

EFAO 2022: Research Protocol

Okra variety trial

Farmer-researchers:

Name	Farm	Region
Rav Singh	Shade of Miti	CENTRAL
Arnest Sebbumba	SARN FARMS	CENTRAL
Orlando Martin Lopez Gomez	Flemo Farm, part of FoodShare Toronto	CENTRAL
Angie Koch and Nikola Barsoum	Demonstration Gardens at Fertile Ground	WEST
Celine Ticknovich		WEST
Chadwick Lewis	Urban Fresh Produce @Just Food Community Farm	EAST
Jessica Tong	Wild Path Farm	EAST
Peter Seenath	Pete's Fresh Organics	CENTRAL
Rachel Denison	Clovercroft farm	WEST
Rashel Tremblay	Locally Germinated	WEST
Nasser Boumenna	Arlington Gardens	Quebec
Paterne Mirindi	Groupement volontaire pour le développement rural durable nord-sud (GVDRD Nord-Sud)	Quebec
Hamidou Maïga	Hamidou Horticulture	Quebec

Project type: Variety trial

Research priorities: Seed selection, production, & breeding

EFAO Contact: Rebecca Ivanoff, rebecca@efao.ca, (519) 760-2971

Objective

Farmers would like to identify the most productive varieties of okra across different farms in southern Ontario during the 2022 season.

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Background

Rav has noticed that locally and ecologically grown niche crops like okra are in high demand in urban city centres, but not a lot of local farmers are growing these crops. The lack of local supply encouraged Rav to start trying different varieties of okra last year and she would like to learn more about which varieties are most productive on ecological farms in southern Ontario.

The varieties that have been chosen for this variety trial are both green and red, spineless and with spines, and of various shapes. All are open-pollinated, so in future years, if you have enough isolation distance between other okra varieties, you could save your own seed. The varieties are also offered by local ecological seed companies.

Experimental Design

Varieties

The 2022 okra variety trial includes 6 varieties, all of which will be transplanted in the field with 2 replicates. Each grower will grow **at least three common varieties** (Clemson Spineless, Burgundy, Jing Orange) but can choose to grow other varieties specific to their farm.

Code	Variety	Colour	DTM	Source	Organic Seed	Harvest length info
OV1	Clemson Spineless	Green	56	Hawthorn Farm Organic Seed	yes	2.5 - 3 inches
OV2	Burgundy	Red	55	Gaia Organic Seeds	yes	6-8 inches
OV3	Jing Orange	Red	60	Hawthorn Farm Organic Seed	yes	5-6 inches
OV4	Emerald Green	Green	55	Gaia Organic Seeds	yes	3-4 inches
OV5	Dwarf Lee	Green	55	Gaia Organic Seeds	yes	6-7 inches
OV6	Lady Finger	Green	53-64	Gaia Organic Seeds	yes	2-4 inches

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Rav Singh, Reshel Tremblay, Rachel Deison, Peter Seenath, Charwich Lewis, and the CASPP Demo Garden will grow all six varieties of okra for the trial. Arnest Sebbumba, Jessica Tong, and Celine Ticknovich will grow the three common varieties plus one other of their choice. Carl Leslie will grow the three common varieties and one hybrid variety Jambalaya.

	Clemson Spineless	Burgundy	Jing Orange	Emerald Green	Dwarf Lee	Lady Finger	Jambalaya
Arnest Sebbumba	X	X	X		X		
Jessica Tong	X	X	X	X			
Celine Ticknovich	X	X	X			X	
Carl Leslie	X	X	X				X

X- Denotes the varieties of okra that each farmer-researcher will grown on their farm as a part of the variety trial

Planting and Cultivation Recommendations

The trial should be grown **as you would normally grow okra in the field**, including bed and row spacing. The table below provides suggestions based on recommended cultivation practices for okra. Use the suggestions if they make sense for your farm.

