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Horticulture Research

Flea Beetle Control in Eggplant

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http://bit.ly/pfi_horticulture

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In a Nutshell

- One of the biggest pest problems in organic production of egg plant is flea beetles.
- In this study, two farms tested the effectiveness of kaolin clay and row covers.
- The treatments were not significantly different from each other in most years.
- Overall, greater eggplant protection, either from the kaolin clay or row covers, increased the total yield of the marketable eggplants.
- Weighing the costs and time needed to apply these crop protections with the potential income is a critical next step for eggplant farmers.

Project Timeline:
March 2010 to September 2012

Kaolin clay and row covers were tested to determine their effectiveness in controlling flea beetles on eggplants at Scattergood farm.

About the Cooperators

Scattergood Friends School is a small Quaker boarding school about 15 miles east of Iowa City at West Branch. They have a farm with approximately 10 acres of IDALS-certified organic gardens and orchards and about 30 acres of pastures, upon which they grass-finish beef and lamb. Scattergood Farm also raises a few heritage breed Guinea hogs, a small flock of turkeys, occasional broiler flocks, and a laying flock of about 100 chickens. Scattergood primarily grows food for their school, but also markets some products through New Pioneer Coop in Iowa City and Coralville.

Ben Saunders managed Turtle Farm, now Wabi Sabi farm, near Granger in 2010 and 2011 when he conducted a similar trial to the one conducted by Scattergood Friends School. This certified organic fruit and vegetable operation supplies food to 185 families through their community supported agriculture (CSA) program, which has been in operation since 1996, one of the first CSAs in Iowa. Turtle Farm also sells food to restaurants, through an on-farm stand and at a farmer's market.

Background

One of the biggest pest problems in organic eggplant production system is flea beetles. Flea beetles feed heavily on solanaceous plants, especially on eggplant leaves from transplant until flower set, killing the plant and affecting fruit development (Brust et al., 2006). An organic pest control called Surround® WP, a kaolin clay product, has been developed. The previous studies on the effectiveness of kaolin clay in controlling flea beetle population seem to be mixed (Worley 2012). While one study resulted in a significant decrease in flea beetles when kaolin clay was applied at transplant stage (Brust et al., 2006), another study did not find kaolin clay to reduce the flea beetle damage on eggplants (Maletta et al., 2002). Practical Farmers' cooperator Ben Saunders tested kaolin clay and row covers in 2010 and 2011 to measure their effectiveness at reducing flea beetle presence and damage. In the 2010 trial, while yields were higher in both the kaolin clay and the row cover treatments than the control, no statistical analysis was conducted. 2010 was a very wet year and kaolin clay was not practical as it needs to be reapplied when washed off with rain. In 2011, Ben replicated the trial and the yield for both kaolin clay and row covers were significantly greater than the control. In 2012, Mark Quee, a new cooperator for this research project, examined the potential for kaolin clay and row covers to decrease the presence of flea beetles and extent of flea beetle damage.

Methods

Mark compared 'Black Beauty' eggplant using three treatments: control, Agribon+™ 19 row cover, and kaolin clay (Surround® WP).

Scattergood Farm planted four random replications of ten plants each for each treatment, taking data on the eight center plants in each replication. Transplants were seeded in March and moved to field on 6/04/2012 at the size of four to five inches. Guard row eggplants were planted on each side of the experiment. The eggplants were planted 18 inches apart, with three and six feet between rows.

Row covers were placed on eggplants at time of transplant and removed at flower formation. Surround® WP was applied at transplant and weekly thereafter until flower formation.

Mark irrigated his eggplants after transplanting as well as seven times during the growing season with drip tape. Ripe fruit was collected and sorted into two categories, marketable and cull, based on exterior quality. The number of fruit and harvest weight was determined for both categories for each plot. Mark recorded the harvest window and plant health as well as weather notes throughout this project.

Harvest counts were collected four times during the season, on 7/30, 8/04, 8/20 and 9/05, 2012.

Results

This year, Scattergood Farm faced a unique problem with this project – they did not have any flea beetle pressure until a couple weeks into harvesting. Therefore, the control beds looked comparable to the row cover and kaolin clay treatments. Mark was not sure what attributed to no flea beetles this year.

