

EFAO 2023: Working Research Protocol

Potato variety trial under no-till conditions

Farmer-researcher(s): Rob Read, Willow Creek Permaculture Farm - WEST

Project type: Variety/Breeding trial

Research priorities: Seed selection, production, & breeding

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About the farm

Willow Creek Permaculture Farm is a 50 acre farm near Dutton, Ontario. We rotationally graze sheep and Kunekune pigs, and also raise turkey and chickens. Besides growing hundreds of fruit and nut trees, and perennial vegetables and herbs (with more planted each year), we have substantial annual vegetable gardens and are researching and breeding varieties and landraces of vegetables. We also run a learning pod/homeschooling enrichment program for children aged 6-12, and several day camps for kids each year.

Objective

This trial will attempt to test whether different varieties of potato produce better or worse when using the mulch method for potato production, and which ones perform the best in these conditions, in calcareous soils in southern Ontario.

Background

For the past several years, we have been planting our potato crops using the mulch method first advocated (to my knowledge) by Ruth Stout in the 1950s. The method is to sow seed potatoes directly on the surface area (in this case, an untilled previously-tarped area), then cover densely with mulch (in this case, switchgrass about 1' tall at establishment).

My experience, as well as research by others, (see link in References) shows that the mulch method, while often producing less yield when compared to other methods, still comes out with high potential due to the large labour saving when planting and harvest are done with hand tools.

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References

<https://lowtechinstitute.org/2018/12/04/potatoes-five-ways-a-trial-looking-at-different-potato-growing-methods/>

