

Cover Crops as Living Mulch Under Organic Vegetables at Roots & Shoots Farm

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Project Description

Incorporating leguminous cover crops into vegetable rotations is known to improve soil quality and increase nitrogen availability to subsequent crops but it can be difficult for small vegetable growers to include season-long leguminous covers on limited land. Further, establishing winter covers after harvest of late season crops like winter squash and Brussels sprouts is not always feasible. Using cover crops as living mulches under vegetable crops could address both of these issues if growers can find a balance between vegetable and cover crop resource use. In the first year of this study we established two clovers under two vegetable crops while monitoring for potential loss of vegetable yields. In the second year, we planted two vegetable crops into those established clover aisles, again aiming to minimize yield loss. If the cover crop can be established under vegetable crops in this way, small-scale growers can have more total land protected by winter covers and can increase soil quality through the use of legumes without having to take land out of vegetable production.

Project Design

The research is taking place on four organic farms in south central Wisconsin. Each farm has two replicates of the three treatments for acorn squash and Brussels sprouts. The three treatments are (1) undersown with medium red clover (MRC), (2) undersown with Dutch white clover (DWC), and (3) standard clean cultivated (Control)

Year One, 2015 - Living aisles were established under the vegetables.

Year Two, 2016 - The two vegetable crops traded plots and were planted into 24" tilled strips in the center of each block. At first weeding, half of each treatment was (a) mulched with marsh hay to completely cover the tilled planting strip, or (b) maintained as clean cultivated in the planting strip (control).

Data being collected includes weed and clover densities and biomass, soil moisture, vegetable harvest data, and labor time for each treatment.

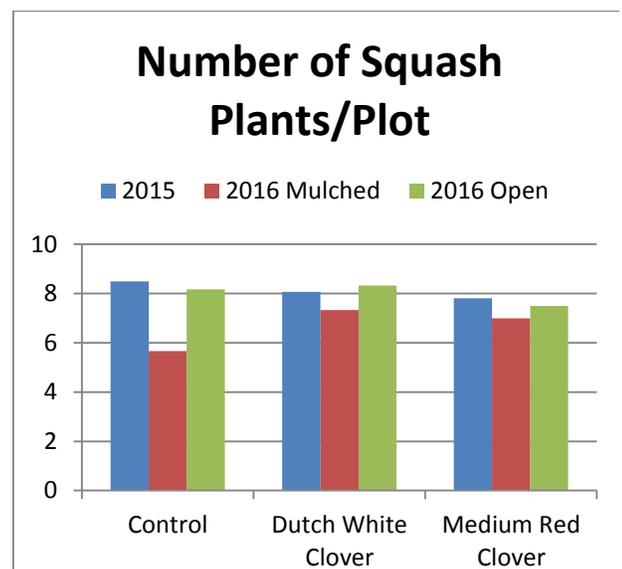
Year Two Timeline 2016

- week of 5/24: clovers mowed, tilled 24" planting strips into center of plots, vegetable crops planted in single rows, 5' on center, 18" between plants, all vegetables planted with water and 1 pint of compost in the transplant hole, row cover used at planting on all but one farm
- week of 6/7: weeded all plots, applied marsh hay mulch on half of each plot to completely cover the planting strip.
- Week of 8/16: harvested acorn squash

