Weeds Research Overview

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Organic Weeds Research at DREC

- Funded by USDA-OREI in partnership with MSU
- Four year study- 1 MS student
- Characterize changes in weed population in association with no-till + sheep grazing vs. conventional tillage
- Measurements: seed bank, above ground weed biomass, crop yield loss

DREC Sheep Grazing

Organic Weeds Research at Fargo/DREC

- 3 acres at NDSU Horticulture Research Farm became organically certified in 2015
- Received 180K grant from The Ceres Trust to conduct organic vegetable crop research (2015 to 2017)
- Received support from ND Specialty Block Grant for 2016 for organic vegetable crop research.

Vegetable Study Objectives

- Impacts of tilled vs. no-till (mulched) system on weed management and soil health in a four-crop organic vegetable crop rotation
- Impact of inoculation with arbuscular mycorrhizal fungi on soil and plant health
- Economic comparisons between the two systems
- Also replicated at DREC

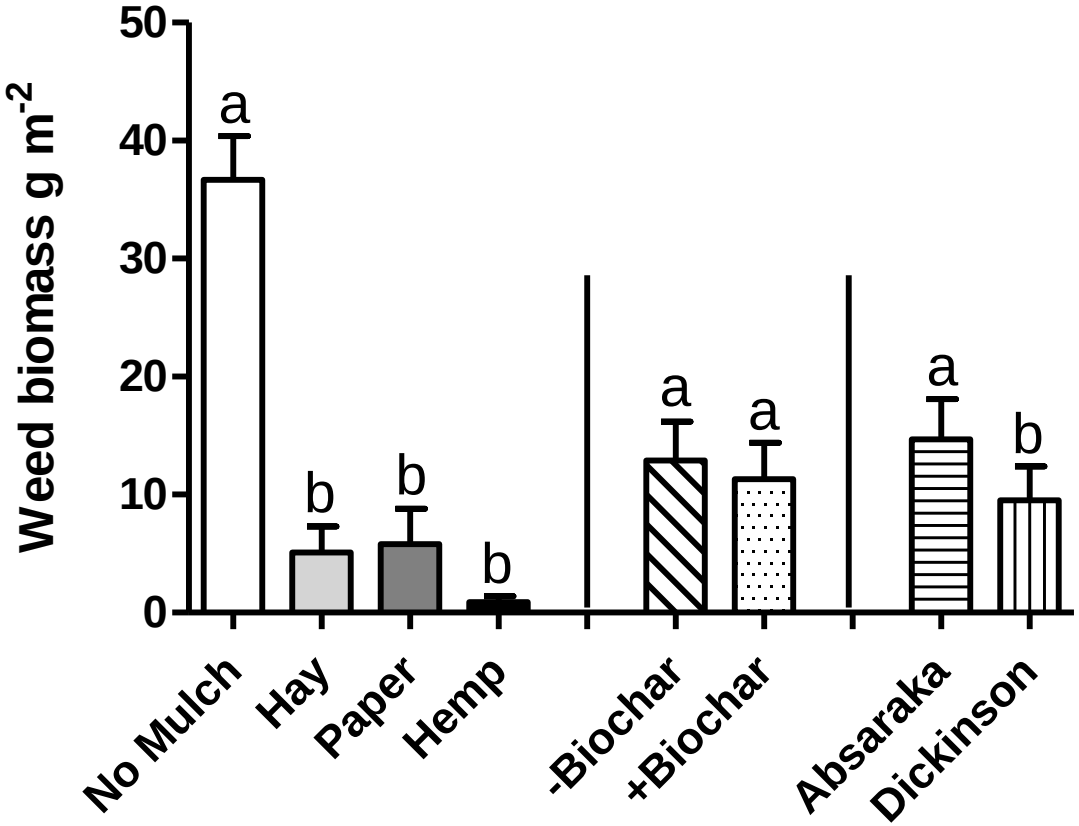
Some Preliminary Results

- At mid-season, onions grown in non-mulched plots were larger than onions grown with mulch.
- At maturity, mulched plots yielded higher, and this was due to differences in onion number per plot, not weight per onion.
- AMF inoculant had no impact on onion production.