Plot size per variety	10 plants per variety section, 2 replications = 20 plants total for each variety in the trial
Row and bed spacing	In-row: 12"-18"; between row: 24"-36"
Seeding date	4-6 weeks before the last frost; early to late April
Transplanting dates	4-6 weeks after the last frost; late May to early June around the time you are transplanting tomatoes and other hot crops
Days to harvest	55-64 days from transplant
Harvesting	Start picking when pods are no more than (see information in variety table above) 2 to 3 inches long – this takes about five days from flowering. If you allow pods to develop to their full size, the plant will stop producing. The smaller pods should also be soft. As they get larger, they will become tough, fibrous and unfit for green use. For a continuous harvest, pick the

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	<p>Pods every two to three days. Remove pods by cutting from the plant.</p>
Post Harvest	<p>Store in cool place like peppers or eggplants, okay for about 1 week</p>

Each farmer should receive approximately **30 seeds of each variety**. We suggest that you plant 30 seeds of each variety. The goal is to get at least **20 seedlings** so that you can plant 10 per plot.

Field Layout

The trial arrangement is flexible as long as you plant at least 2 replicated blocks of 3 varieties with each variety plot having *at least* 10 plants of the variety (you can plant more okra if you have space available).

Please observe these best practices as best you can and record what you do:

- For this trial, create two replicate blocks of your trial space by dividing the space in half (see layout below)
- Plots may be distributed in multiple side-by-side beds or planted in one bed (see examples below)
 - In each half, plant the varieties in a random order, either by drawing variety names out of a hat, etc. or randomly choosing the flat to transplant next.
 - Each of the 2 replicate blocks should have a plot of 10 plants for each variety; the order of the planting will be different in each replicated block.
- Avoid the edge of the field and the end of the bed when finding a place for the trial.
- Avoid areas with known soil, shade or irrigation differences that would affect some plots more than others. That is, try to plant your trial in a homogenous area in your field.
- If possible, plant the trial in a spot where it has the same crop on either side of it.
- Use stakes to label the plots AND draw a field map showing the order and location of varieties. This serves as a backup in case the stakes get lost! **Please snap a photo of the layout and send it to Rebecca**, which is a third back-up!

Examples of field layout:

Example 1: Layout with 2 replicate blocks of 6 varieties (at least 10 plants/variety) down a single row. Note: each variety is randomly assigned to a plot in each replicate block.

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Replicate block A						Replicate block B					
V5 - min 10 plants	V2 - min 10 plants	V3 - min 10 plants	V4 - min 10 plants	V6 - min 10 plants	V1 - min 10 plants	V4 - min 10 plants	V3 - min 10 plants	V1 - min 10 plants	V5 - min 10 plants	V2 - min 10 plants	V6 - min 10 plants

Bed length →

Example 2: Layout with 2 replicate blocks of 6 varieties (10 plants/variety) planted across multiple rows. Note: each variety is randomly assigned to a plot in each replicate block. This layout can also be used within one bed, with rows of okra on each side of the bed.

Replicate block A		Replicate block B	
V5- min 10 plants	V3- min 10 plants	V6- min 10 plants	V1- min 10 plants
V1- min 10 plants	V6- min 10 plants	V4- min 10 plants	V2- min 10 plants
V2- min 10 plants	V4- min 10 plants	V2- min 10 plants	V5- min 10 plants

Bed length →

Statistical model

This trial will be a randomized and replicated trial over multiple farms. We will use an ANOVA (or other appropriate statistical methodology) to determine the significance of each measurement across the farmer participants.