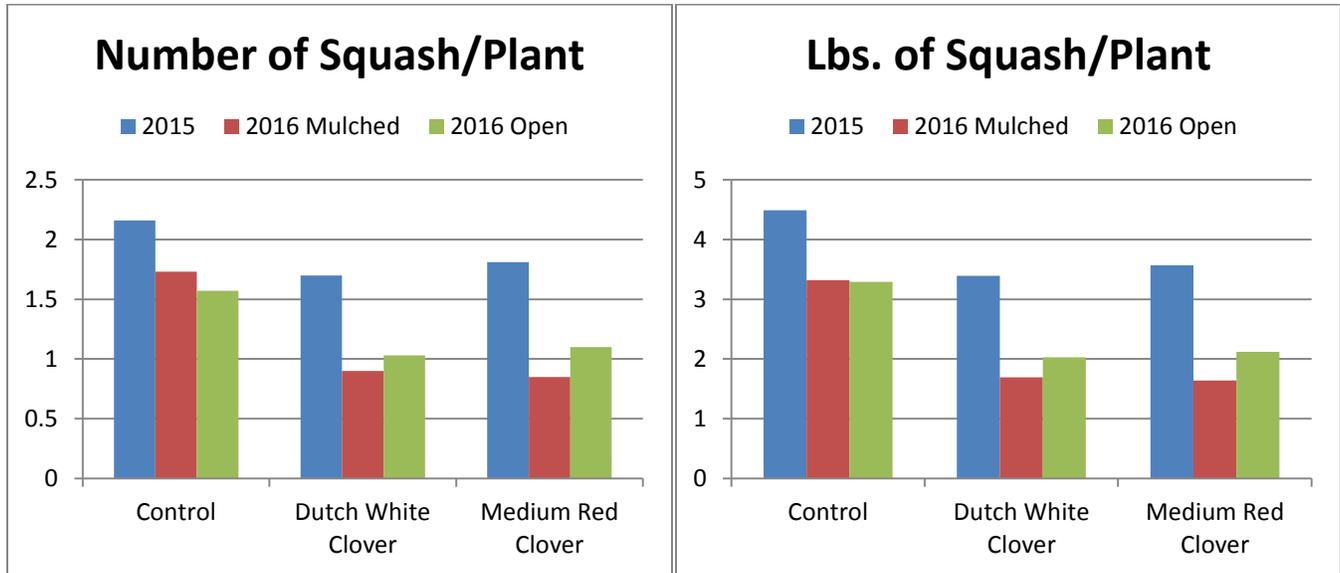
Roots & Shoots Field Map 2016

Heidi's crops

5'	1A DWC		2A MRC		3A Control		Brussels
	Open	Mulch	Open	Mulch	Mulch	Open	
5'	1B DWC		2B MRC		3B Control		Acorn
	Open	Mulch	Mulch	Open	Mulch	Open	
5'	4A MRC		5A Control		6A DWC		Brussels
	Mulch	Open	Open	Mulch	Mulch	Open	
5'	4B MRC		5B Control		6B DWC		Acorn
	Open	Mulch	Mulch	Open	Open	Mulch	
	16.5'	16.5'	16.5'	16.5'	16.5'	16.5'	beans & field road



Preliminary Results



- Acorn squash under performed in 2016 due to disease and insect pressure.
- Marsh hay mulch negatively impacted squash plant survivorship, especially in the controls. Interestingly, marsh hay mulch, negatively impacted yields of acorn squash **per plant** in the clover treatments, but not in the control.
- Brussels sprout harvest data is still being collected. After the first 2016 harvest, the control plots yielded more than the clover treatments. And the mulched plots yielded more than the open plots within each treatment. 2015 data also showed that Brussels sprout yields were negatively impacted by the living aisles.
- Mowing the clovers through the season was more difficult than expected for two reasons. Though the squash variety chosen was described as having a bushy growth habit, in fact it vined quite a bit, getting in the way of the mower. Also, three of the farms used common lawn mowers that were not self-propelled making pushing them through tall clover difficult. One farm had a special self-propelled mower that was both easier to use and cut the clover high enough to allow for faster regrowth and better weed suppression.
- Tilling the planting strips into the established clover was more difficult than expected. It may have been better to exclude clover seeds from the 24" planting strip in year 1, both as a way to improve vegetable yields and to make tilling into the clovers easier in the second year.
- Analysis of 2015 labor data showed that while less labor was used in the treatments, the cost savings was not enough to make up for the loss of yield.

Final Results and Recommendations

While we did not realize our goal of using living mulch aisles under acorn squash and Brussels sprouts without a loss in yield, we will be able to outline some recommendations for farmers interested in moving forward with this idea. There are many reasons why using cover crops as living aisles are still worth exploring, including their ability to keep soil in place and make it easier to work it the field in wet years like 2016. Our final report will be posted to the SARE database in early 2017.

This project is funded through a SARE Partnership Grant. For access to final reports, search the SARE database for project number ONC15-011 or contact Claire@csacoalition.org.

<http://mysare.sare.org/mySARE/ProjectReport.aspx?do=viewProj&pn=ONC15-011>



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