

Weed suppression with living mulch and strip tillage in organic peppers

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Project Results

Introduction

- Weed control in organic vegetables is crucial for maintaining high yields, but difficult without effective, affordable herbicides.
- Tillage, cultivation, and plastic mulch are standard practices, but have negative effects on soil health and produce waste.
- Reduced tillage vegetable production may be possible using cover crops as organic mulch or living mulch to control weeds.
- This study was designed to test whether a red clover living mulch could provide season long weed control in bell peppers.

Treatments

ST-LM

Strip-till/living mulch: planted with red clover (12 lbs/A), strip tilled and flail mowed



ST-RC

Strip-till/roller crimp: planted with cereal rye (67 lbs/A) and crimson clover (8 lbs/A), roller-crimped and strip-tilled



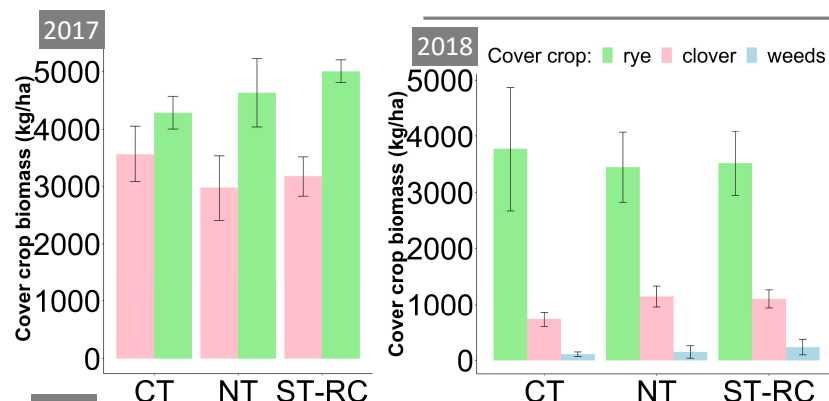
NT

No-till: planted with cereal rye (67 lbs/A) and crimson clover (8 lbs/ac) and flail mowed



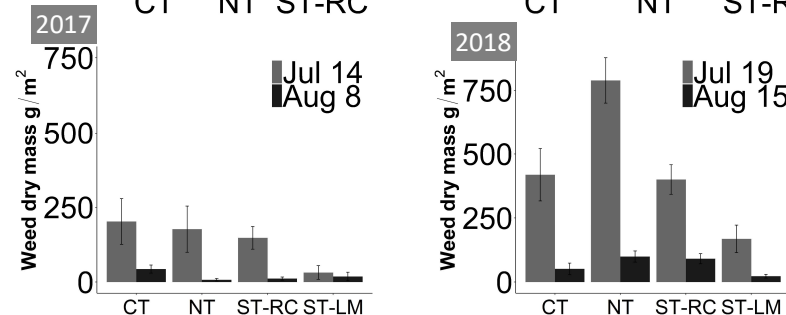
CT

Conventional tillage: planted with cereal rye (67 lbs/A) and crimson clover (8 lbs/A), chisel plowed and rototilled



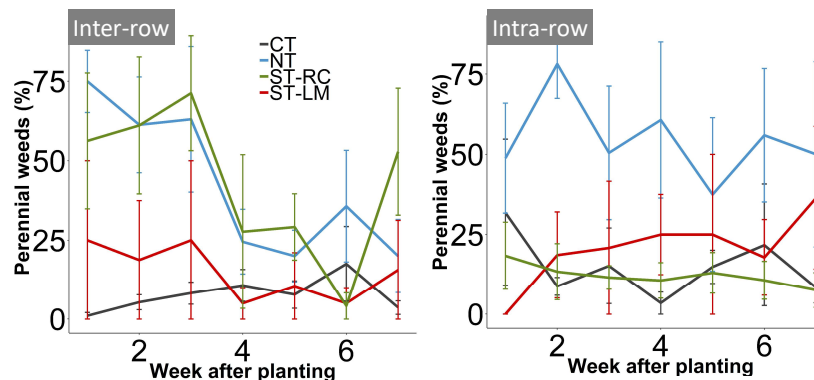
Organic mulch efficacy depends on biomass production

Annual cover crops were terminated at anthesis ahead of planting bell pepper crop. Biomass production varied tremendously between years, with mean biomass in 2017 of 7,822 kg/ha, and only 4,743 kg/ha in 2018. The lower biomass in 2018 resulted in less weed suppression and earlier decomposition of the organic mulch. Biomass of red clover was not measured, since the perennial cover crop continued to grow through the year.



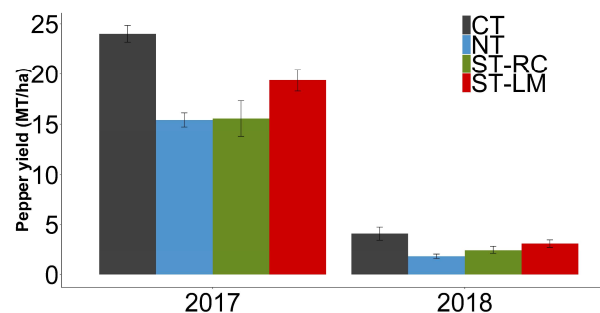
Living mulch provided season-long weed suppression

Weed biomass was measured from un-weeded subplots. These areas were hand-weeded after collecting weed biomass. In both years, the lowest weed biomass was measured from the living mulch treatment. Since weed suppression does not depend on having large amounts of dead biomass that break down over time, the living mulch provided superior weed suppression.



Living mulch suppresses perennial weeds

Weed species were identified and counted from quadrats placed in inter- and intra-row spaces weekly. Areas of the field that received tillage (all of CT and intra-row of strip tilled treatments) had lower proportions of perennial weed species than areas that did not receive tillage. However, the proportion of perennial weeds in the living mulch inter-row area was more similar to the tilled CT treatment.



Living mulch yield better than organic mulch

Marketable yield was highest in the CT treatment in both years. Earlier harvests from the ST-LM treatment were lower than other treatments, but ST-LM plants outperformed NT and ST-RC during the later harvests. Fruit quality among all treatments was similar. A wider tilled strip in the living mulch may improve plant growth earlier in the season by reducing the amount of shading from adjacent clover plants.