Okra variety trial

Farmer-researchers:

Name	Farm	Region
Rav Singh	Shade of Miti	CENTRAL
Rae Denison	Clovercroft	WEST
Orlando Lopez and Tara Ramkhelawan	Flemo Farm	CENTRAL
Ann Samuels	Wealth's Riches Inc	EAST
Judith Prince	Ubuntu Community Farm	CENTRAL
Angie Koch and Nikola Barsoum	Demonstration Gardens at Fertile Ground	WEST

Project type: Variety trial
Research priorities: Seed selection, production, & breeding
EFAO Contact: Rebecca Ivanoff

Objective

Farmers would like to identify the most productive varieties of okra across different farms in southern Ontario during the 2023 season.

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. Okra is an important cultural crop for many communities in southern Ontario however many local and organic farmers do not grow it - partly due to lack of knowledge and resources.

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 green, spineless and with spines, and of various shapes. All are open-pollinated, so in future years, with enough

isolation distance between other okra varieties, the seed could be saved. The varieties are also offered by local ecological seed companies. We hope that this research will increase the low supply of okra growing information in our area.

Rav would like to really focus on 3 varieties and their **productivity**. A big challenge for small-scale okra producers is that the growing season is short and yield/plant is typically low for southern Ontario. Doing a second year of data collection for 3 varieties will help provide more robust data. A challenge that some farmers noted last year was low profitability because okra has a short season and lower yields.

Experimental Design

Varieties

The 2023 okra variety trial includes 4 varieties, all of which will be transplanted in the field with **2 replicates.**

Code	Variety	Colour	DTM	Source	Pod Length	Notes:
OV1	Emerald Green	Green	55	Gaia Organic Seeds	6-7 inches	Famous heirloom is a vigorous, early producer of round, velvety green pods on tall, robust plants. Emerald okra was bred and released by the Campbell's Soup Company in the early 1950's. We found this variety to be a standout in our 2022 okra trial
OV2	Dwarf Lee	Green	55	Gaia Organic Seeds	6-7 inches	Dwarf 3'-4' tall plants. Productive and early. Pods are intermediate between slender and stocky. Good flavor and texture.
OV3	Cajun Jewel	Green	50	Commonwealth Seeds	6-7 inches	“Why didn’t we try this one last year! Everyone says it’s the one for northern climates. Also a

						dwarf, spineless.
OV4	Annie Oakley OP	Green	52	Commonwealth Seeds	6 inches	very productive, compact plants with spineless, uniform and tender green pods. It was recommended to us last year."

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 planting out; early to late April
Soaking Seeds:	Okra seeds have a hard seed coat: you can speed up germination by soaking the seeds for 8-24 hours in room temperature water before seeding, or nicking the seed with sandpaper or nail clippers (scarification).
Germination:	Okra love heat and optimum soil temperature range is 24-32C! Heating matts are ideal for okra transplants.
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. Do not disturb roots.
Cultivation	Weed control is important in this crop, especially when the plants are small. Cultivation should be shallow to prevent damage to the roots of the crop. Because okra love heat, some farmers have found they get better yields when the crop is planted in black landscape fabric or plastic or other mulches that warm up the soil. To avoid keeping the soil cool and delaying the harvest, some farmers hoe the transplants until hot weather arrives and only

	with the hot weather do they use organic mulches such as spoiled hay to prevent moisture loss and suppress weeds.
Days to harvest	55-64 days from transplant
Harvesting	Start picking when pods are no more than 7 inches long (depending on variety) – this takes about four -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 pods every two to three days.** Okra can be harvested by hand, but using pruning shears or a sharp pocket knife can minimize damage to the plant. Handle okra carefully because the pods bruise easily. **Growers can sell, share, distribute, or eat these okra pods as best fits their farming operations.**
Post Harvest	The optimum conditions for storing fresh okra are a moist environment and temperatures of 7 to 10 °C. Okra should not be washed before storing it in the refrigerator, as this will speed up decay. If properly harvested, handled, not washed, and stored correctly, good quality pods keep in the refrigerator for about seven days.

Each farmer should receive approximately **40-50 seeds of each variety**. We suggest that you plant all the seeds of each variety. Dwarf Lee had only 62% germination last year so that's why you will get more of this 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.

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.

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
- Mulch
- Other products or notes
- Printable sheet

Field Map

- 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!
- Printable Sheet

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)
- Printable Sheet

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**
    - Printable Sheet

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

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
- Printable Sheet

Some common pests and disease seen in okra plants can be found from Penn State here: https://plantvillage.psu.edu/topics/okra/infos

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 frequent as the season and that crop dictate**. This can mean up to 3 times a week during the hottest part of the year.**

- 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
- Printable Sheet

Marketability

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?
- Printable Sheet

Evaluation rubric		1	2	3	4	5	
Trait	**Guidelines**	**Poor**	**Fair**	**Acceptable**	**Good**	**Outstanding**	**Timing**
Marketability	*How easy would it be to sell this variety in your market, given its quality at harvest?*	Difficult to sell	Expect limited sales	Expect average sales	Expect strong sales	Would sell out!	*When all varieties are at their peak*

Flavour and texture

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

- Notes on Flavour (sweet, bitter) and texture (hard, slimy)
- Flavour and texture will be taken once a year in the middle of harvest season
    - Rating rubric below
- Printable Sheet

Evaluation Rubric		1	2	3	4	5	
Trait	**Guidelines**	**Poor**	**Fair**	**Acceptable**	**Good**	**Outstanding**	**Timing**
Flavour	*How much do you like the overall flavour of this variety? Please taste the varieties cooked (and raw if you'd like)*	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!	*Post-harvest*

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 by giving a rating and **writing some notes**! Stories are always good!
    - Rating rubric below
- Printable sheet

Evaluation Rubric		1	2	3	4	5	
Trait	**Guidelines**	**Poor**	**Unsure**	**Acceptable**	**Good**	**Outstanding**	**Timing**
Overall Performance	*What is your final impression of this variety?*	It is clearly not a good fit for me and my markets	I am unsure if it is a good fit for me and my markets	I like this variety but need to evaluate further	Solid variety, a good fit for me and my markets	Love this variety and would recommend to other growers	*End of the Season*

Photos

Please take photos of the following times/items:

- ☐ Farmer-researchers 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
- ☐ Tasting
- ☐ Different varietal pods beside each other
- ☐ Other

Research Timeline:

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
Mid 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, 2023	Make sure all your data and photos are submitted	Send data to EFAO staff
December 31, 2023	Farmer-fee and research expense invoice with receipts for expenses	Submit invoices at this site: https://efao.ca/data/
January/February 2024	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.

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Material	Unit	Quantity Required	Total Cost*	Note
Seed				
Total				

Farmer-fee

$100/variety grown and data collected for 2023

Invoices for Farmer-Fees

Farmer-fee

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

References

References here

Memorandum of Understanding

Please fill out the MOU at https://airtable.com/shrc1mcIYcx5Aq6Ex