

## EFAO 2022: Research Protocol

# Spring and Summer Iceberg variety trial

### Farmer-researchers:

Name	Farm	Region	Planting
Kristine Hammel	Persephone Market Garden	WEST	Spring, Summer, Fall
Evalisa McIlffaterick	Root Cellar Gardens	NORTH	Spring for seed production
Sarah Judd	Meadow Lynn Market Garden	WEST	Spring, Summer

### Project type: Variety trial

### Research priorities: Seed selection, production, & breeding

**EFAO Contact:** Dillon Muldoon, [dillon@efao.ca](mailto:dillon@efao.ca), (705) 313-5930 & Rebecca Ivanoff, [rebecca@efao.ca](mailto:rebecca@efao.ca), (519) 760-2971

## Objective

Farmers would like to identify the most productive and best tasting varieties of iceberg lettuce across different farms in Ontario during the 2022 growing season. Evalisa is interested in which varieties of iceberg lettuce can produce seed in Zone 3.

## Background

Krisiten started growing iceberg lettuce for the first time last year and her customers love the product. She is interested in growing more and finding a variety that is flavourful and produces enough to meet her local market's demand. There are currently few varieties available and it doesn't seem to be grown much on a smaller scale by direct marketers.

## EFAO 2022: Research Protocol

### Experimental Design

#### Varieties

The 2022 iceberg lettuce variety trial includes six varieties, which will be planted at three plantings over the growing season: spring (late April), summer (early July), fall (mid-August). For each planting, the farmers will grow transplants of the varieties in 2 replicates. Each grower will grow at least three common varieties (Saladin, Marius, Gildenstern).

Code	Variety	Colour	Source	Organic Seed ?	Any Intellectual property on this variety?
LV1	<a href="#">Saladin</a>	<b>Green</b>	High Mowing	Yes	None known
LV2	<a href="#">Lava Dome</a>	<b>red</b> stripes and splashes	Frank Morton/Wild Garden?	yes	OSSI pledged
LV3	<a href="#">Laibacher Eis 4</a>	<b>Green</b> with red edge	Bingenheimer	yes	Open source
LV4	<a href="#">Marius</a>	<b>Green</b>	Bingenheimer	yes	Open source
LV5	<a href="#">Gildenstern</a>	golden <b>green</b>	Wild Garden	yes	OSSI pledged
LV6	<a href="#">Head Cardinal</a>	<b>red</b>	Wild Garden	-	None known

#### Planting and Cultivation Recommendations

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

## EFAO 2022: Research Protocol

Plot size per variety	12+ plants per variety section, 2 replications = 24+ plants total for each planting date, 3 planting dates (spring, summer, fall) = 72 plants total
Row and bed spacing	In-row: 12"-16"; between row: 12"-18"
Seeding date	Your main spring, summer and fall successions, aiming for around spring: Late March; summer: Early June ; and fall: Mid-July
Transplanting dates	All farmers will transplant when acceptable in their regions, aiming for spring: Late April ; summer: Early July ; and fall: Mid-August
Days to harvest	62+ days from transplant
Harvesting	Harvest full grown mature heads

Each farmer should receive approximately 30 seeds of each variety for each planting. We suggest that you plant 30 seeds of each variety in each planting. The goal is to get at least 24 seedlings of each variety in each planting so that you can plant 12 per plot.

**If you have germination issues** and you have between 16-24 heads of a variety (for a single planting), plant about half in one replicate and half in the other replicate:

$$16 = 8 + 8$$

$$17 = 9 + 8$$

$$18 = 9 + 9$$

$$19 = 9 + 10$$

$$20 = 10 + 10$$

.....

$$24 = 12 + 12$$

If you have fewer than 16 heads of a variety (for a single planting), plant 10 heads in one replicate and the remainder in the second replicate. If you have fewer than 10 heads, then plant all in one replicate

## EFAO 2022: Research Protocol

In all cases, take notes of the # of heads that go in per planting on the data sheet. And take photos.

