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# Organic Practices for the Production of Muskmelon

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**Abstract**
Cucurbit crops, especially muskmelon and cucumber, attract cucumber beetles, which vector Erwinia tracheiphila, the causal agent of bacterial wilt. High numbers of overwintering beetles, which often lead to high bacterial wilt incidence, usually occur during the first stages of plant establishment. Growers of organic muskmelon need effective ways to manage the cucumber beetle/bacterial wilt complex, particularly during the highestrisk period early in the season.

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

# Organic Practices for the Production of Muskmelon

**RFR-A1227**

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## Introduction

Cucurbit crops, especially muskmelon and cucumber, attract cucumber beetles, which vector *Erwinia tracheiphila*, the causal agent of bacterial wilt. High numbers of overwintering beetles, which often lead to high bacterial wilt incidence, usually occur during the first stages of plant establishment. Growers of organic muskmelon need effective ways to manage the cucumber beetle/bacterial wilt complex, particularly during the highest-risk period early in the season.

Row covers are usually deployed from transplant until anthesis (start of female flowering), then removed to allow insect pollination. Several studies at ISU and elsewhere have suggested that a 10-day delay in row cover removal can shield muskmelon crops from the first emergence of wilt-spreading cucumber beetles, resulting in less bacterial wilt, and correspondingly better yield, than either removing the cover at anthesis or not using row covers at all. Opening the ends of the row covers has been tried in order to allow for pollination.

The project is the third year in a three-year multi-state effort, with Kentucky and Pennsylvania, to optimize organic growing practices that effectively manage insect and diseases, and enhance pollination for cucurbit crops.

## Materials and Methods

Transitioning organic land was used for the multi-factorial experimental plot at the ISU Horticulture Research Station, Ames, Iowa. On May 17, 3-week-old organic transplants of Strike muskmelon were planted 2 ft apart in black plastic mulch with drip irrigation and 8-ft centers. Subplots consisted of 30-ft-long rows of 15 plants. Spunbond polypropylene row covers (Agribon® AG-30) were installed on wire hoops immediately after transplanting.

A Latin square experimental design using 16 subplots (4 replicates of 4 treatments) was used to examine impacts of row cover treatments:

1) no row covers (control)
2) row covers applied at transplanting and removed at anthesis (when female flowers start to open)
3) row covers applied at transplanting with the ends opened at anthesis and removed 10 days later (Figure 1)
4) row covers applied at transplanting and removed 10 days after anthesis.

Weed management was achieved with 6 in. of corn stalk mulch between rows and composted bark was placed around the opening in the plastic around each seedling before row cover placement.

Striped and spotted cucumber beetle adults were counted weekly from transplant through the beginning of harvest using yellow sticky cards and weekly visual monitoring of five randomly chosen plants/subplot. Disease incidence was monitored weekly. Melons were harvested daily from July 23 to August 13. The number and weight of marketable and cull melons harvested from each subplot was recorded.

## Results and Discussion

Row covers were highly effective in increasing yield. Thirty ft subplots with row covers yielded 12 to 28 more melons and an additional 50 lb of marketable weight compared with the no-row-cover control (Table 1). Increased yield was mostly due to protection from high winds early in the season, but may also have been partially related to cucumber beetle pressure and bacterial wilt that appeared late in the season (Table 1).

Cucumber beetles first entered the plot June 22, a few days after anthesis. First generation beetles were observed to emerge in late April, but they did not enter the study plot. We did not find row cover removal time to be a factor in bacterial wilt incidence this year. Bacterial wilt was not detected until a week before harvest and was not significantly affected by row cover treatment ($p = 0.8318$) (Table 1).

Yield from plots with open ends (Treatment 3) followed similar timing to plots where row covers were removed at anthesis (Treatment 2) and both of these treatments began to produce ripe fruit one week earlier than Treatment 4 (row covers removed 10 days after female anthesis onset) (Figure 1). Therefore it is likely that pollinators were accessing the flowers under the row covers through the open ends (Figure 1).

In summary, row covers increased yield and opening the row cover ends at anthesis may allow pollination, at least for the short (30-ft-long) row segments used here.

