

Farmer-Led Research 2019: **Reduced tillage for fall brassicas**



COVER CROPS

Farmer-Researcher(s):

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EFAO Contact

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This document outlines the steps that Ryan will follow to execute his research project, *Reduced tillage for fall brassicas*, including design, execution, data collection and data sharing. It also serves as a Memorandum of Understanding between Ryan and EFAO.

Background

Ryan wants to see if they can reduce soil tillage/weed cultivation and irrigation requirements for fall brassicas. To do this, he will trial a mix of fall rye and hairy vetch cover crop, which will be crimped and used as mulch the following season for late-season broccoli in northern Ontario. He expects that they can build enough biomass by early July to establish a suitable mulch when crimped for late season brassicas in the northern Ontario. This will reduce the need for weed cultivation (tillage) and irrigation.

Experimental Design

Ryan will use a treatment of hairy vetch and fall rye cover crop planted in fall, crimped in spring for broccoli planting, with no irrigation. Ryan will plant a fall rye and hairy vetch mix at a rate of 130 lbs/acre. The mix rate will be 110 lbs of fall rye and 20 lbs of hairy vetch.

He will compare this to his business-as-usual control, which is tilling 2 times in the spring for weed control before transplanting the fall broccoli crop (mid-July in northern Ontario), with drip irrigation. Ideally, his business-as-usual has broccoli following a pea and oat cover crop that winter kills.

The design for this comparison is a randomized complete block design with 4 replicates. Each replicate has 4, 100' beds, each divided in half. Each half bed was randomly assigned either control or treatment. All beds will be covered with Protek net for swede midge control.

Randomization for Ryan's trial:

100' total	Row 1	Row 2	Row 3	Row 4
50'	Control	CC	Control	CC
50'	CC	Control	CC	Control

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Methods and Materials

Ryan will use a locally-made crimper, which is low tech and hand powered. The crimper will be similar in shape to a broadfork, but instead of tines, a t-post will be fastened to the bottom to break the cover crop stalks. He will transplant the broccoli into the mulched cover crop with a trowel by hand.

Measurements

To track differences between the treatment and control, Ryan will measure:

- 1) Marketable yield based on # of heads or equivalent heads per bed foot for each replicate section. This will be done for each of three (approx) harvest dates.
- 2) Weed pressure
 - a) Ryan will cut biomass when he cultivates (hoes) his control beds. For each replicate (8 samples total), he will use the quadrat method with known area (a coat hanger made into a square, etc) and cut the cover crop biomass within a representative area in each plot. He will place biomass in clean feed bags to dry in the greenhouse and weigh the dried biomass. If he wants, he can also sort the biomass by cover crop species and weed and record the weight of each type.
- 3) Soil moisture taken bi-weekly using a using a irrometer tensiometer or a soil moisture meter **(TBA in 2020)**.
- 4) Labour differences, using the farm's labour tracking method for COP

Ryan will also track rainfall as a covariate.

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)
Irrrometer Tensiometer or soil moisture meter	1	~ \$150 or \$800	~\$150 or \$800	Y
Shipping for soil moisture meter	1		\$40 (estimated)	N

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Rain gauge	1	\$10	\$10	N
Hand-built, hand powered crimper	1	~\$80	~\$80	N
Organic rye, vetch, oat and pea seed			\$100	N
Hose	1	\$180	\$180	N
Seeders			In-kind	
Insect net and supports			In-kind	

Research Calendar

Time	Task	Action Item
September 1-7, 2019	CC seeding	
July 1-5, 2020	Crimping	
June 12-19, 2020	Broccoli seeding	Also decided on soil moisture measurements
July 10-17, 2020	Transplanting	

Deadline for data, progress report and photo submission

As soon as possible in November.

Memorandum of Understanding

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

Payment will be \$250 for 2019 and \$500 for 2020.

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