

EFAO 2022: Research Protocol

The production of table beets in three row vs four row spacing

Farmer-researcher: Ann Slater, Ann Slater, Fresh Organic Vegetables - WEST

Project type: Research trial

Research priorities: Weed control

EFAO Contact: Dillon Muldoon

Objective

Ann wants to know what is the yield comparison between three rows of beets vs four rows of beets on an approximately three feet bed system.

Background

Planting four rows is the more intensive option, but from observation she is not sure the yield is higher on four rows vs three rows. Three rows makes for easier weed control and potentially for better airflow to cut down on leaf-type diseases. Four rows potentially limits the light available to plants. She has often planted three rows for early beets, because she thinks they get more light and are therefore earlier. But she is starting to wonder if there is a yield benefit in the long term from four rows. When is intensive too intensive?

References

1. <https://journals.ashs.org/horttech/view/journals/horttech/20/3/article-p560.xml>

Experimental Design

Ann will grow Boro an F1 variety of organic red table beets (*Beta vulgaris*) which matures in 50 days. To plant the crop Ann will use an Earthway precision garden seeder with the beet seed plate. She will plant in the two first weeks of May 2022 when the weather allows into the layout seen below.

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Field Layout

	Rep 1		Rep 2		Rep 3		Rep 4	
3' bed width	Control (3 row Beets)	Treatment (4 row Beets)	Treatment (4 row Beets)	Control (3 row Beets)	Treatment (4 row Beets)	Control (3 row Beets)	Control (3 row Beets)	Treatment (4 row Beets)
	12.5' plot		25' rep					
	100' bed length							

Ann will plant four replications of beet in early to mid May in a 100 foot bed with a 3 foot width. In each replication Ann will plant either the Control (3 rows of beets) or the treatment (4 rows of beets) based on the layout above.

Statistical model

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

Measurements

Crop management records

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

- Seeding date
- In-row spacing
- Between-row spacing
- Fertilizer applications (rates, amounts, and date)
- Irrigation
- Mulch
- Other products or notes
- DOC LINK

Yield marketable topless beets

The following information will be collected on this sheet **at every harvest throughout the harvest window/period** bi-weekly for CSA:

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- Marketable
 - Weight of marketable harvest beets with no tops (lbs/g)
- DOC LINK

Yield non-marketable topless beets

The following information will be collected on this sheet **once in September at the last harvest period** bi-weekly for CSA:

- Non-marketable (**ONLY IN SEPTEMBER**)
 - Weight of non-marketable harvest beets with no tops (lbs/g)
 - Count of non-harvestable beets
- DOC LINK

Observations on weed control, weeding time

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

- Ann will make notes, take photos of any observations of difference weed pressure or time to control weeds in treatments throughout the season
- DOC LINK

Disease and pest observations

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

- Ann will make notes of any disease or pest issues that occur on beets for row treatments throughout the year
- DOC LINK

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

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

Photos

- Farmer-researcher with FLRP sign
- Seeding
- Emergence
- Differences among treatments
- Pest and disease
- Weed pressure
- Crop at maturity
- Harvest actions shot

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- Marketable vs non-marketable beets
- 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 Mid May	Seeding	Seed 100 ft experimental bed of beet according to design above
June -August	Observations	Make note of any pest, disease, or weed difference between treatments on data sheets provided
July - September	Harvest	Harvest Beets biweekly for CSA taking weights without tops of marketable and non-marketable beets (take photos)
Ongoing	Data	Send data to Dillon on an ongoing basis
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

Dillon will check in with Ann by email in Mid-July and in September

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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
Scale				
Total				

Farmer-fee

A \$500 farmer-fee can be collected for the 2022 season after all data and photos have been submitted to the EFAO 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/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.

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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.

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).

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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).

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/shrIAcZ7bowmTQwvd>