Measurements

Quantitative and Qualitative

Crop management records

The following information will be collected on this sheet once a year:

- Seeding date
- Transplant date
- In-row spacing
- Between-row spacing
- Configuration (number of rows/beds)
- Fertilizer applications (rates, amounts, and date)
- Irrigation

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- Mulch
- Other products or notes

Germination both % and date (Count)

The following information will be collected on this sheet once a year:

- Germination rates will be taken **twice at 12 days and 24 days post seeding**
 - Total number of seeds sown
 - Total number of seeds that germinated after 12 days
 - Total number of seeds that germinated after 24 days
 - Germination notes (how did you seed your cells, place, other information)

Early Season/Post Transplant Vigour Ratings

The following information will be collected on this sheet once during the season:

- Early season vigour looks at seedling size, health, and growth rate after transplant
- Early season vigour will be taken once around **1 month after transplant**
 - Rating scale from very poor (1) to very high (5) [1=very low (0-20%); 2=low (20-40%); 3=moderate (40-60%); 4=high (60-80%); and 5=very high (80-100%)]

Evaluation Rubric		1	2	3	4	5	
Trait	Guidelines	Poor	Fair	Acceptable	Good	Outstanding	Timing
Vigour	<i>How vigorous (i.e. robust, fast-growing, resilient to stress, etc) is this variety?</i>	Weak and slow-growing plants	Below average vigour	Acceptable growth and some resilience to stress	Strong growth	Exceptional growth and resilience to stress	<i>Mid-Season</i>

Disease and Pest Observations

The following information will be collected on this sheet **throughout the season**:

- Growers will make notes of any disease or pest issues that occur on okra varieties throughout the year

Some common pests and disease seen in okra plants can be found from Penn State here:

<https://plantvillage.psu.edu/topics/okra/infos>

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Day to first flower, first harvest and last harvest

The following information will be collected on this sheet **once during the season:**

- Date of first flower (will be determined from early season vigour sheets)
- Date of first harvest (will be determined from harvest sheets)
- Date of last harvest (will be determined from harvest sheets)

Yield (Sheet for one, twice or thrice weekly)

The following information will be collected on this sheet **at every harvest throughout the harvest window/period.** This can be as frequently as the season and that crop dictate:

- Marketable
 - weight of marketable harvest (lbs/g)
 - number of marketable pods
- Non-marketable (over ripe, diseased, etc)
 - weight of non-marketable harvest (lbs/g)
 - number of non-marketable pods

Marketability at market

The following information will be collected on this sheet **once during the season:**

- How do the different varieties of okra sell (at market, CSA, or other outlets)? Were people interested in them?

Flavour and texture

The following information will be collected on this sheet **once during the season:**

- Notes on Flavour (sweet, bitter?) and texture (hard, slimmy?)
- Flavour and texture will be taken once a year in the middle of harvest season
 - Rating scale from very poor (1) to very excellent (5) [1=very poor (0-20%); 2=poor(20-40%); 3=moderate (40-60%); 4=excellent (60-80%); and 5=very excellent (80-100%)]

Evaluation Rubric		1	2	3	4	5	
Trait	Guidelines	Poor	Fair	Acceptable	Good	Outstanding	Timing
Flavour	<i>How much do you like the overall flavour of this variety? Please taste the varieties <u>cooked</u>.</i>	Would not eat again	Might try again	Would eat again, but wouldn't seek out	Would eat again happily	Would seek it out and rave about it!	<i>Post-harvest</i>

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Overall performance

The following information will be collected on this sheet **once at the end of the season**:

- Farmers will rate their impression of the overall performance of each variety

Photos

Please take photos of the following times/items:

- Farmer-researches with FLRP sign
- Germination
- Transplanting into the field (during and finished)
- Flowering/ flowers
- Younger pods vs older pods
- Ideal marketable, and unmarketable okra
- Harvest actions shot
- Other

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
Early to late April (depending on your farms systems)	Seeding	Start seeds in cells
Early June	Transplanting	Transplant seedlings into field
Throughout the year	Observations	Throughout the season check measurement sections
July, August, September	Harvest	Harvest okra when ready
Throughout the year	Submit data and photos	Send data to EFAO staff
September 30, 2022	Make sure all your data and photos are submitted	Send data to EFAO staff

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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

Rebecca will check via group emails at seeding, transplant, harvest and end of season.

