

Cooperator

Jason Jones, Pleasant Hill

Project Timeline

September 2009–May 2010

Web Link

www.practicalfarmers.org

Contact

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Funding

SARE, Walton Family Foundation,
Green Lands Blue Waters

Background

Weeds are a constant nuisance at The Homestead, a Certified Naturally Grown farm near Pleasant Hill, as they are at many organic and chemical-free vegetable farms.

Cover crops offer many benefits, from added fertility, erosion prevention, improved soil tilth, an additional rotation to break pest-and-disease cycles, and weed control.

The Homestead was interested in all the benefits cover crops offer, but in this case, they wanted to see if there was an impact on spring weed germination after planting a cover crop in the fall.

Effectiveness of White Mustard on Spring Weeds

Abstract

Jason Jones of The Homestead near Pleasant Hill planted white mustard (*Sinapis alba*) fall 2009 to test its impact on weed germination in spring 2010. White mustard germinated uniformly and winter killed in late November 2009. Weed counts were not statistically different between mustard plots and the bare ground control. Carrot germination was slightly less in the mustard plots than in the bare ground control, but not enough to create a statistical difference.

While results did not show that there was reduced spring weed germination, Jason was satisfied with the cover mustard provided on his field for erosion control. Since the mustard winter killed, no cultivation was necessary in the spring and the bed was clean enough to plant into without a spring tilling.

White mustard (*Sinapis alba*) mulched into the soil is purported to have biofumigant activities that have the potential to inhibit germination of weed seeds (Suszkiw, 2004).

Method

Jason Jones, farm manager at The Homestead, planted white mustard by hand at a rate of one oz. per 100ft² on September 4, 2009 following garlic and beet crops.

Jason planted the cover crop treatment and a control (bare ground) in randomized strips that



April 14, 2010: Jason Jones crouches behind a plot of mustard residue that winter killed on left, and the bare ground control treatment on the right.

were replicated six times across the field and then split those plots the following spring into weedy and weed-free subplots.

Weeds were counted within each subplot four times using a square foot quadrat in the spring on April 14, 2010. Jason cultivated half of the plot using a Williams flex-tine weeder for a weed-free germination bed, and half he left “as is” for the weedy germination treatment. Jason planted carrot seeds April 30 and then measured plant stands on May 14 using four quadrats within each subplot.

Carrot germination was measured in one foot square quadrats. Germination was recorded on both weedy and weed-free plots to determine if the mustard cover crop impacted germination of the cash crop. Carrot germination was quite low in all treatments. Jason unintentionally used one-year-old coated carrot seed for the trial, which could have significantly reduced carrot germ and skewed overall germination results.

The data were analyzed using an Analysis of Variance (ANOVA) to determine treatment effects. All statistical analysis was performed using JMP8.

Farm Cooperator

Jason Jones is farm manager at The Homestead, a living and learning center for people with autism. The campus includes an agriculturally based vocational program for adults with autism that employs 24 campus residents and several people who live in the Des Moines area. They raise Certified Naturally Grown fruits and vegetables, on approximately six acres of land, which they market through community supported agriculture (CSA), the Iowa Food Cooperative,

and Farm to Folk. They also grow one acre of apples and raise vegetable transplants for sale in the spring and poinsettias for sale in the winter in their heated 5,000-square-foot greenhouse.

Results

According to Jason’s visual observations, the mustard germinated

and total weed counts for mustard, cover crop treatment plots, was 136 plants/ft². The control had over 50% more weeds present than the mustard plot. However, as reported in chart 1, the control had one replication with significantly higher weed counts than the other five replications. If this replication is excluded, total weed counts were more similar between the

