Research Report: HORTICULTURE 2017
Living & Dry Spring Mulches in Garlic

Ecological Farmers Association of Ontario

FARMER-RESEARCHER

Ken Laing, Orchard Hill Farm - West Region

WHY IT MATTERS

Garlic on small organic farms is typically either dry mulched (e.g. straw) or grown in bare soil and cultivated for weed control. Farmers would like to see the soil covered to prevent erosion, increase water retention, and improve soil nutrition. However, water retention could increase nematode pressure and green mulches could compete with garlic. **Ken set out to see if there was a difference in yield of marketable garlic between cultivation and spring mulches.**

RESEARCH QUESTION

Is there a difference in labour and/or yield between garlic that is cultivated when compared with hay or winter wheat?

METHODS

Ken compared three spring garlic management strategies. All garlic was the Orchard Hill Farm landrace variety, and fall planted no-till into an oats/peas/barley cover crop.

1. Ken's **control** was to manage garlic by regular cultivation passes on bare soil.
2. A **dry mulch** of hay was spring applied in some plots, to help with moisture retention and weed suppression.
3. Finally, Ken planted winter wheat as a **green mulch** in the spring on the remaining plots. He chose a winter cereal for spring planting so the plants stay vegetative and do not grow up so tall.

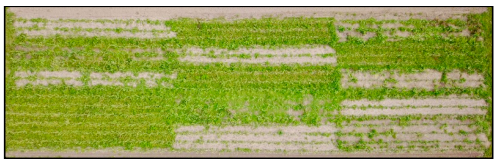
Blocks	Bed	Treatment		
Block 1	15 14 13			
Block 2	12 11 10			
Block 3	9 8 7			
Block 4	6 5 4			
Block 5	3 2 1			

***Figure 1**. Ken's experimental layout. He split the field into 15 test plots that were three rows wide for ease of management. Treatments were assigned with a randomized complete block design with five replicates. **Green** = Winter wheat green mulch; **Orange** = Hay mulch; **Brown** = cultivation.*

Predictions

Ken predicts the yields will be highest in the dry mulch beds, followed by cultivated beds, and heads will be smallest with green mulch.

RESULTS



An aerial view of the treatments plots replicated 5 times

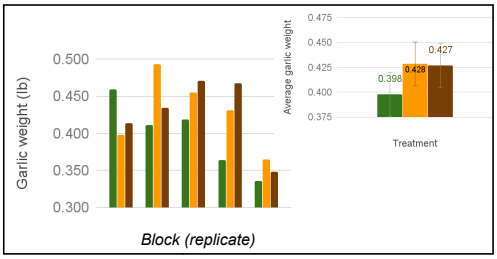


***Figure 2.** Green garlic average weights across three treatments in each plot and average across all plots (inset; P=0.56). **Green** = Winter wheat green mulch; **Orange** = Hay mulch; **Brown** = cultivation.*

- Both kinds of mulch have extra expenses for materials and application, and weeding must be done by hand.
- Ken's can use his root lifter to harvest under clean cultivation but must harvest by hand with mulch.
- With Ken's 3 year rotation for garlic, the cultivation system only requires ploughing once whereas the both mulch systems would require ploughing twice in 3 years.

Experimental description at Ken's field day, Orchard Hill Farm.

TAKE HOME MESSAGE

- Contrary to Ken's prediction there was no difference in yields among the three treatments.
- This means any nutrient competition from the green mulch (winter wheat) did not affect garlic yields.
- Ken thinks there might be a yield drag in green mulch in a drier season; but weed pressure, which was "fairly bad", might also be better in a drier season.
- Moving forward, Ken will keep using the clean cultivation system because weed control is more mechanized and he can use his root lifter to harvest (the mulch was too high for the lifter).
- Yields were highest for each treatment on the northern side of the patch, which is reflected in differences in yield among replicates in the field. This means the field condition prior to planting had a bigger impact on garlic weight than management!
- Designing this experiment in strips instead of blocks would have made management easier.

Ken's experimental block design.

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Orchard Hill Farm Weather Data:

Monthly temperatures and precipitation for 2017 and historical averages.

St Thomas WPCP was selected as the weather station for Orchard Hill Farm. It is located 9.47km from the farm.