Strawberry Mulch Trial

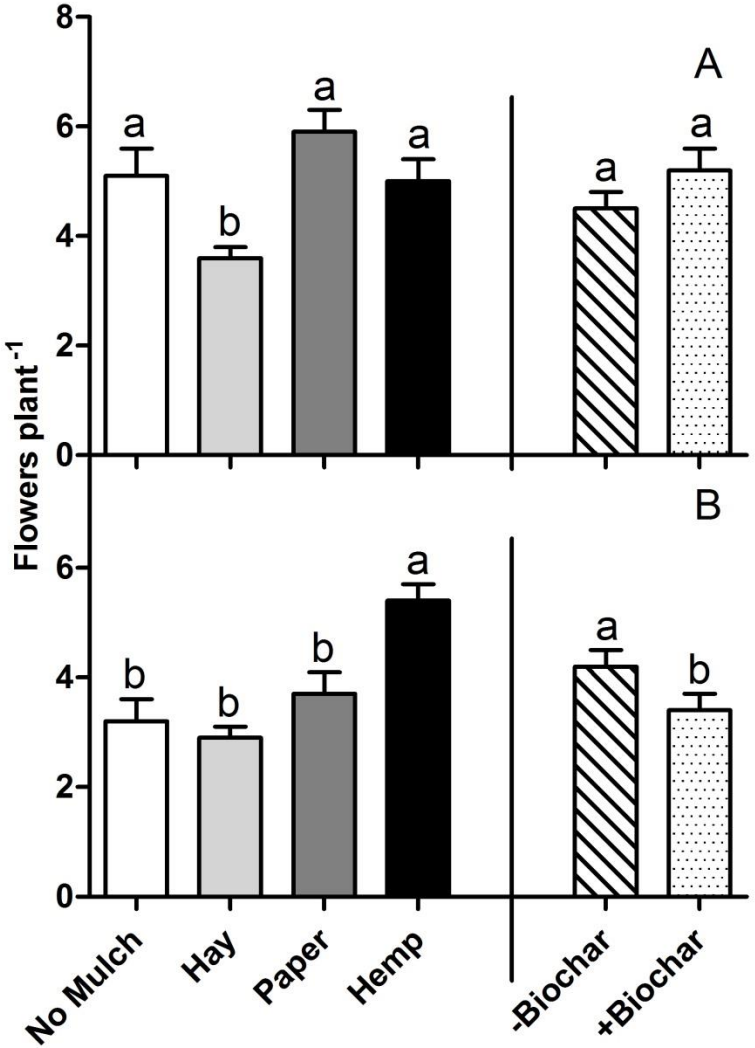
- A study to compare three organic mulch materials (hay, paper, hemp) in strawberry production was initiated in 2015 at Absaraka and DREC.
- A secondary objective was to evaluate the effects of soil-applied biochar on strawberry growth and yield

Mulch and Biochar Impacts on Peak Weed Biomass



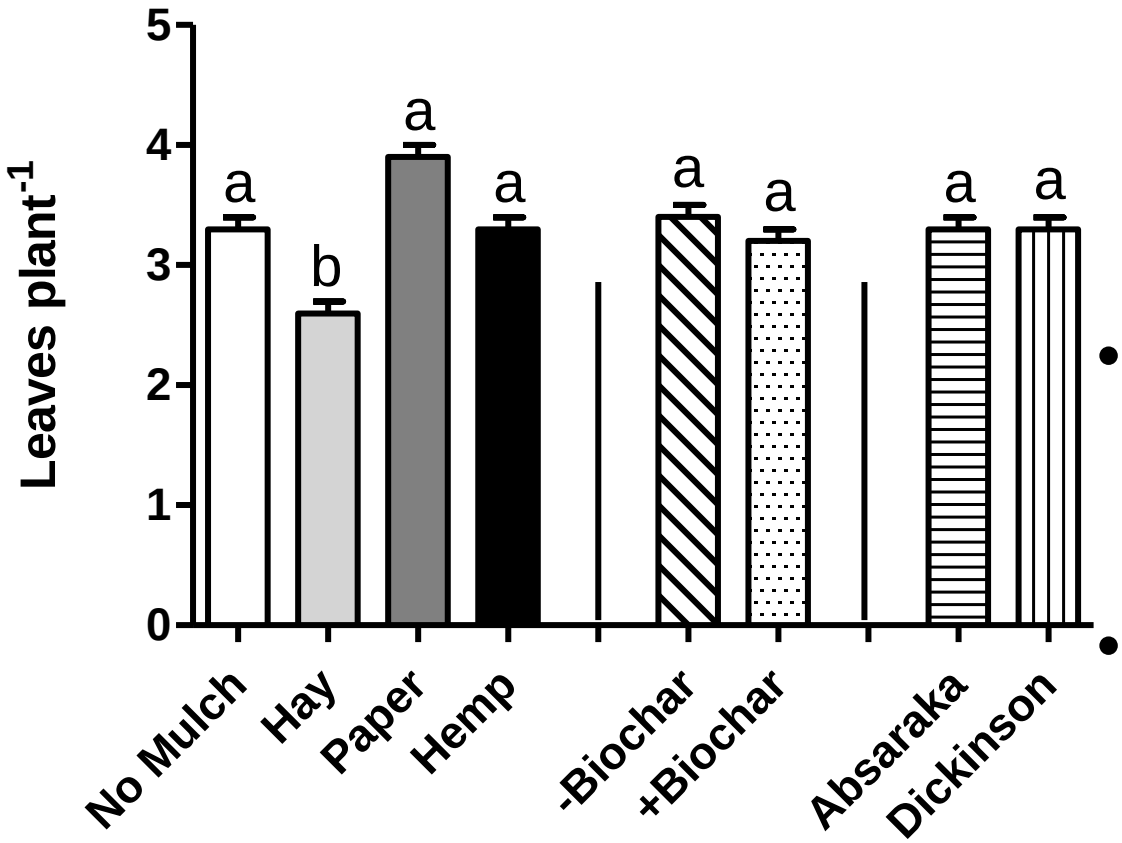
- At both sites, all three mulches suppressed weeds equally well compared to the non-mulched control.
- Biochar application did not affect weed biomass.
- Weed pressure was somewhat greater at Absaraka than DREC

