

2008 Field Study on Organic Control of Cucurbit Pests Tewksbury Grace Farm

In 2007, in cooperation with PASA and Penn State Cooperative Extension, we conducted a successful trial of organic control of cucurbit pests in field cucumbers and winter squash. Methods of control were fairly simple, basically using hoops and barrier cloth (Agribon 19) to keep out unwanted pests, namely squash bugs, striped and spotted cucumber beetles, and squash borers. A hive of bumblebees was placed under each crop “tunnel” to pollinate flowers.

Because of the success of the 2007 trial (we had experienced regular cucurbit crop failure prior to that season), we again partnered with PASA and Penn State Cooperative Ext. to conduct another cucurbit field study, using the techniques developed in 2007, but with a new row cover material called Enviromesh.

Some background: we sought a new material to replace the Agribon because we found it trapped excessive heat in the tunnels, and during the height of summer (with last year being very hot and droughty), these very hot conditions caused chronic stress on the plants. Tunnel ends had been screened to provide venting, but did little to alleviate trapped heat. We also found that Agribon was easily subject to wind damage and disturbance. Though adequately bricked down, the material acted like a kite, and several times came completely undone, thus potentially exposing plants to pests as well as creating tedious labor to reinstall. Finally, the Agribon was significantly tattered after two hailstorms in the '07 season, thus allowing the possibility for unwanted pests to access the plants and also our bumblebee pollinators to exit. After some research, our group decided on a promising material, Enviromesh, that was supposed to be durable and non-ripping, and not trap heat, since it is a screen-like material.

Cucumbers

We planted 3 succession crops of cukes in a 75' l x 4' w raised bed, the first transplants going in May 31, the second round on June 5, and the final round on June 11. We planted 1/3 of the bed at each time, with 24" spacing, 2 transplants offset down the row. Roughly 10 varieties of cukes were interplanted, including white, Asian, and traditional (e.g., Marketmore) style fruits.

After transplants were planted, a heavy layer of straw mulch was applied to the bed. Then, the bed was hooped with 9-gauge wire, covered in Enviromesh, and bricked down on all edges. A bumblebee hive was placed under the “tunnel” on June 13.

We had great success again with this method, and found the Enviromesh to perform well, though we noticed that plant tendrils would latch on to the mesh and create small openings. No striped or spotted cucumber beetles were seen inside or outside the material. We definitely plan to use these control methods in the future.

2008 cuke harvest was excellent, yielding 860 lbs from June 27 to Aug 18, and bearing unblemished fruit.

Winter Squash

This year we added an additional section of winter squash, for a total of two 75' 1 x 4' w raised beds.

On May 27, we planted 12 varieties of winter squash, using 24 inch spacing, with 2 plants offset down the rows. Heavy straw mulch was applied after planting.

Using 9-gauge wire hoops and flexible 10' pieces of 1/2" PVC piping inserted over rebar, we covered a 75' 1 x 20' w section with Enviromesh. A hive of bumblebees was placed under the tunnel on June 27.

Plant growth was robust with lots of vining and formed fruit. We noticed squash bugs on the exterior of the material by late June. As the squash plants grew, leaves pressed against the material, and we observed squash bugs feeding and laying eggs on the leaves through the material (squash bugs unable to do this through Agribon). As with the cukes, squash tendrils attached to the Enviromesh and created small openings. This material is not knit, so if it is snagged in any way, it tends to open and unravel. Also, after installation we noticed about a 4-inch opening along a center seam, apparently missed during the custom sewing.

Despite seeing some squash bugs on the exterior, all was well until we pulled the cloth off to inspect plants on July 29 where we found widespread squash bug infestation (eggs and nymphs) throughout the patch. We hand groomed plants as best as possible. On Aug 3, we inspected again, and found continued infestation, also observing a few striped and spotted cuke beetles under the material. Again, we hand groomed plants.

At this time, we have had to pull a few plants. There is moderate damage to plants, though fruit has formed that appears to be maturing. If the plants can stay alive long enough for the fruit to ripen, we should get a fairly decent harvest.

We cannot determine how such a severe infestation occurred – it is as if there was no cover on at all. The few scattered holes did not seem sufficiently large and accessible enough to allow such a severe infestation. There were no cucurbits on these beds prior to 2008. We are uncertain whether to use Enviromesh for this again.