

INTEGRATING ROW COVERS, COMPOST APPLICATION AND RHIZOBACTERIA INTO ORGANIC MUSKMELON AND SQUASH PRODUCTION

Ermita Hernández and Elsa Sánchez

The Department of Plant Science at Penn State University, Tyson Building, University Park, PA. exh922@gmail.com

Many important diseases and insect pests affect muskmelon and squash (cucurbits) production causing economic losses to growers if they are not appropriately managed. The best way to manage these pests is integrating multiple control tactics, which are currently recommended, although growers mostly rely on frequent pesticide application. On the other hand, organic cucurbit growers rely primarily on organic nutrient sources for managing plant nutrition. This has become a challenge for organic growers since organic nutrient sources, including compost, manures, other organic amendments and green manures, release nutrients slowly and nutrient availability is often unpredictable, especially organic nitrogen, which must undergo mineralization to become available. A three-year field experiment was conducted in Pennsylvania to examine the combined effect of row cover (RC), compost application and PGPR (plant growth promoting rhizobacteria) on organic cucurbits production. Plots were assigned to three RC treatments (removal at anthesis, removal 10 days after anthesis and no RC), three nutrient treatments (high amount of compost, low amount of compost, and organic bagged fertilizer), and two PGPR treatments (with or without), in a split plot factorial design. The objective of the study was to evaluate these combined treatments to manage the cucumber beetle and bacterial wilt complex, squash bugs, soil fertility and plant nutrition in organic muskmelon and squash production without compromising yield. Row covers modified the crop microclimate by increasing air and soil temperature on both cultivars. In muskmelon, removing RC 10 days after anthesis significantly reduced cucumber beetle and bacterial wilt disease and increased plant nutrient concentration, earliness and yield. In squash, removing RC at anthesis prevented squash bugs from laying their eggs in plants and significantly increased yield. Applying low amount of compost seems to be the best nutrient treatment, reducing bacterial wilt and squash bug egg masses, and increasing soil fertility and organic matter without impacting yield compared to the organic fertilizer in both cultivars. PGPR had no significant effect in either cultivar. Results from this study provide immediate management options to organic cucurbit growers to adopt and increase farm sustainability and yield in the eastern part of the United States. The study suggests different combination of RC and compost on muskmelon and squash as an integrated pest and nutrient management strategy in the organic production in Pennsylvania.

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