

EFAO 2024: Working research protocol

Growing Quinoa in Ontario

Farmer-researcher(s):

- Dean Orr, Mill Valley Farm - CENTRAL
- Mira Melien, Boreal Berry Farm - NORTH

Project type: Variety trial

Research priorities: Seed selection, production, & breeding, Soil health

EFAO Contact: Sarah Larsen, sarah@efao.ca

Objective

Working off of Dean's previous three years (2021-2023) working on selecting varieties and finding the right growing and management conditions of quinoa in southern Ontario, Dean and Mira will trial three varieties of quinoa: Chadmo, Brightest Brilliant Rainbow, and Buffy and focusing on seeing their performance in the grow-out stage, including seed harvesting and yield.

Background

Dean's 2023 trial (report pending):

- Seeded 4 replicates of 200 cell trays of the 7 varieties (germination; seedling vigour).
- Transplanted ~ 80 of the best seedlings from each tray into a RCBD with 4 replicates.

Code	Variety
QV1	Linares
QV2	Chadmo
QV3	Apellewa
QV4	Dave 407
QV5	Brightest Brilliant Rainbow 2021
QV6	Buffy 2021

EFAO 2024: Working research protocol

QV7	Dean's Buffy
-----	--------------

- Germination: Chadmo & Dave 407 > Apellewa & Linares >
- Buffy 21 & Brightest Brilliant Rainbow 21 > Dean's Buffy
- Seedling vigour: Dave 407 > Chadmo ≥ Linares ≥ Apellewa > Buffy 21, Brightest Brilliant Rainbow 21 & Dean's Buffy
- Field vigour: Apellewa ≥ Chadmo, Buffy 21, & Brightest Brilliant Rainbow 21 ≥ Dean's Buffy ≥ Linares ≥ Dave 407
- Early heading:

Consistent seed heads	A few seed heads	Very few seed heads
Linares Dave 407 Buffy 2021 Dean's Buffy Brightest Brilliant Rainbow	Apellewa	Chadmo

- Take home messages:
 - Transplants grew well and provided good weed control on 15" centres
 - New varieties had better germination (new seed? newer variety? variety trait?)
 - Transplant stress was a factor for some varieties, although some recovered
 - 200 cell trays worked but 128 or 98 cell trays might allow for less stress

[Dean's 2022 Report](#)

[Dean's 2021 Report](#)

Experimental Design

Dean and Mira will grow three varieties of quinoa (Chadmo, Brightest Brilliant Rainbow, and Buffy), starting them in 128 square cell trays (2.1 x 2 inches); a single tray for each plot (with extras to spare)

Each plot will need 80 plants to fill, so they will seed two trays per replicate plot, for a total of 6 trays of each variety. Dean will seed around April 30th and Mira will seed around 7-10 days later, possibly even later depending on the spring conditions. **In the greenhouse, they will keep the trays labeled but randomized as to not bias greenhouse conditions for any one variety.**

Both Mira and Dean will plant on 15 inch rows, with 6 inch in row spacing.

EFAO 2024: Working research protocol

At the transplant stage, June 1 for Dean and 7-10 days later for Mira (adjusted for her seeding date and the spring conditions) they will transplant into the field using a replicated blocks design with four replicates.

Field Layout

Example of the design:

- Each variety is in each block
- Order of the varieties within a block is randomized

BLOCK 1	BLOCK 2	BLOCK 3	BLOCK 4
Chadmo	BBR	Chadmo	Chadmo
BBR	Buffy	BBR	Buffy
Buffy	Chadmo	Buffy	BBR

Statistical model

We will use analysis of variance, blocked by farm, to test for differences among varieties.

Measurements

Yield

Quantitative

- They will each cut 10-15 plants from each plot, and thresh, and clean with an air-screen cleaner and measure total weight with a scientific scale.
- **Along with harvest weight, they will RECORD THE NUMBER OF PLANTS HARVESTED FROM.**
- They will then divide the total weight by # of plants harvested and that can be extrapolated up to a rough lbs/ ac, based on row width and plant spacing (69,696 plants in an acre for 15 inch rows and 6 inch plant spacing).

Photos

Please take photos of the following times/items:

EFAO 2024: Working research protocol

- Farmer-researches with FLRP sign
- Field preparation
- Seeding
- Emergence
- Differences among varieties
- Pest and disease
- Flowering/ flowers
- Crop at maturity
- Harvest actions shot
- Other

Video and/or social media (OPTIONAL)

Videos

Please capture video of "one or more of the following":

1. Yourself talking about the project in general and why you wanted to do this project/ what you hope to learn;
2. Your observations of the subject of your research as you describe what you are seeing out loud and why it's relevant to your project;
3. A tour of the trial/bed layout and why it was chosen.

Please note:

- It is totally optional to film yourself as part of the video.
- You don't have to add captions or anything, just take the raw video and upload it to this GoogleDrive folder:
https://drive.google.com/drive/u/1/folders/1osqAo05Wg8Su0_SOASIt4a8FpVahHrj
- Please also email your EFAO staff contact when you upload!

Example posts for inspiration:

Example posts for inspiration:

[Melanzana Eggplant](#) [Loofah](#) [Okra Trials](#) [Blue Icicle Tomato](#)
[Tsakoniki Eggplant](#) [Upright Ground Cherry](#) [Lettuce Variety Trials](#)

Social media

If you are posting about your trial on social media, please tag EFAO, @efao2.

EFAO 2024: Working research protocol

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.

Time	Task	Methods & Measurements or Action Item
Apr 30, 2024	Dean will seed	
	Mira will seed	
Jun 1, 2024	Dean will transplant	
	Mira will transplant	
	Dean will harvest	Yield measurements
	Mira will harvest	Yield measurements
December 31, 2024	Farmer-fee and research expense invoice with receipts for expenses	Submit invoices at this site: https://efao.ca/data/
January/February 2025	Finalize and publish research report	Work with EFAO staff to review polished research report for publication.

Staff check-ins

Sarah will check in monthly.

Farmer-fee

Farmer-fees for this project are \$1000 in total. You are eligible for 50% (\$500) for implementing the trial, and 50% (\$500) for submitting data and photos. EFAO staff will be in touch in the fall with invoicing instructions and deadlines. If you decline, cancel, or defer the trial, you also forfeit the payment.

EFAO 2024: Working research protocol

Memorandum of Understanding

Please fill out the MOU at <https://airtable.com/appPSElrt17OMWXia/shrgHQSEj7yONdGSm>.

The terms of the MOU are listed below.