



Healthy Food, Diverse Farms, Vibrant Communities

Cooperator

Mark Quee, Scattergood Farm, West Branch

Project Timeline

July 2010 to June 2011

Staff Contact

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Web Link

http://tinyurl.com/covercrops2vegetableground

Funding

Sustainable Agriculture Research and Education

Role of Cover Crops in Converting Perennial Pasture to Vegetable Ground

Written by Sally Worley

Abstract

Scattergood Farm measured the effects of two cover crops or no cover crop on numbers of weeds and compaction measured by soil density in a vegetable crop following a transition from a pasture. The treatments tested were buckwheat followed by winter rye mixed with hairy vetch cover crop, buckwheat followed by tillage radish cover crop, and no cover crop. In the past Scattergood Farm has transitioned pasture to vegetable-production fields with excessive tillage and faced significant weed pressure and compaction in these newly transitioned fields. Results from this study did not show statistically significant differences in numbers of weeds between cover crop or no cover crop treatments. However, farm manager Mark Quee observed differences in the field and plans to incorporate more cover crops into his pasture-to-vegetable-ground transitions.

About the Cooperator

Scattergood Friends School is a small Quaker boarding school about 15 miles east of Iowa City, 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 also raises a few heritage breed Guinea hogs and has a couple Berkshire sows, a small flock of guinea fowl and turkeys, broiler flocks and a laying flock of about 100 chickens. Scattergood Farm primarily grows food for its school but also markets through New Pioneer Coop in Iowa City and Coralville, and is trying to support the nascent West Branch farmer's market.

Background

Scattergood Farm converted pasture from perennial alfalfa and clover to vegetable crop ground from summer 2010 to spring 2011. They wanted to test whether a cover crop could aid their transition of pasture



Pre-tillage and planting, March 24, 2011

ground to vegetable crop production without increasing their weed pressure or potentially compacting the soil. The book Managing Cover Crops Profitably provides data that cover crops are effective at reducing weed pressure and soil compaction; Scattergood wanted to know if cover crops would produce measurable results for this purpose in less than one year.

Method

Mark Quee, Scattergood Farm manager, conducted the trial using a randomized, complete-block design, with four replications. Treatments included: buckwheat followed by a mix of winter rye and hairy vetch, buckwheat followed by tillage radish and a no-cover-crop control. Each plot was 12' X 25'. All cover crops were planted with a drill. Treatment one consisted of buckwheat (rate 70lb./acre) followed by winter rye (50lb./acre) mixed with hairy vetch (25lb./acre). Treatment two consisted of buckwheat (70lb./acre) followed by tillage radish (14lb./acre). The control



After tillage radish



Hairy vetch and rye

Table 1

Date	Treatment 1	Treatment 2	Control
7/1/2010	till 4"	till 4"	till 4"
7/15/2010	buckwheat	buckwheat	
8/12/2010	mow and till 2"	mow and till 2"	mow and till 2"
8/26/2010	winter rye and hairy vetch	tillage radish	
4/14/2011	mow and till 2"	mow and till 2"	mow and till 2"
4/14/2011	Plant cash crops	Plant cash crops	Plant cash crops
5/19/2011	Weed counts	Weed counts	Weed counts

Table 1. Calendar of Mark Quee's activities.

was left bare. All treatments were tilled 4-inches deep on July 1, and were mowed and tilled 2-inches deep on August 12.

Cash crops planted in the spring included lettuce, spinach, peas, arugula and turnips. Six weed counts were taken per plot one month following cash crop planting.

Results and Discussion

The mean weed count for the control was 9.1, for the tillage radish plot was 8, and for the vetch rye plot was 6.25 (**Graph 1**, Cover effect on weed count). Using analysis of variance, no significant difference was measured between the treatments. ($P > .3696$).

The average bulk density (g/cm^3) for the control was 1.17, for the tillage-radish treatment was 1.14, and for the rye-vetch treatment was 1.16. Using analysis of variance, results show there is no statistical difference in bulk density between the treatments ($p > .829$).

Although no statistical difference was found, Mark observed a visual difference in weed pressure between the plots: "There were no weeds in the tillage-radish plots in the spring before the cash crop was planted. Weed pressure was minimal in the winter-rye-and-hairy-vetch cover crop. The winter rye did become a weed in the

vegetable crop." When Mark tilled in the winter rye, he approximates that 95% died but 5% re-established and became mature grass. Mark: "The vetch was sufficiently killed. People are afraid of vetch becoming a weed, but it wasn't a problem." The tillage radish did not over-winter although it did leave holes across the field where it decomposed.

Conclusion

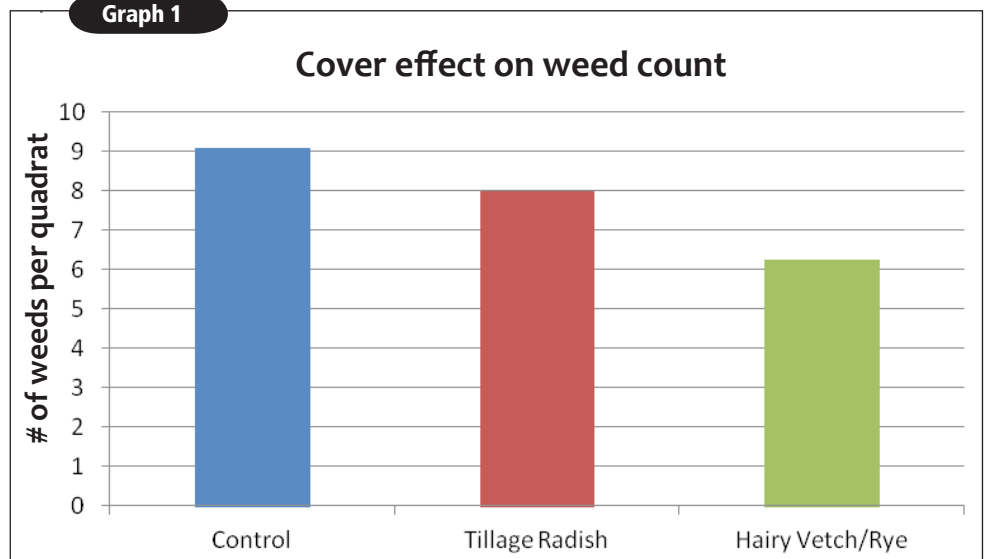
Mark felt the cover crops assisted his conversion from pasture ground to vegetable plots. He felt the cover crops helped build soil and reduced weed pressure significantly in preparation for vegetable plants. "I observed the beneficial traits of tillage radish, and the

most important thing I learned was the significance of buckwheat. Evidenced by a tractor tire that didn't match up with our tillage equipment; there was an almost immediate and aggressive pasture rebound except where the buckwheat was planted." Mark plans to use buckwheat more aggressively when converting fields from perennial to annual crops. He has already done so in another transition field, and the use of buckwheat has resulted in clean beds.

Mark felt the experience of participating in the trial was beneficial: "It was well-timed and interesting, and I learned some important things that I will implement in the future, even though the statistics don't support what I learned. In the past when I converted pasture to annual crops, I did repeat tilling—it was a waste of time and gas, and didn't do much to build the soil. This project was great!"

References

Sustainable Agriculture Network. 2007. *Managing Cover Crops Profitably*, 3rd edition. Sustainable Action Network, Beltsville, MD.

Graph 1**Chart 1.** Mean number of weeds per treatment (approximately 1ft^2).