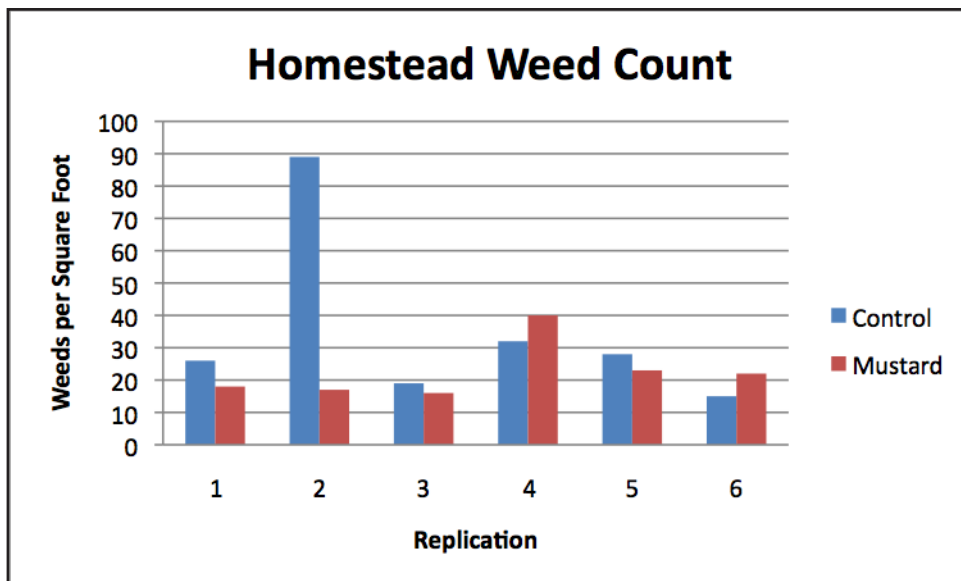


Chart 1. Homestead weed count April 14, 2010.

The control plot had over 50% more weeds present than the mustard plot.

uniformly and created 80-90% cover in the fall. It winter killed late November 2009. Also according to Jason’s observations, 40-50% white mustard residue covered the soil in the spring.

Weed counts are reported in chart 1. Total weed counts for the control, or bare ground plots, was 209 plants/ft²,

cover crop 119 plants/ft² and control plot 120 plants/ft².

No significant difference of number of weeds was measured between the mustard and control plots ($p=0.9705$).

Carrot germination was also measured. Chart 2 (pg. 3) reports carrot germination in both the weedy and weed-free treatments. In each instance, germination was higher where the Williams tine cultivator was not used prior to seeding.

Chart 3 (pg. 3) illustrates carrot germination by treatment. Average germination was 72 plants/ft² in

the control and 62 plants/ft² in the mustard plots resulting in 16% greater germination in the control plots. However, this was not statistically significant ($p=0.6892$).

Conclusions

Although no significant statistical differences were found between the control (bare ground) and the cover crop treatment, (white mustard) plots, Jason observed benefits in planting the cover crop: "It provided a good cover to hold the soil. Even though the data doesn't show it, it looked like there were less weeds where the mustard was planted."

Jason found the seeding of the mustard to be easy and fit into his fall schedule. He does not have a seed drill, but thinks white mustard may have more potential if seeded with a drill, then followed by a cash crop seeded using a drill in the same location.

To reduce potential adverse impacts of a mustard on cash crop germination, Jason plans on using a larger seeded crop such as a legume after mustard. Since mustard winter killed, it created a seed bed clean enough to spring sow the cash crop without needing to spring till.

One challenge white mustard poses as a cover crop is its crop family (Brassicaceae). Since it is a brassica, it may prove difficult to add into a rotation on a vegetable farm that raises a large amount of brassica crops. Jason Jones: "As a result of this trial, mustard is now part of my cover crop 'tool box.' I had not planted mustard as a cover prior to this trial, but plan on continuing to implement it into my cover crop plan."

