



Healthy Food, Diverse Farms, Vibrant Communities

Cooperator

Ben Saunders, Granger

Project Timeline

March-August 2010

Web Link

www.practicalfarmers.org

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Funding

Leopold Center for Sustainable
Agriculture On-Farm Research and
Demonstration

Background

Flea beetles feed heavily on eggplant leaves from transplant until flower set, killing the plant and affecting fruit development. Ben Saunders, PFI Cooperator, has used Spinosad, a biologically derived pest deterrent approved for use in certified organic agriculture, in the past to help control flea beetles. Other organically-approved pesticides to control flea beetle are available², but Ben is looking for a non-toxic physical control that won't harm beneficial insects.

Kaolin clay has undergone preliminary trials to control flea beetles.² Kaolin clay was effective at reducing flea beetle populations, but adversely impacted fruit quality and was difficult to wash off mature fruit. This trial looked at the potential impact kaolin clay has in the early season prior to fruit set.

Non-toxic, Physical Flea Beetle Controls

Abstract

Flea beetles are frequent eggplant pests that adversely affect yields and fruit quality. This trial tested two non-toxic physical controls, kaolin clay¹ (Surround WP) and row covers, applied from transplant to flowering, for their effectiveness in controlling flea beetle populations and subsequent damage. This first year's results show potential for both treatments, but more research needs to be done to say with more confidence that either measure is a viable flea beetle control option.

Method

This research project measured the difference between kaolin clay, row covers and a control in decreasing the presence of flea beetles and flea beetle damage.

Ben planted three plantings of ten eggplant plants in each treatment. Data was collected from the middle eight plants in each planting. Guard row eggplants were planted as a buffer on each side of the experiment. The



Ben Saunders manages Turtle Farm, a certified-organic fruit-and-vegetable farm near Granger.

Black Beauty eggplant was planted and two treatments were tested: (Reemay™), and kaolin clay (Surround WP) versus a control.

eggplants were planted 18 inches apart, with three to six feet between rows. Ben sowed his eggplant seeds the fourth week of March and

transplanted them to the field on May 24. The transplants measured about four inches tall and had approximately four true leaves. The plants were removed from the field August 31.

The farm crew removed the row covers June 17 to weed the treatment areas, totaling two hours of labor time.

Row covers were placed on each eggplant at the time of transplant and removed at flower formation. Kaolin clay was applied at transplant and every week until flower formation. Kaolin clay was reapplied when the farm received more than 0.25 inches of rain in a 24-hour period. Kaolin is

number of fruit and individual weight were determined for each category within each treatment. Ben also recorded the harvest window and observed plant health.

On August 31, the eggplants were still fruiting, but the fruit was small and the plants were not producing enough to justify further harvest. Pest damage was apparent on all treatments, and the plants appeared to be stressed or nutrient deficient from wet conditions.

An additional site was planned for replication of this trial, but wet conditions prevented them from collecting data this year.

Results

Flea beetles and flea beetle damage were first observed on the control June 7. June 21 Ben observed that the plants under row cover were significantly larger than the control and kaolin clay treatment. Flea beetle damage was first observed on the plants sprayed with kaolin clay July 21. June 28, blossoms started to open and Ben stopped applying kaolin clay and removed the row covers.