Mulch and Biochar Impacts on Strawberry Flower Number



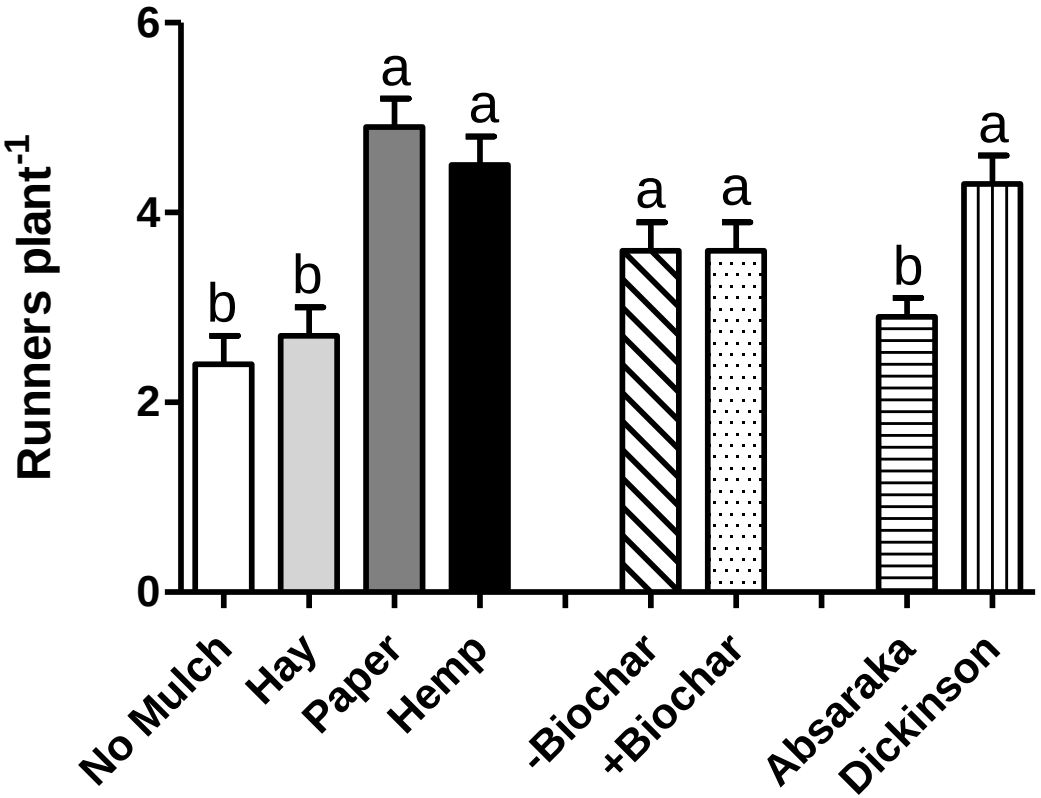
- At Absaraka, hay mulch suppressed flower production, but biochar has no impact (p= 0.05).
- At Dickinson, hemp mulch was associated with increased flowers compared to no mulch, hay, and paper.
- Biochar was associated with slight flower number decrease at DREC

Mulch and Biochar Impacts on Strawberry Peak Leaf Number



- Hay mulch was associated with a slight decrease in leaf number.
- Biochar had no impact on leaf number.
- Peak leaf number did not differ between sites.

Mulch and Biochar Impacts on Strawberry Runners



- Compared to no mulch and hay mulch, paper and hemp mulch were associated with more runners.
- Biochar had no impact on runner production.
- DREC plants produced more runners than Absaraka plants.

Interpretation of Results

- Since weeds were removed, the impacts of mulch material on strawberry growth and development were due to some factor other than competition.
- Volumetric soil water content and temperature were measured periodically throughout the season, but there were few differences among mulch treatments.
- Nitrogen fertilizer was applied to all plots twice during the growing season, so N was probably not a factor.
- Paper and hemp mulches suppressed weeds with a lower profile that did not shade or impede strawberries.