

EFAO HORTICULTURE 2020: Research Protocol

No-till Tomato Production

Farmer-Researcher: Matt Jones, Jones Family Farm - West

Research Priorities: Soil Health, Weed Control, Cover Crops

EFAO Contact: Sarah Hargreaves, sarah@efao.ca

Research Question

Does the addition of a cardboard mulch or a crimped cover crop improve tomato yield, weed control or soil health when growing through landscape fabric?

Background

With the benefits of no-till agriculture systems becoming increasingly apparent, appropriate ecological methods for weed control that do not disturb the soil are needed. In land with high weed pressure, growing full season vegetables using landscape fabric as a mulch has become a routine practice at Jones Family Greens.

The practice used has been to put a layer of compost on beds early in the season (April), cover with landscape fabric and then transplant vegetables at appropriate time. It is unclear, however, if this provides sufficient nutrients for the full season. Two methods that may improve this could be the addition of cardboard mulch and the use of cover crops. This research aims to address this with the use of tomatoes as the experimental vegetable.

Experimental Design

Randomized block design with 4 replicate blocks (rows) and 3 treatments each (including control), as follows:

CHANGED TO 6 rows, 3 grafted, 3 partially grafted (rows all same variety)

Row 1		Row 2		Row 3		Row 4
Cardboard		Cover crop		Control		Cardboard
Cover crop		Control		Cardboard		Cover crop
Control		Cardboard		Cover crop		Control

- Control: layer of compost raked even on bed and covered with landscape fabric

EFAO HORTICULTURE 2020: Research Protocol

- **Cardboard treatment:** layer of cardboard (no tape, staples or coloured ink) placed on bed with minimum of 3" overlap between sheets, same thickness of layer of compost placed on top of cardboard and covered with landscape fabric
- **Cover crop treatment:** same thickness of layer of compost raked even on bed and mix of cover crop (peas, oat and barley) direct seed using 3 ganged Earthway seeders (5" spacing). Just prior to transplanting (late May), the cover crop will be crimped by walking sideways on downhill skis with 2 T-posts attached to their bottom. Crimped cover crop will be then covered with landscape fabric

For each treatment section within each bed:

- Tomatoes will be planted at 2' spacing (8 plants per treatment section in each bed).
- 8 varieties of grape/cherry tomatoes will be used (all indeterminate), one of each type in each experimental section.
- Tomatoes will be transplanted through landscape fabric late May on the same day.

Tomatoes are routinely suckered and grown using a Florida weave; 8' T-posts or rebar will be pounded in at the ends of beds and between each treatment.

Analysis: Analysis of variance (ANOVA).

Research Plan

Time	Task	Methods & Measurements or Action Item
End of March	Seed tomato plants Grafting?	<ul style="list-style-type: none"> • Start seeds; may graft into Estamino
When soil is workable - end of March	Plant cover crops	Matt will use 3 ganged together Earthway seeders spaced at about 5", 2 with peas/oats premix and middle one with barley.
When soil is workable - end of March	Prep beds	<ul style="list-style-type: none"> • Add compost, cardboard and landscape fabric according to the experimental design
When soil is workable - end of March	Deploy data loggers	Soil Temperature Data <ul style="list-style-type: none"> • Bury HOBO data loggers to the plots and test they are working • 3 in row, one not under landscape fabric control and one in weather station type setup
Mid April	Check-in	Sarah will check in
Early June	Check-in	Sarah will check in
Every harvest	Harvest	Tomato Yield Data

EFAO HORTICULTURE 2020: Research Protocol

		<ul style="list-style-type: none"> • Pre-weigh all totes • Harvest all marketable tomatoes from a section (8 plants, mixed species) into a harvest crate. • Repeat for each section (12 total) • Weigh totes and record weights on datasheet (Matt will make)
Late July	Check-in	Sarah will check in
Fall?	Water infiltration	Water Infiltration Data <ul style="list-style-type: none"> • Take water Infiltration tests: 3 x each section + 2 undisturbed locations at farm (adjacent to growing area and woodlot)
Throughout	Photos	Qualitative Data <ul style="list-style-type: none"> • Take photos throughout the duration of the trial • Weed pressure differences in each treatment (through plant holes) • Ease/difficulty of each treatment • Any apparent differences in plant health.
Deadline October 15	Submit data and photos	Submit data and photos to Sarah
After data is submitted to Sarah	Invoice	Send Sarah invoice for farmer-fee

Materials

Please list all the equipment that you need for this project. Indicate “In-kind” under Total Cost for any materials that you already own or have access to. For pre-approved research expenses, for which you will be reimbursed, please indicate cost.

Material	Quantity Required	Total Cost*	Note
Landscape fabric	300'	In-kind	
Scale	1	EFAO Tool Library	Kilotech, KPS 68MS, +/- 0.2lbs or +/-0.1kg
T-posts	16	~\$150	
Cover crop (barley)		In-kind	Oats and peas in-kind
Harvest buckets	2	~\$70	\$25 USD each (from Johnny's)

EFAO HORTICULTURE 2020: Research Protocol

Tomato seed	8 varieties	In-kind	
Cardboard	100'	0	Have some, need to obtain more
Hobo data loggers	5	EFAO Tool Library	For soil temperature measurements
Total		~\$220	

* For approved research expenses

Farmer-fee: \$500, invoiced to EFAO after farmer-researcher submits data.

Memorandum of Understanding

Farmer-researchers agree to keep an active membership with EFAO throughout the duration of their trial. Reimbursement for research expenses and farmer-fees will be paid to current members only.

Please also refer to efao.ca/farmer-led-research for a **Memorandum of Understanding** of other responsibilities. Specifically refer to sections:

- *What is expected of me as a farmer-researcher?*
- *What support will I receive from EFAO as a farmer-researcher?*

To check the status of your membership, log in here:

<https://efao.z2systems.com/np/clients/efao/login.jsp> or contact Martina, martina@efao.ca.

References

- Ricky Baruc of Seeds of Solidarity discusses his use of cardboard mulch in Growing for Market pp 9-19 Feb 2018 issue
- Andrew Mefferd's The Organic No-Till Farming Revolution pp 81-104