### Field Layout

The trial arrangement is flexible as long as you plant at least 2 replicated blocks of 3 varietal plots with each variety plot having *at least* 12 plants of the variety (you can plant more lettuce if you have space available) for each of the spring, summer, and fall successions.

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

- For each of the planting dates (spring, summer, and fall) please follow the field layout recommendations below.
- For each planting in 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 12 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 to Rebecca, which is a third back-up!

### Examples of field layout:

Example 1: Layout with 2 replicate blocks of 6 varieties (at least 12 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	V2	V3	V4	V6	V1	V4	V3	V1	V5	V2	V6
Min	Min	Min	Min	Min	Min	Min	Min	Min	Min	Min	Min
12	12	12	12	12	12	12	12	12	12	12	12
plants	plants	plants	plants	plants	plants	plants	plants	plants	plants	plants	plants

## EFAO 2022: Research Protocol

Bed length →

Example 2: Layout with 2 replicate blocks of 6 varieties (12 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 lettuce on each side of the bed.

Replicate block A		Replicate block B	
V5 - min 12 plants	V3- min 12 plants	V6- min 12 plants	V1- min 12 plants
V1- min 12 plants	V6- min 12 plants	V4- min 12 plants	V2- min 12 plants
V2- min 12 plants	V4- min 12 plants	V2- min 12 plants	V5- min 12 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 per planting**:

- Seeding date
- Transplant date
- In-row spacing
- Between-row spacing
- Configuration (number of rows/beds)
- Fertilizer applications (rates, amounts, and date)
- Irrigation
- Weed control
- Mulch
- Other products or notes

## EFAO 2022: Research Protocol

### Germination

The following information will be collected on this sheet once per planting:

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

### Disease and pest observations

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

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

### First harvest, last harvest, bolting

The following information will be collected on this sheet **throughout the growing season** from yield sheets

### Yield (One per planting/per week of harvest?)

The following information will be collected on this sheet **at each harvest throughout the harvest window/period**:

- Marketable
  - number of marketable heads
- Non-marketable (damage/disease/pest?)
  - number of non-marketable heads

### Seed Producers

The following information will be collected

- Date of seeding, TP, when 50% mature, when % bolted, when first seed harvest, when last seed harvest. Seed yield (g)

### Flavour

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

- Notes on Flavour (sweet, bitter?) Texture (crunchy-not crunchy), overall flavour rating?

## EFAO 2022: Research Protocol

- 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
Flavour	<i>How much do you like the overall flavour of this variety? Please taste the varieties <u>raw</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!

### Overall performance

The following information will be collected on this sheet **once a year 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)
- Growing lettuce
- 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
First Planting (Spring)		

## EFAO 2022: Research Protocol

Late March - early April	Seeding	Start seeds in cells
Late April - early May	Transplant	Transplant seedlings into field
	Observations	
	Head Harvest	
	Seed Harvest	
Second Planting (Summer)		
Early June	Seeding	Start seeds in cells
Early July	Transplant	Transplant seedlings into field
	Observations	
	Head Harvest	
Third Planting (Fall)		
Mid-July	Seeding	Start seeds in cells
Mid-August	Transplant	Transplant seedlings into field
	Observations	
	Head Harvest	
December 31, 2022	Farmer-fee and research expense invoice with receipts for expenses	Submit invoices at this site: <a href="https://efao.ca/data/">https://efao.ca/data/</a>
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 group emails at seeding, transplant, each round of harvest DATA.



## EFAO 2022: Research Protocol

### 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			\$85.73	Ev seed cost for Lava Dome, Guildenstern, and Head Cardinale.
Postage				
<b>Total</b>				

### Farmer-fee

Trial leads, Krisitne and Evalisa will submit an invoice for a farmer-fee of \$500; all other farmer-researchers will submit an invoice for \$300 to the EFAO after they have submitted their data and photos to research staff.

### 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/shrIAcZ7bowmTQwvd>

## EFAO 2022: Research Protocol

### 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](mailto: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.

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.

## EFAO 2022: Research 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](mailto:sarah@efao.ca)) or mobile (226-582-0626).

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>