References

Suszkiw, Jan. "Mustard for Pest Control, Not for Your Sandwich." Agricultural Research. October 2004: 14-15

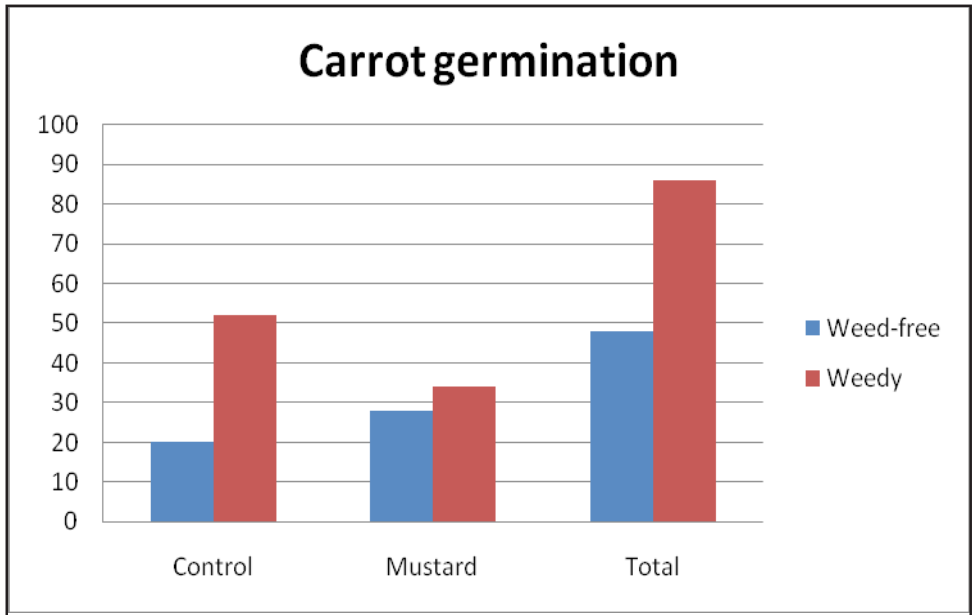


Chart 2. Carrot germination comparing weedy and weed-free areas.

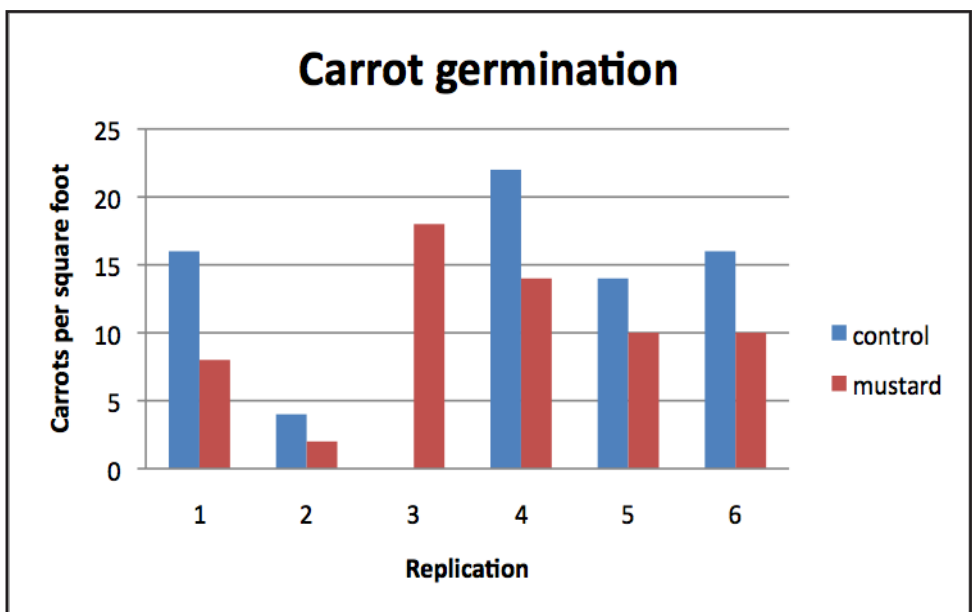


Chart 3. Carrot germination by treatment.