

Effect of Extended-Duration Row Covers on Muskmelons

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Introduction

Cucurbit crops, especially muskmelon and cucumber, are difficult to grow in the Midwest because of bacterial wilt, causing significant crop losses. Striped and spotted cucumber beetles transmit *Erwinia tracheiphila*, which causes bacterial wilt. High beetle densities often occur during the first stages of plant establishment.

Row covers have traditionally been used to increase crop earliness, leading to earlier harvest dates and higher market prices. Row covers are usually deployed from transplant until anthesis (start of flowering), then removed to allow insect pollination. By using hives of bumblebees to supplement pollination, it may be possible to extend row cover duration by approximately 10 days beyond anthesis. Extending row cover protection may shield muskmelon crops from the first emergence of wilt-vectoring cucumber beetles, leading to a healthier crop and a greater yield.

Materials and Methods

Thirty-foot-long rows of 15 Athena muskmelon seedlings were planted into black plastic mulch at the ISU Horticulture Station, Ames, IA. Single-row treatments using polymer row covers (Agribon AG-30) on wire hoops, with edges buried in soil, were compared in a Latin square design, including four replications (rows) of four treatments, as follows:

A) Row covers removed at anthesis.

- B) Row covers removed 10 days after anthesis. At anthesis, both ends of row covers were opened to allow pollination.
- C) Rows covers removed 10 days after anthesis. At anthesis, a bumblebee hive (Koppert, Inc.) was inserted under one end of the row cover, and the end was re-sealed.
- D) No row covers.

Striped and spotted cucumber beetle numbers were monitored weekly from transplanting (June 11) through the beginning of harvest (September 9) using yellow sticky cards. Beginning 10 days after anthesis, the percentage of healthy, wilted, or dead plants in each row was assessed weekly. The number and weight of marketable and cull melons harvested from each row was also recorded.

Results and Discussion

The cool, wet spring prevented us from planting before the first overwintering generation of cucumber beetles emerged. However, the row covers effectively protected the plants from the second generation of beetles, since all treatments with row covers had fewer plants wilted than the no-row-cover Treatment D (Figure 1). The no-row-cover treatment reached an average of 60% wilted or dead plants by the beginning of harvest (September 12).

Row covers also resulted in greater yield of marketable fruit than the no-row-cover treatment (Figure 2). Delayed-removal row covers with the beehive inserted during anthesis had the highest number of marketable fruit produced, followed by the delayed row cover treatment with no bees and the row covers removed at anthesis. The no-row-cover treatment had only 20 marketable fruit by the end of the season.

The results on total number of marketable fruit not only suggests that the use of row covers may increase yields by protecting plants from cucumber beetles. It seems that the beehives inserted in one of the row cover treatments caused increased pollination, and as a result, a larger amount of fruit was produced.

Acknowledgements

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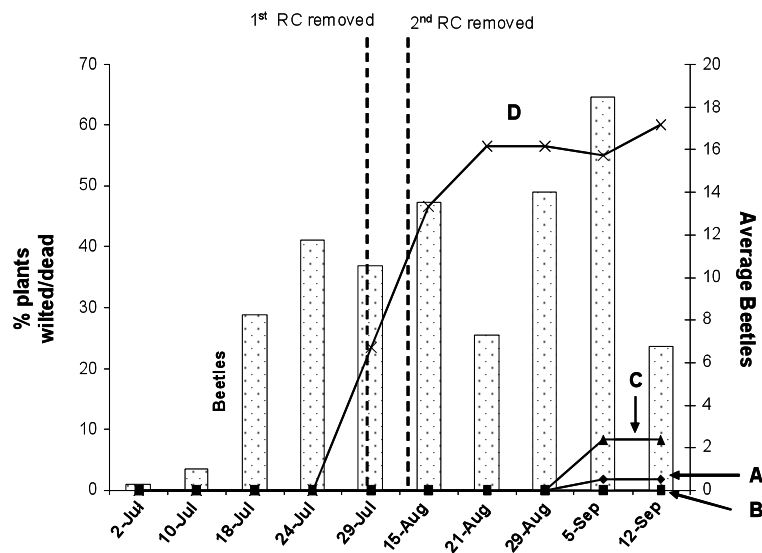


Figure 1. Mean percentage of bacterial wilt symptoms (left axis) for all four treatments. A = row cover removed at anthesis; B = row cover removal 10 days after anthesis, ends opened; C = row cover removal 10 days after anthesis, bees inserted; D = no row cover. Bars and right axis indicate average number of beetles collected each week beginning at transplant.

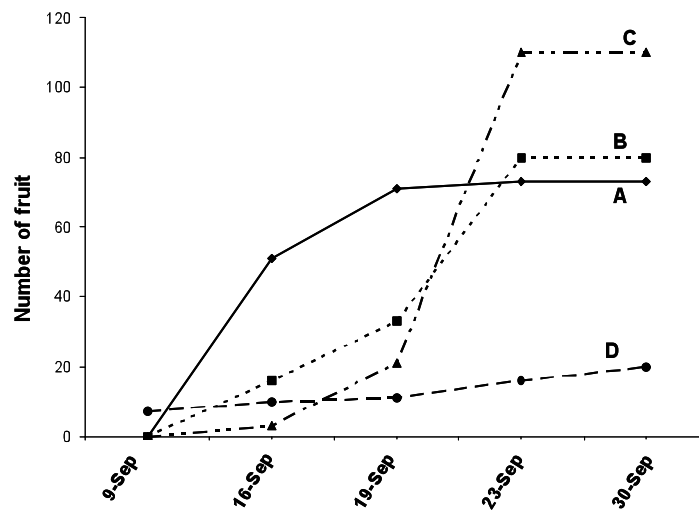


Figure 2. Cumulative number of marketable fruit harvested from four treatments. A = row cover removed at anthesis; B = row cover removal 10 days after anthesis, ends opened; C = row cover removal 10 days after anthesis, bees inserted; D = no row cover.