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Row Cover and Low-risk Insecticide Strategy for Cucumber Beetle Management

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Abstract
Spotted and striped cucumber beetles vector is a bacterium that causes wilt in cucurbits. They 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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Row Cover and Low-risk Insecticide Strategy for Cucumber Beetle Management

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Introduction

Spotted and striped cucumber beetles vector is a bacterium that causes wilt in cucurbits. They 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 Farm in Ames, the Armstrong Research and Demonstration Farm in Lewis, and the Muscatine Island Research Station 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:

1) Admire at 4.8 oz/1,000 transplants (imidacloprid transplant drench).
2) Admire at 4.8 oz/1,000 transplants + insecticide* at label rate after flowering.
3) Entrust at 2.5 oz/A (14-day foliar applications of an organic spinosad product not yet labeled for cucumber beetles).
4) Invite at 12 oz/A + insecticides* at 10% label rate.
5) Insecticide* at label rate.
6) Nonsprayed control.

* The insecticide was Capture 2EC (bifenthrin) at 6 oz/A alternated with Sevin XLR (carbaryl) at 32 oz/A.

Striped and spotted beetle populations on five plants per plot were recorded each week. Bacterial wilt ratings (number of wilted plants per 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, as 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 or delayed the incidence of bacterial wilt, indicating that they protected the plants from cucumber beetles.

For the second year, more striped beetles were counted in rows with no row cover, and more spotted beetles were counted in rows with a row cover (Table 1). This may be associated with the timing of beetles in the melon fields, although this has not been looked at in depth.

Of the plants with insecticide treatments evaluated, all resulted in yields greater than the nontreated control (Table 2). This is mostly from the increase in marketable fruit (Table 2). Most insecticide treatments lowered the number of wilted plants compared with the nontreated control.

There was no correlation between yield and either beetle population. There was a significant negative correlation between bacterial wilt incidence (at the later dates, Table 2) and marketable melon number and weight ($P<0.001$).

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Table 1. Yield, beetle populations, and disease incidence in a single row of melon plants in covered and uncovered fields at Ames, Lewis, and Muscatine, Iowa, in 2004.

Treatment	Melon Number	Melon wt. (lb)	% Melons Marketable	Striped (weekly avg.)	Spotted (weekly avg.)	Wilt (% plants)[a]	Wilt (% plants)[b]
Covered	31.5	163.6	77.6	0.48	0.76	8.2	10.4
Uncovered	24.7	140.1	71.6	0.68	0.51	13.8	15.1
LSD (P<0.05)	2.0	11.7	4.3	0.14	0.13	5.5	n.s.

[a] Percent wilted plants on July 27.
[b] Percent wilted plants in early August, just before harvest.

Table 2. Yield, beetle populations, and disease incidence in a single row of melon plants treated with insecticides at Ames, Lewis, and Muscatine, Iowa, in 2004.

Treatment	Melon Number	Melong wt. (lb)	% Melons Marketable	Striped (weekly avg.)	Spotted (weekly avg.)	Wilt (% plants)[a]	Wilt (% plants)[b]
Admire	29.8	160.5	79.1	0.76	0.78	8.0	13.0
Admire + Insecticide [c]	28.5	153.2	73.9	0.59	0.71	8.4	9.7
Invite + 10% Insecticide	29.4	160.1	79.0	0.54	0.65	4.0	5.3
Insecticide	29.6	162.9	75.7	0.49	0.56	16.0	16.0
Entrust	28.8	154.8	78.4	0.57	0.54	6.7	8.0
Non-treated	22.6	119.8	61.4	0.55	0.58	22.2	25.1
LSD (P<0.05)	3.5	20.3	7.4	0.24	0.23	9.5	9.7

[a] Percent wilted plants on July 27.
[b] Percent wilted plants in early August, just before harvest.
[c] Insecticide was Capture alternated with Sevin.