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A Row Cover and Low-Risk Insecticide Strategy for Cucumber Beetle Management

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Abstract

Spotted and striped cucumber beetles vector a bacterium that causes wilt in cucurbits. These beetles are the major pest of muskmelons in Iowa. We investigated the success of spun-cotton Reemay row covers and several reduced-risk insecticides for management of cucumber beetles and bacterial wilt.

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A Row Cover and Low-Risk Insecticide Strategy for Cucumber Beetle Management

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Introduction

Spotted and striped cucumber beetles vector a bacterium that causes wilt in cucurbits. These beetles are the major pest of muskmelons in Iowa. We investigated the success of spun-cotton Reemay row covers and several reduced-risk insecticides for management of cucumber beetles and bacterial wilt.

Materials and Methods

Twenty-five- foot rows of 'Athena' muskmelon seedlings were planted into black plastic mulch at the ISU Horticulture Station near Ames, the Armstrong Research and Demonstration Farm at Lewis, and the Muscatine Island Research Farm in Fruitland. Each location included two fields, a row-covered field, and an uncovered control field. The row-covered fields were covered at planting and covers were removed at bloom.

There were four replications of several insecticide treatments in each field:

- Admire at 4.8 ou/1,000 transplants (imidacloprid transplant drench)
- Entrust at 2.5 ou/acre (14-day foliar applications of an organic spinosad product not yet labeled for cucumber beetles)
- Invite at 12 ou/acre + Sevin XLR at 3.2 ou/acre (14-day foliar applications of an attractant product combined with a 10% rate of carbaryl)
- Invite at 12 ou/acre + Boric Acid (14-day foliar applications of an attractant plus an organic insecticide)
- Sevin XLR at 32 ou/acre (conventional 14-day foliar applications of carbaryl)
- Non-sprayed control

Striped and spotted beetle populations on five plants/plot were recorded each week. Bacterial wilt ratings (number of wilted plants/plot) were taken at the first sign of disease at each location. Melons were counted, weighed, and inspected for disease and insect damage at harvest.

Results and Discussion

There was a clear benefit to covering the plots with Reemay, because it increased both the number and weight of melons harvested (Table 1). Some of the yield benefits of these covers may have been due to a warming effect in the spring, but they also decreased the incidence of bacterial wilt, indicating that they protected the plants from cucumber beetles. The row covers delayed the first onset of bacterial wilt by three weeks in Ames and one week in Muscatine.

Of the insecticide treatments evaluated, none resulted in yields greater than the untreated control (Table 2). In fact, plots treated with the attractant (Invite) + an organically-approved insecticide (boric acid) had lower yields than the control. Furthermore, attempts to find a correlation between yield and either beetle populations or bacterial wilt incidence for the insecticides failed. This means that, although the insecticides sometimes reduced beetle populations or bacterial wilt below the levels found for the control, these reductions did not always lead to higher yields.

This result was very surprising, because more beetles should lead to more disease, and more disease should lead to dead plants and fewer melons. One reason this may have occurred is the fairly low populations and seemingly late

arrivals of striped and spotted cucumber beetles in Iowa this year. Perhaps a certain population of beetles or early epidemics of bacterial wilt are necessary to affect yield. We look forward to testing these insecticides next year, when beetle populations may be greater.

Table 1. Yield, beetle populations, and disease incidence in a single row of 12 melon plants in row-covered and uncovered fields at Ames, Lewis, and Muscatine, Iowa, in 2003.

Treatment	Number	Weight (lb)	Striped (mean/plot)	Spotted (mean/plot)	Wilt (mean plants/plot)
Row-covered	21.69 a	122.77 a	0.069 a	0.060 a	0.366 a
Uncovered	14.64 b	86.19 b	0.041 b	0.043 b	0.126 b
LSD (P<0.05)	*2.78*	*13.06*	*0.013*	*0.012*	*0.038*

Table 2. Yield, beetle populations, and disease incidence in a single row of 12 melon plants treated with insecticides at Ames, Lewis, and Muscatine, Iowa, in 2003.

Treatment	Number	Weight (lb)	Striped (mean/plot)	Spotted (mean/plot)	Wilt (mean plants/plot)
Admire	19.75 a	114.95 a	0.057 abc	0.06	0.05 d
Entrust	17.08 ab	97.89 ab	0.08 a	0.06	0.17 c
Invite+Sevin	21.29 a	116.77 a	0.05 bc	0.05	0.29 b
Invite+BoricAcid	13.33 b	77.4 b	0.05 bc	0.04	0.44 a
Sevin	20.17 a	119.25 a	0.03 c	0.04	0.22 bc
Control	17.37 ab	100.62 a	0.06 ab	0.05	0.276 b
LSD (P<0.05)	*4.82*	*22.62*	*0.02*	*-*	*0.07*