mined leaves. Success and Knack were effective in reducing the number of mined leaves relative to the untreated check. All of the treatments provided effective control of leafminers for 14 to 21 days after treatment. Success exhibited a rate response with the highest rate showing the fewest number of mined leaves compared to the lower rate.

Introduction

Cantaloupes planted in the summer for fall harvest are severely impacted by several pests. Leafminers (*Liriomyza sativae* and *L. trifolii*) are especially troublesome soon after crop emergence and then through the growing season. The leafminer larvae mine through the leaves of melon plants and reduces the photosynthetic capacity of the plant as well as causing defoliation that would expose developing fruit to the sun. Leafminers are managed by applying foliar insecticides when they begin to appear shortly after crop emergence on the cotyledon leaves. Abamectin (Agri-mek®) and cyromazine (Trigard®) are two effective insecticides being used currently. Reliance on only two insecticides that require multiple applications during the growing season for managing the pest creates the scenario for potential resistance to develop by the leafminer to the insecticides. Spinosad (Success®) and pyriproxyfen (Knack®) are two new insecticides belonging to new and different classes of chemistry that have demonstrated possible activity against the leafminer. This field test was conducted to 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. Gold Mine was planted on 17 Jul 1997 on 40-inch beds spaced 10 ft apart and furrow irrigated. Treatment plots were single beds measuring 35 ft long and replicated four times in a randomized complete block design. Insecticide applications were made with a hand-held boom equipped with two hollowcone TX-10 nozzle tips spaced 20-inches apart. The spray was applied using a CO_2 backpack sprayer pressurized at 45 psi to deliver 25 gpa water. A non-ionic surfactant, Latron CS-7 at 0.25% v/v was added to all treatments. At the first application date on 28 Jul, all treatments were applied when cantaloupes were at the 1-true leaf stage of growth, air temperature was 100 degF, skies clear, and slight breeze at less than 5 mph. On 04 Aug, the second sequential application of certain treatments were applied when melons were at the 2- to 3-leaf stage of growth, temperature was 106 degF, clear, and no winds. On the third application date, all treatments were applied again when melons were beginning to bloom and temperatures were 110 degF, clear, and breezes less than 3 mph. Insecticide efficacy was evaluated by counting the number of mined

leaves of each plant per 10 ft of row. Evaluations were made at 7 to 14 days after treatment (DAT). Number of mined leaves per plant were calculated and means were subjected to analysis of variance.

Results and Discussion

Following the first application of all treatments, at 7 DAT-1, the number of mined leaves per plant was very low for all treatments and ranged from 0 to 0.058 mined leaves/plant (Table). The untreated check had 0.048 mined leaves/plant. The Knack treated melons had no observable mines on the foliage. At 7 DAT-2, a general visual observation indicated no new additional mines were detectable. The untreated check melons had fewer mines than the previous week with 0.03 mined leaves/plant. At 14 DAT-2, the number of mines in the untreated check increased to 0.645 mined leaves/plant that was greater than all other treatments. Success, Agri-mek, and Trigard treatments applied only once on 28 Jul showed melons with 0.423, 0.434, and 0.414 mined leaves/plant, respectively. Agri-mek and Trigard applied twice (28 Jul and 04 Aug) showed melons with numerically fewer mined leaves/plant than the single application. Success applied only once was comparably effective as two applications. The number of mined leaves/plant in Knack treated melons was numerically less than in the untreated check. At 21 DAT-2 or 28 DAT-1, all of the melons had 2.163 to 3.075 mined leaves/plant and treatments were not different from the untreated check. Following the third application date when all treatments were applied, the number of mined leaves/plant was reduced from the previous week and less than the untreated check. All treatments were significantly reduced compared to the untreated check at 8 DAT of the final application. Melons receiving three applications of Agri-mek displayed the fewest number of mined leaves/plant with 1.059. Trigard treatments were similar after the final application with 1.3 mined leaves/plant. Success treatments tended to display a rate response with fewer mined leaves/plant observed for the higher rate than the lower rates.

During the early stage of crop growth, a single or two applications of any treatment on cantaloupe demonstrated effective reduction of visible leafminer mines on foliage for 14 to 21 DAT. At 21 and 28 DAT, the number of mines on foliage increased and treatments were effective in reducing number mined leaves/plant at 8 DAT after a final application. Agri-mek and Trigard are commercially available effective treatments to reduce the impact of leafminers on cantaloupe in the fall planting season. Success and Knack provide potential as alternative chemistries to be incorporated in a rotational scheme with existing products to control leafminers.

Table. Leafminer Control in Cantaloupe, 1997. (Umeda, Gal, Strickland)

Treatment	Rate	Mean number of mines per plant [3]				
	(lb AI/A)	04-Aug	11-Aug	18-Aug	25-Aug	02-Sep
Untreated Check		0.048	0.030	0.645	2.813	2.820
Success[1]	0.06	0.026		0.417	2.163	1.934
Success[1]	0.09	0.015		0.519	3.075	1.532
Success[1]	0.13	0.030		0.363	2.790	1.350
Success[2]	0.09	0.031		0.423	2.162	1.611
Agri-mek[1]	0.02	0.058		0.242	2.223	1.059
Agri-mek[2]	0.02	0.054		0.434	2.487	1.517
Trigard[1]	0.125	0.053		0.352	2.521	1.332
Trigard[2]	0.125	0.033		0.414	2.363	1.307
Knack[1]	0.05	0.000		0.528	2.356	1.791
LSD (p=0.05)		0.073		0.263	0.825	0.621

[1] Treatments applied on 28 Jul, 04 and 25 Aug.

[2]Treatments applied on 28 Jul and 25 Aug.

[3] Mined leaves counted in number of plants per 10 ft of row.