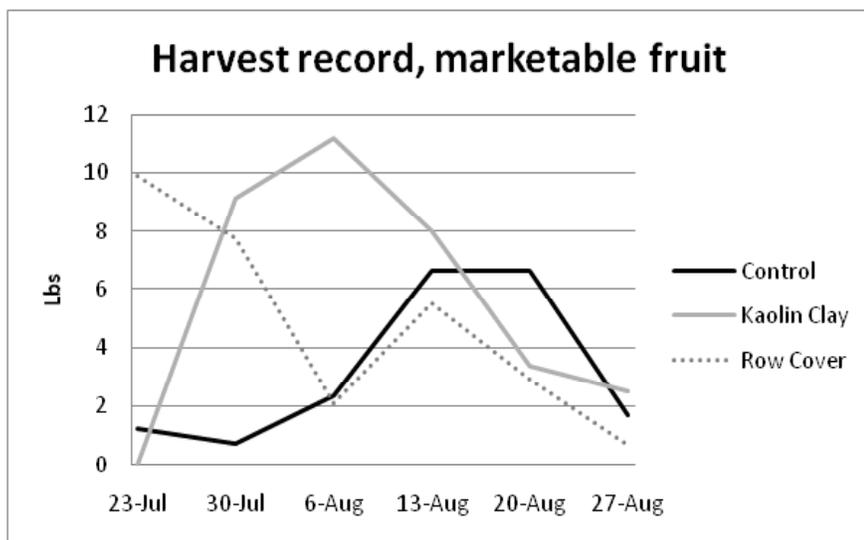
Chart 1 illustrates the harvest of marketable fruit from each treatment over time. Table 1 displays the total yield, average size, and percent marketable fruits. The plants treated with kaolin clay yielded the most by weight and quantity. They also had the highest percent marketable. Plants under row cover until flowering came in second for yield quantity and weight, but had the highest occurrence of culls.

Ben's recorded rainfall totaled 32.2 inches from May 24 to August 31. Due to heavy rainfalls, he had to reapply kaolin clay often, and the eggplants remained consistently wet.

Statistical analysis did not lead to a significant difference between yields because harvest dates were used as replications, creating a lot of variations in the data.

Conclusions

It took Ben approximately 45 minutes to mix and apply the kaolin clay for each application. He applied kaolin clay 11 times for a total of 8.25 hours of labor. Ben said, "In a less rainy season, I probably would have only needed to apply the kaolin clay half the number of times."



intended to be a physical barrier to the eggplants, and needed to be reapplied when washed off.

Ben irrigated his transplants right after transplanting and after one week. He did not fertilize or mulch his eggplants, and did not use any form of pest control other than the treatments.

Ripe fruit was collected and sorted into two categories, marketable and cull, based on exterior quality. The

Farm Cooperator

Ben Saunders manages Turtle Farm near Granger. Turtle Farm is owned and operated by Angela Tedesco. This certified-organic fruit and vegetable farm supplies food to 170 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.

The row cover took approximately two hours to install and one hour to remove. Ben reflects, “In hindsight I could have put weed fabric under the row cover to eliminate the two hour weeding time.”

Ben’s conclusions: “I think the extra yield does justify the time and expense for both kaolin clay and row cover. The plants in both the kaolin clay and row cover treatments appeared healthier and bigger throughout the season. They both produced significantly more eggplant and the eggplant they produced also individually weighed more than the control.”

Ben does question the practicality of using kaolin clay if Iowa summers continue to be as wet as this year’s: “If this season is indeed becoming the



Preliminary results of this study show potential promise for both row covers and kaolin clay used from transplant until flowering as effective non-chemical controls for flea beetles in eggplant. Further research with a larger range of replications would help determine if this initial study’s

References

1What is kaolin and how does it work?

Surround WP presents a unique form of pest control: a non-toxic particle film that places a barrier between the pest and its host plant. The active ingredient is kaolin clay, an edible mineral long used as an anti-caking agent in processed foods, and in such products as toothpaste and Kaopectate. There appears to be no mammalian toxicity or any danger to the environment posed by the use of kaolin in pest control. (ATTRA Reduced-Risk Pest Control Factsheet, <http://attra.ncat.org/attra-pub/PDF/kaolin-clay-apples.pdf>)

2Flea Beetle: Organic Control Options, <http://attra.ncat.org/attra-pub/fleabeetle.html>

	Control	Kaolin Clay	Row Cover
Total yield (lb)	19.3	34.2	28.9
Average size marketable fruit (oz)	18.2	20.3	20.1
Average size cull fruit (oz)	14.2	12.6	19.1
Number marketable fruit	17	27	23
Number cull fruit	5	7	10

new ‘norm,’ I don’t think I could justify using the kaolin clay. There were times when I was applying it every other day and this would not be very practical when applying to an entire row(s) of eggplant.”

observations are representative of the potential these treatments have for flea beetle control.