**Table 1. Summary of organic production of muskmelon using row covers.**

| Treatment | | Bacterial wilt % July 22 | Row covers removed | First cuke beetles | First bacterial wilt | Harvest yield | |
|---|---|---|---|---|---|---|---|
| | | | | | | Weight (lb) | Melon number |
| 1 | No row covers | 50 | NA | June 22 | July 17 | 151.8 a* | 36.0 a* |
| 2 | Row covers removed at anthesis | 42 | June 18 | July 5 | July 17 | 206.5 b | 47.8 b |
| 3 | Open ends at anthesis; row covers removed 10 days later | 42 | June 28 | July 5 | July 17 | 242.0 c | 59.8 c |
| 4 | Row covers removed 10 days after anthesis | 37 | June 28 | July 5 | July 17 | 204.1 b | 63.5 c |

*Means followed by different letters denote significant differences among treatments ($p < 0.05$, LSD).

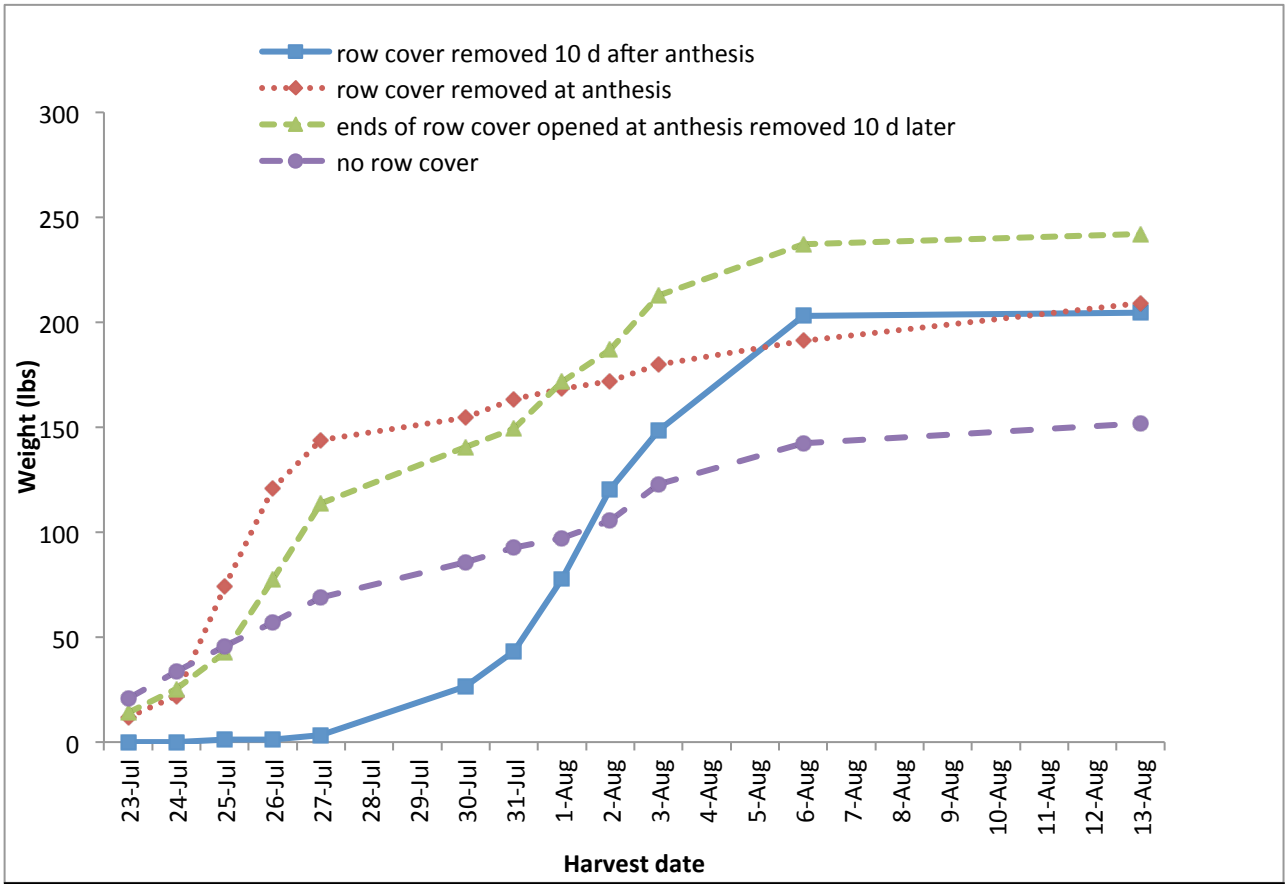


**Figure 1. Marketable weight versus harvest day for four row-cover treatments.**