2002

# Trapping and Other Strategies for Control of Cucumber Beetle in Muskmelon

Mark L. Gleason
*Iowa State University*, mgleason@iastate.edu

Sara Jane Helland
*Iowa State University*

# Trapping and Other Strategies for Control of Cucumber Beetle in Muskmelon

**Abstract**
Spotted and striped cucumber beetles (*Diabrotica undecimpunctata howardi* and *Acalymma vittata*) that vector a bacteria that causes bacterial wilt in cucurbits are the major pest in Iowa muskmelon fields. Growers currently spray insecticides to control these insects on a one- to two-week preventive schedule. Use of large amounts of chemical can be expensive and damaging to beneficial pollinators and the environment. We investigated the success of the prototype Trece trap-and-bait system—soon to be Organic Materials Review Institute approved— in controlling these beetles. The traps chemically lure beetles to insecticide-treated baits inside the traps, placed some distance away from the muskmelon crop. We also tested three other management methods in combination with the traps: Reemay® row covers, slitted row covers, and transplants treated with BioYield® (rhizobacterial) potting soil.

**Keywords**
Plant Pathology

**Disciplines**
Agricultural Science | Agriculture | Plant Pathology

# Trapping and Other Strategies for Control of Cucumber Beetle in Muskmelon

Mark Gleason, professor and extension plant pathologist
Sara Helland, research associate
Department of Plant Pathology

## Introduction

Spotted and striped cucumber beetles (*Diabrotica undecimpunctata howardi* and *Acalymma vittata*) that vector a bacteria that causes bacterial wilt in cucurbits are the major pest in Iowa muskmelon fields. Growers currently spray insecticides to control these insects on a one- to two-week preventive schedule. Use of large amounts of chemical can be expensive and damaging to beneficial pollinators and the environment. We investigated the success of the prototype Trece trap-and-bait system—soon to be Organic Materials Review Institute approved— in controlling these beetles. The traps chemically lure beetles to insecticide-treated baits inside the traps, placed some distance away from the muskmelon crop. We also tested three other management methods in combination with the traps: Reemay® row covers, slitted row covers, and transplants treated with BioYield® (rhizobacterial) potting soil.

## Materials and Methods

Our experiment included two fields: a control field and trapping field with traps placed in two concentric rings, 50 and 65 feet outside of the planted area. The experimental design within each field was a completely randomized design of four treatments in four replicates. The four treatments included Reemay® and slitted row covers stretched over wire hoops, BioYield® transplants, and a control. 'Athena' seedlings were planted into black plastic on 29 May. Yellow sticky cards were placed in each plot at the time of planting; they were counted and replaced once per week through the end of harvest. Dead beetles in the traps were counted each week, and traps were emptied. Bacterial wilt ratings (number of wilted plants per plot) were not taken at Castana due to very low levels of disease. Melons were harvested on 2, 6, 9, 13, 16, 20-Aug.

## Results and Discussion

Overall, there were fewer beetles found in the field with traps than in the field without (Table 1). Nevertheless, the overall yield of the nontrapping field was higher than that of the trapping field (Table 2). Without bacterial wilt data, however, we cannot relate beetle populations to yield differences. This means that we cannot make firm conclusions about the success of the traps. We plan to repeat this experiment next year with the hope that the disease incidence will be higher.

We noticed that the traps and sticky cards in the trapping field collected significantly more spotted beetles than striped beetles (Tables 1 and 3), despite the numbers of striped and spotted beetles on sticky cards in the control field being equal (Table 1). Another year of study might give us some insight into what seems to be a differential effect of the traps on two species of beetle.

The effect of the row covers and BioYield®-treated soil on beetle populations was minimal (data not shown). Plots with BioYield®-treated transplants produced melons with lower marketable weights and average weights than untreated plots (Table 4). The slitted row covers seem to have increased total weight (marketable + cull), marketable weight, number of marketable melons, and marketable melon weight (Table 4). This increase may have been due to a temperature change, however, since it was not associated with a decrease in beetle

populations or bacterial wilt. Another year of data would be useful in understanding why slitted row covers increased yield.

**Acknowledgments**

Thanks to Barb Smith and our summer help for counting beetles, maintaining the fields, and harvesting melons throughout the season.

**Table 1. Mean number of spotted, striped, and total beetles found on a sticky card over the entire season in the trapping and control fields.**

| Field | Striped beetle | Spotted beetle | Total beetles |
|---|---|---|---|
| Trapping Field | 4.2 A | 4.7 | 8.9 B |
| Control Field | 20.6 B | 5.9 | 26.4 A |
| *LSD .05* | *3.7* | *1.9* | *5.0* |

**Table 2. Mean total weight (marketable + cull), marketable weight, number of marketable melons, and marketable melon weight in a single plot for the trapping and control fields.**

| Field | Total weight (lbs) | Marketable weight (lbs) | Quantity (melons) | Average weight (lbs/melon) |
|---|---|---|---|---|
| Traps Field | 208.2 A | 211.4 | 35.0 | 6.1 |
| Control Field | 248.1 B | 234.2 | 40.1 | 5.9 |
| *LSD .05* | *27.5* | *31.7* | *5.3* | *0.5* |

**Table 3. Mean number of spotted and striped beetles found in a trap during 2001 at three Iowa locations.**

| Species | Number of Beetles |
|---|---|
| Striped | 0.2 A |
| Spotted | 22.9 B |
| *LSD .05* | *3.3* |

**Table 4. Mean total weight (marketable + cull), marketable weight, number of marketable melons, and marketable melon weight in a single plot for four cucumber beetle control methods tested at three Iowa locations.**

| Treatment | Total weight (lbs) | Marketable weight (lbs) | Quantity (melons) | Average weight (lbs/melon) |
|---|---|---|---|---|
| ReeMay Covers | 232.7 AB | 214.7 BC | 34.1 B | 6.3 A |
| Slitted Covers | 254.9 A | 258.1 A | 42.1 A | 6.2 A |
| BioYield | 197.8 B | 190.0 C | 35.4 AB | 5.3 B |
| Control | 227.4 AB | 230.3 AB | 38.5 AB | 6.1 A |
| *LSD .05* | *40.2* | *39.4* | *7.5* | *0.6* |