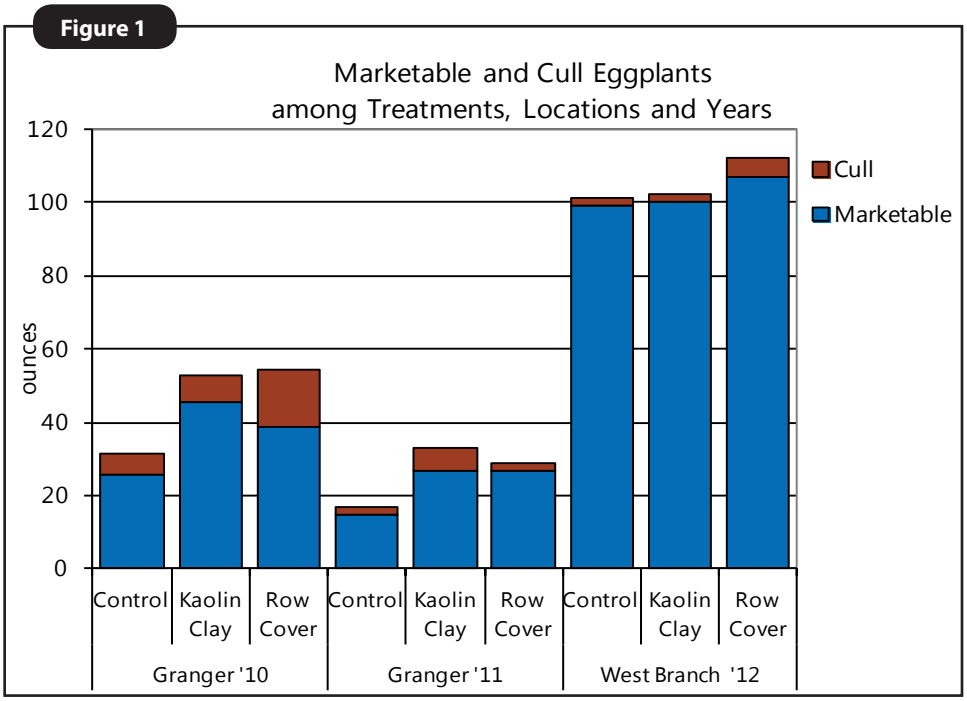
Replications were significantly different across the field, as Mark had noticed when the eggplants were transplanted. The transplants at the west end of the field looked more diseased than those at the east end. During harvest there was statistically lower eggplant yields on the west end yielding 55.8 oz. versus 132 oz. on the east end of the field.

The treatments: control, kaolin clay and row cover statistically all yielded the same marketable and cull eggplant amounts in 2012 at Scattergood Farm (**Figure 1**). The marketable eggplant yields in Granger in 2011 were significantly greater where row cover or kaolin clay was used. In 2010 while there was greater yields in treatments, yields were not statistically significantly different. Although not statistically significant in either year or location a trend was observed in all three years. Greater eggplant protection, either from the kaolin clay or row cover treatments, increased the total yield of the marketable eggplants. Although no analysis could be run in 2010 the cull eggplants were noticeably greater in the kaolin clay and row covers as compared to the control. In 2011 at Granger the amount of cull eggplants in the kaolin clay treatment was statistically greater than in the other treatments but not different in 2012 at West Liberty. Statistical analysis was not able to be determined in 2010 but still the observed trends might indicate an increase in the amount of culls as compared to the control.

Conclusions

For organic vegetable farmers of eggplant physical or non-toxic crop protection seems to increase crop yields from these on-farm studies. Weighing the costs and time needed to apply these crop protections with the potential income from these plants is a critical next step for eggplant farmers. Knowing more about the cost-benefit analysis of additional management will help determine if an increase in eggplant yield can compensate for the additional time and money of adding these crop protection methods.

Figure 1



Flea beetle research in action

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Cooperators' Program

PFI's Cooperators' Program gives farmers practical answers to questions they have about on-farm challenges through research, record-keeping, and demonstration projects. The Cooperators' Program began in 1987 with farmers looking to save money through more judicious use of inputs.