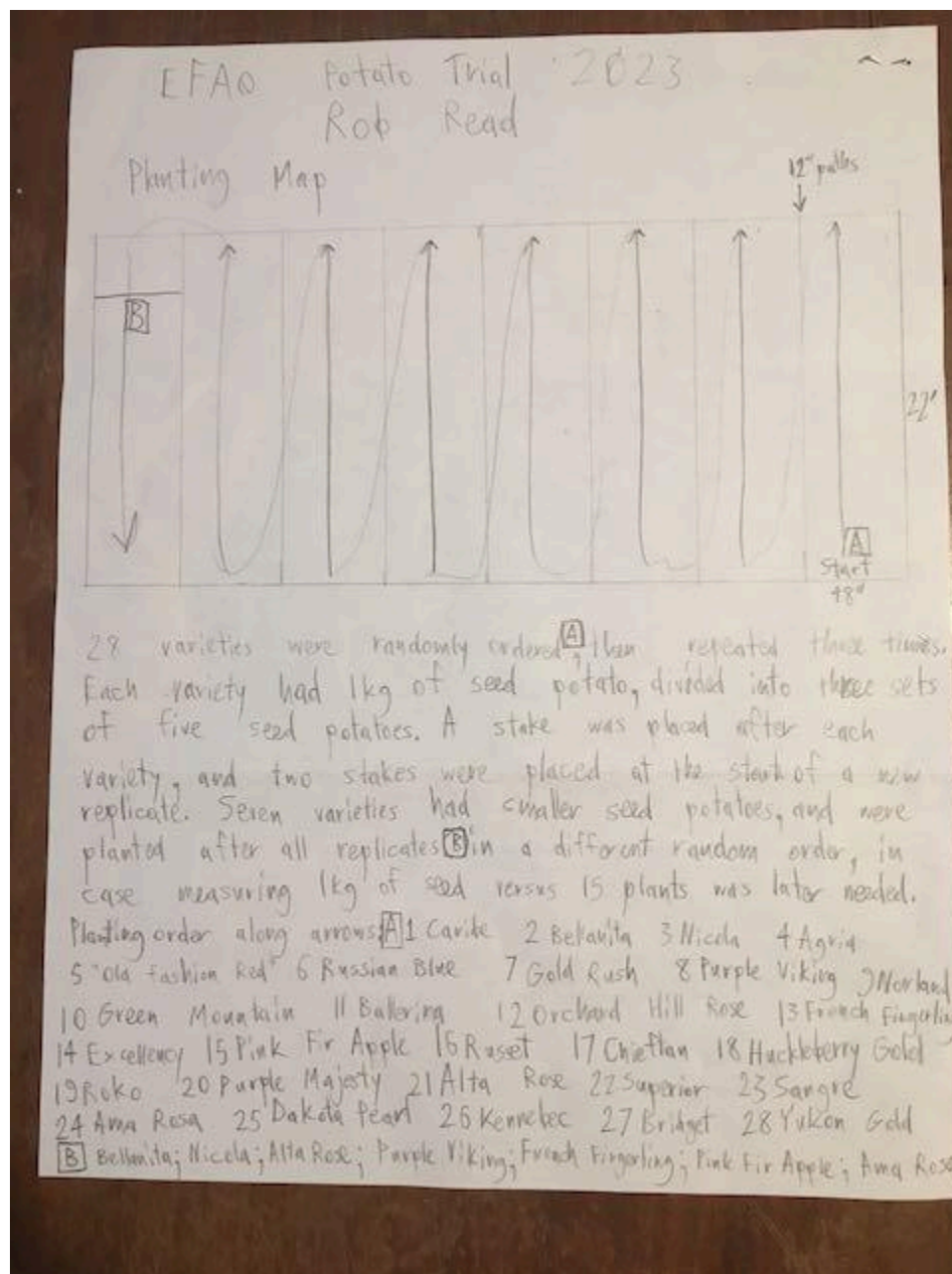
Experimental Design

Rob will plant potatoes in three replicate blocks, randomizing the order of potatoes in each replicate block by drawing names from a hat. He will grow each potato variety in each block. He will use the following specifications to plant the potatoes:

- 12" spacing on diagonal in 48" beds, being careful to not plant too close to the edge, alternating rows of 3 and 2 means each replicate will take approximately 2 linear feet of 48" row.
- With 3 replicates of each of 28 varieties, the total linear feet required is 168'
- Pattern of the rows will be 8 rows 21' long within a larger garden, with buffers of 1' on all sides.
- Enough potato seed to split into 5 plants x 3 replicates = 15 pieces total

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Field Layout



Statistical model

We will analyze the difference among varieties using an analysis of variance (ANOVA) blocked by block and using the days to maturity as a covariate.

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- This will allow for us to have a block effect to assess environmental effects and be able to look at relative yield per day, or could group into early/mid/late maturity types and look at yield and quality parameters within and among each group.

Measurements

Yield & Marketable Yield

Quantitative

- **Hand harvest each variety at the vine die-back stage, while keeping the blocks separate**
- **Record days to maturity and harvest date**
- **Keep varieties separate until they are weighed for yield and marketable yield**
- **DATA COLLECTION SHEET:**
<https://docs.google.com/spreadsheets/d/1Z5gTb8wBV9hiwbks1USTzusqw1vNpkFfePLLK242jkw/edit#gid=1999400069>

Potential flow:

- Day 1: Bag by variety (per block); store safely out of the light
- Day 2 (or afternoon of first day, depending on timing): next day; weigh; sort for marketable yield and re-weigh; put in storage
- 6 days total for all blocks.

Plant health

Qualitative

- Take notes and photos on disease and pest pressure
- Flowering dates, other notes

Photos

Rob will take photos throughout the trial, including at set-up, throughout the growing season, and at harvest.

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Research Plan

Please note that if data is submitted after the submission deadline, EFAO staff cannot guarantee that your data will be analyzed and written up before the Research Symposium and/or the next growing season.

Estimated Date	Exact Date	Task	Methods & Measurements or Action Item
May (dependent on soil temperatures)		Prepare beds and perimeter	Un-tarped no-till plot. Establish locations of 4' beds. Broadfork all beds. Amend each with feather meal, and several other elemental amendments. Work soil surface lightly with rotary cultivator.
In week prior to planting		Prepare randomization labels	
Late April - early May		Plant potatoes	Recording randomized layout for each block
		In-season management	Manage as usual; take notes and photos throughout the season
		Harvest	See notes above
December 31, 2022	December 31, 2022	Farmer-fee and research expense invoice with receipts for expenses	Submit invoices at this site: https://efao.ca/data/
January/February 2023		Finalize and publish research report	Work with EFAO staff to review polished research report for publication.

Staff check-ins

Check in monthly

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Materials

Please list all materials, supplies and equipment that will be reimbursed for this project. If possible, please also indicate a short-list of any in-kind materials, supplies and equipment that you will use.

Material	Unit	Quantity Required	Total Cost*	Note
Seed potatoes			232.51 (including shipping and tax) + \$9.72 for three locally sourced varieties	
Total			~\$242.23	

Farmer-fee

\$1000 if the trial is conducted and data is submitted on/before the deadline; \$500 if the trial is conducted and data is submitted after the deadline.

Invoices for Farmer-Fees

Farmer-fee & Expenses

- Submit an **invoice** for your farmer-fee (email will be sent in September) & expenses
- **Deadline:** December 15, 2023

Memorandum of Understanding

Please fill out the MOU at <https://airtable.com/shrc1mclYcx5Aq6Ex>