RESEARCH PROTOCOL: SOIL HEALTH & WEED CONTROL 2018
Tarping vs Tilling for Salad Production

Farmer-researcher
Brent Preston and Gillian Files, The New Farm

This document outlines the steps that Brent and Gillian will follow to execute their research project, *Tarping vs Tillage for Salad Production*, including design, execution, data collection and data sharing. It also serves as a Memorandum of Understanding between Brent and Gillian and EFAO.

Motivation
To help regenerate soil health, Brent and Gillian want to reduce the number of tillage passes they makes for their production of organic salad mix. Given that salad greens are relatively labile in composition (i.e. easily decomposable), they want to try tarping as a method for bed preparation before they direct seed at the start of the season and between succession plantings. Brent and Gillian are also curious about the effect of the tarp on soil moisture and irrigation needs of the crop.

Experimental Design
Brent and Gillian will compare two methods of bed preparation for succession planting of greens (lettuce, mustard greens, spinach):

1. Control: tillage after harvest; tillage before direct seeding
2. Treatment: Mowing any standing crop remaining in the row; tarping; removing tarp and direct seeding.

Brent and Gillian have 7 acres dedicated for salad production. Approximately ½ acre is planted every week and approximately ½ acre every week is cut, with 7-10 days between harvest and planting the next succession. In total, they have around 20 plantings a season, 3-4 plantings per bed, with 8 beds mustard greens + arugula mixed, 4-5 beds mixed varieties of lettuce, 5-6 spinach (one variety).

Throughout the season, tarps will be rotated around the fields as different beds are harvested and prepared for the next planting. Tarp placement will be as follows:

In total, Brent and Gillian will rotate the tarps at least 6 times, with the goal of targeting each of the three groups of greens (mustard greens, lettuce, spinach) at least 2 at times throughout the season.

Methods & Measurements

Step	Tilling	Tarping
Initial bed preparation for the season	Till (using a tractor-mounted rototiller) to incorporate cover crop residue	
Post harvest	Till to kill harvested salad stubble	Mow any remaining greens that are left unharvested.
Bed preparation ~ 7 days after harvest - **Measurement**	Till	Place 2 tarps (Barbier brand), 32" x 200' each. The tarps will be placed on approximately half of a planting of greens, overlapping enough to cover 5 beds of greens. **Measure and record # bed feet that is covered and uncovered by tarp.** The tarps will be secured by row bags filled with soil, and/or burying the edges of the tarp with soil.
Pre-planting assessment - **Measurement**	None	If the soil is ready for seeding, plant as usual. If there is too much residue remaining, till and plant as usual.
Soil moisture - **Measurement**	**Take and record soil moisture** in control and treatment strips (see directions below)	
Planting	Plant greens immediately using a six-row Jang seeder (for mustards, arugula and kale) or a one-row Earthway seeder (for lettuce and spinach).	
Soil moisture - **Measurement**	**Take and record soil moisture** in control and treatment strips (see directions below)	
Management	Place temporary hoops and cover mustard, arugula and kale beds with Proteknet row cover, burying edges with soil.	
Irritation	Place overhead irrigate lines and irrigate immediately after planting (if necessary).	
Cultivation	Cultivate lettuce and spinach beds with colineal hoes (if necessary).	

Weeding	Hand weed lettuce and spinach beds.
Harvest	Harvest greens using hand shears.

Back-up Management: If Brent and Gillian aren't getting enough decomposition after tarping, they will consider tilling the residue immediately after harvest and then tarping.

Measurements

For both the treatment and control, Brent and Gillian will measure the following to assess the efficacy of the tarp method, as outlined on the Data Collection Sheet.

1. Labour required (i.e. tilling, mowing, placing tarps, upkeep, tarp removal, seeding, weeding, irrigating)
2. Tractor time/fuel requirements (i.e. tilling, mowing)
3. Soil moisture
    a. PROTOCOL
4. Ability to direct seed without additional tillage (Yes/No)
5. Soil health (TBD, Solvita basal respiration)

Statistical test

A paired t-test will be used to assess differences between the treatment (tarping) and control (tilling) for each measurement except Ability to direct seed (4), which will analyzed with a chi-squared test.

Materials and Research Expense Budget. Prices are approximate; NA or in-kind for any materials that you already own or have access to. Please indicate if you intend to give any of the supplies to EFAO's Tool Library for others to use after you are finished with them.

Material	**Quantity**	**Unit**	**Total Cost**	**EFAO's Tool Library (Y/N)**
Tarps	2	$500	$1000	N
Soil moisture probe	2	https://www.amazon.ca/Moisture-Meter-Tester-295mm-Electrode/dp/B00NTPVHOG/ref=pd_sim_469_4/144-3936372-5975602?_encoding=UTF8&psc=1&refRID=M8VTD4TGD28YZFCK01QY	$80	Y

Soil tests		TBD		N
Total			$1080 + soil tests	

Deadline for data and photo submission:

October 31, 2018 or earlier if possible

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Memorandum of Understanding

Please refer to **efao.ca/research-mou** for Memorandum of Understanding.

Contact

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