

Perimeter Trap Crop Demonstration Trial for Cucumber Beetle in Butternut Squash

Michelle Infante-Casella
Agricultural Agent
Rutgers Cooperative Extension of Gloucester County
New Jersey Agricultural Experiment Station
1200 N. Delsea Drive, Clayton, NJ 08312
<http://www.gloucester.rce.rutgers.edu>

Abstract:

Striped cucumber beetle (*Acalymma vittatum*, Fabricius) is a major pest of all cucurbits in the Mid-Atlantic region of the United States. This insect pest transmits the bacteria *Erwinia tracheiphila* that causes the disease bacterial wilt in cucurbit crops. Even with conventional insecticides this pest causes major economic loss for farmers each season. Alternative control methods in conjunction with presently used tools need to be adopted by growers. Past research done by Andrew Cavanagh and Ruth Hazzard at the University of Massachusetts has shown that the use of perimeter trap crops for controlling striped cucumber beetle in butternut squash (*Cucurbita moschata*) has proven effective. The use of 'New England Blue Hubbard' (*Cucurbita maxima*) as a perimeter trap crop around a field of 'Waltham' butternut squash was demonstrated in Mullica Hill, New Jersey during the 2006 growing season. This demonstration trial resulted in reduced insecticide applications to control cucumber beetle.

Squash is one of the most important vegetable crops in New Jersey. This commodity is produced predominately for the fresh market with a small percentage produced for freezer processing and baby food. The U.S.D.A. National Agricultural Statistics Service reports that squash acreage in New Jersey for 2005 was 3,100 acres and 3,200 acres in 2004. The acres planted have remained relatively stable over the past decade. Crop value does fluctuate from year to year based on average pricing. In 2004, New Jersey's squash crop was valued at \$12,066,000 and in 2005 the value dropped to \$7,924,000 even with acreage remaining about the same. The bulk of winter squash production consists of butternut squash. Acorn squash and spaghetti squash are the other two types that are grown in large acreage. Some specialty winter squashes that are grown in small amounts include Calabaza (Spanish pumpkin), Delicata types, hubbard types, and cheese pumpkins.

Temperature conditions in New Jersey are favorable for winter squash production. The main insect pests affecting this crop include seed corn maggot, cucumber beetle, squash vine borer, aphids, squash bug, mites, and whiteflies. Some insecticides are effective in controlling most of these pests. Cucumber beetle is problematic because it vectors bacterial wilt. This disease rapidly infects the plant at any growth stage. The plant becomes infected, vascular tissue clogs with bacteria, the plant wilts, withers, and dies.

Perimeter trap cropping is based on the fact that insects prefer on species or variety of plant over another, due to morphology, relative concentration of feeding stimulants, or other factors (Cavanagh and Hazzard 2006). When the more attractive plant is established around a perimeter of a field, insects should concentrate in the field edges and not feed on the center of the field (the main crop). Since cucumber beetles over winter in the woods edges around fields

perimeter trap cropping systems are a good fit for control of this insect pest. When populations of beetles build in the perimeter trap crop, the producer can control the pest with insecticides applied only on the perimeter rows of the field. This method provides time and economic savings to the producer.

Materials and Methods

A butternut squash demonstration trial was conducted utilizing a perimeter trap crop of ‘New England Blue Hubbard’ squash to attract cucumber beetle to reduce insecticide sprays. The field was located on a commercial vegetable farm in Mullica Hill, New Jersey. Both blue hubbard and butternut squash were seeded on 11 May at a spacing of 72 in. between rows and 24 in. between plants in a row. Three rows of blue hubbard were seeded around the entire perimeter of the 8 acre field.

Field scouting for insect pests began on 25 May, with scouting conducted 2 times weekly. One hundred random plants of blue hubbard and 100 random plants of butternut were evaluated for insect pests. Live insects were counted and recorded. Insecticide applications were recommended when populations of insect pests reached 10%. The farmer made 3 insecticide applications to the blue hubbard perimeter trap crop only on 31 May, 9 June, and 15 June. Scouting was discontinued when the vines of the butternut began to run and fungicide applications began to control diseases.

Results and Discussion

This demonstration trial showed that planting ‘New England Blue Hubbard’ squash as a perimeter trap crop for ‘Waltham’ butternut squash attracted striped cucumber beetle to the trap crop. The grower reported 85% less insecticide application to control cucumber beetles in this field. The system was successful and cucumber beetle were only found in the trap crop and insecticides were only applied to the perimeter trap crop.

Table 1. Number of live cucumber beetles per 100 plants.

Date	Hubbard	Butternut
25-May	0	0
31-May	47 (s)	0
2-June	4	0
5-June	14	0
9-June	11 (s)	0
13-June	5	0
15-June	7 (s)	0