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
Okra seed 30 seeds of each variety				Rebecca will source
Postage				Rebecca will mail to farmer-researchers
All seedling, planting, and harvesting equipment			In-kind	
Total				

Farmer-fee

Rav, the trial lead, will receive a farmer-fee of \$500; all other farmer-researchers receive \$50 per variety (two replicates/variety) to a maximum of \$300. They can submit invoices to the EFAO after they have submitted their data and photos to research staff.

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Invoices for Farmer-Fees & Reimbursements

Research expenses

- Submit an **invoice along with copies of receipts** for all qualified expenses using form found at <https://efao.ca/data/>
- **Deadline:** December 31, 2022

Farmer-fee

- Submit an **invoice** for your farmer-fee using form found at <https://efao.ca/data/>
- **Deadline:** December 31, 2022

Memorandum of Understanding

Please fill out the MOU at <https://airtable.com/shrlAcZ7bowmTQwvd>

EFAO Account Information

As a farmer-researcher, you must maintain current membership with EFAO throughout the duration of your trial.

We use your mailing address to deliver cheques, farmer-led research signs and any trial supplies.

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

Farmer-fees and Reimbursements

I agree with the following:

- The deadline for reimbursements and farmer-fees is December 31, 2022.
- To receive reimbursement for qualified research expenses, I will submit an invoice and copies of receipts at the form found at <https://efao.ca/data/>.
- To receive my farmer-fee, I will submit an invoice to <https://efao.ca/data/> after I have submitted the final data and photos.

Photo Use

We like to share snippets and stories of farmer-led research through EFAO's print publication, e-newsletter and social media accounts, using photos and updates that you send us. We will credit you when we use any photos.

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Choices (Select all that apply on the MOU):

- EFAO has my permission to share photos in EFAO's print publications
- EFAO has my permission to share photos in EFAO's e-newsletters
- EFAO has my permission to share photos in EFAO's social media
- I do not want my photos share in these ways
- Other

Farmer-Led Research Agreement

I agree with the following:

- I will complete my trial to the best of my ability following the written protocol.
- If circumstances change and I am unable to conduct my trial, I will notify EFAO staff as soon as possible.
- I will keep in contact with EFAO staff with updates and questions, or to make changes to my protocol .
- I will submit data to the EFAO by the date specified in the written protocol.
- I acknowledge that if I submit data after the submission deadline outlined in the written protocol, EFAO staff cannot guarantee that my data will be analyzed and written up before the Research Symposium and/or the next growing season.
- I will work with EFAO staff to interpret data and write the research report.
- I will take photos of my project throughout the season(s).

Program Participation

There are several farmer-led research events held throughout the year including webinars, field days, and the Research Symposium. The Research Symposium is held in conjunction with the annual EFAO Conference at the end of November/early December.

When and where possible I will:

- Attend farmer-led research events, including webinars and field days
- Attend and present my research findings at the Research Symposium
- I will complete the feedback survey related to the program

Data Use

You own all data generated on your farm as part of your farmer-led research trial with EFAO. You can notify EFAO at any time to remove EFAO's privileges to use and share your data, photos and farm information. To opt out of sharing your data, please contact Sarah Larsen via email (sarah@efao.ca) or mobile (226-582-0626).

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I agree with the following:

- By participating in the EFAO's FLRP, I agree to share with the EFAO the data collected as part of my trial, along with photos of the project and any farm information (e.g. soil type, previous farm practices, and soil tests) that I deem relevant.
- By sharing my data, photos, and farm information with EFAO, I agree that EFAO can use this information in research reports, posters, and summaries of my trial (e.g. summaries on the EFAO blog and in EFAO's print publication).
- I understand that I can notify EFAO at any time to remove EFAO's privileges to use and share my data, photos, and farm information.

Signature

Please fill out the MOU at <https://airtable.com/shrlAcZ7bowmTQwvd>