

EFAO 2023: Working Draft Research Protocol

Growing Lablab (Avarakkai) bean in southern Ontario

Farmer-researcher(s): Aarathi Edward-Paiva, Backyard Roots and Shoots - WEST

Project type: Research trial, Variety trial

Research priorities: Seed selection, production, & breeding

EFAO Contact: Rebecca Ivanoff

Objective

In the first year, the objective is to see which variety of Lablab bean is more productive in the zone 6 conditions of Southwestern Ontario

Background

Having grown up eating it on a regular basis in India, Aarathi found it hard to find avarakkai or lablab beans in grocery stores in the GTA. Even the ethnic markets have them only sporadically and of questionable freshness. Given it is a bean, and beans are usually the easiest plants to grow under most conditions, she started looking into growing it locally. Unable to find the seed in local catalogues (only the purple ornamental type is popular here), she contacted AAFC who helped her legally import seeds from South India. She was able to acquire two pounds of two varieties – one dwarf and one vining – both used in India for vegetable production.

Avarakkai/lablab beans are usually eaten in a dish similar to a stir fry; we slice up the pods with the immature seed inside and fry it up with onion, garlic and either pepper or chilli. Some coconut is added to temper the spice if needed.

Aarathi plans to save seeds in another section of her market garden but no data will be collected on that plot in 2023.

No data regarding the difference in labour between these two different varieties (one being a bush vs one being a pole with trellising needs) will be collected this year, but will be

EFAO 2023: Working Draft Research Protocol

reflected on when rating the overall variety performance and if Aarathi would grow the variety again or not.

Experimental Design

Varieties

The 2023 lablab bean variety trial includes 2 varieties, all of which will be both direct seeded and transplanted in the field with 4 replicates.

Code	Variety Name	Plant Habit	DTM (eating stage)	Source	Notes:
LLV1	Val Papdi Bean-Bharat	Bush	45-65	seedsofindia.com (New Jersey, USA)	
LLV2		Vining	45-65	Nagercoil, India	

Planting and Cultivation Recommendations

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

Row and bed spacing	Bush: In-row: 12"; between row: 20" for the dwarf variety (2 rows per bed) Pole: In-row: 12"; between row: single row for the pole variety 3 seedlings per pole/12" Bush: 10 plants per replicate (2 rows, 12 inches between plants) = 10 plants x 4 replicates x two plantings = 80 plants total Pole: 15 plants per replicate (1 row, 12 inches between plants, 3 plants per pole) = 15 plants x 4 replicates x two plantings = 120 plants total
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EFAO 2023: Working Draft Research Protocol

	<i>*If germination is observed to be low during planting #1, EFAO's suggestion is to plant more seeds per hole when direct seeding in planting #2.</i>
Plot size per variety	5 bedfeet per variety per replication 5 feet per replication x 2 varieties x 4 replicates x 2 plantings = 80 bed feet total
Seeding dates	First Planting: 4 weeks before planting out; late April to early May Second Planting: When soil is warm enough (early June)
Inoculant:	Rhizobium inoculant from Vesey's will be applied
Transplanting date (for planting #1)	late May to early June around the time you are transplanting tomatoes and other hot crops. Do not disturb roots.
Days to harvest	45 to 60 days from transplant - to be observed
Harvesting	Max 3 weeks for dwarf and 6-7 weeks for pole is recommended for normal beans - to be observed

Field Layout

The trial arrangement is flexible as long as you plant at least 4 replicated blocks of 2 varieties with each variety plot having *at least* 10 plants of the variety.

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

- For this trial, create four 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 4 replicate blocks should have a plot of 10 bush variety plants and 15 pole variety plants; the order of the planting will be different in each replicated block.

EFAO 2023: Working Draft Research Protocol

- 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: Layout with 4 replicate blocks of 2 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		Replicate block C		Replicate block D	
V1 - min 10 plants	V2 - min 10 plants	V1 - min 10 plants	V2 - min 10 plants	V2 - min 10 plants	V1 - min 10 plants	V1 - min 10 plants	V2 - min 10 plants

Bed length →

***Note that this will be replicated over two planting dates.**

Statistical model

We will use a T-Test, ANOVA, or other appropriate statistical methodology to determine the significance of each trait between the two varieties.

Measurements

Quantitative and Qualitative

Crop management records

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

- Indoor sowing date
- Transplant date
- Direct Seeding date
- In-row spacing
- Between-row spacing
- Configuration (number of rows/beds)

EFAO 2023: Working Draft Research Protocol

- Fertilizer applications (rates, amounts, and date)
- Irrigation
- Mulch
- Pest control measures
- Other products or notes

[Datasheet for Printing](#)

Germination both % and date (Count)

The following information will be collected on this sheet twice for each planting:

- 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, other information)
- [Datasheet for Planting #1](#)
- [Datasheet for Planting #2](#)

Early Season/Post Transplant Vigour Ratings

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

- Early season vigour looks at seedling size, health, and growth rate after transplant
- Early season vigour will be taken once around **2 weeks after transplant**
- Early season vigour will be taken once around **1 month after direct seeding**
- [Datasheet for Printing #1](#)
- [Datasheet for Printing #2](#)

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 bean varieties throughout the year

[Datasheet for Printing](#)

EFAO 2023: Working Draft Research Protocol

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. We will use this information to measure yield per bedfoot.

- 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
- [Datasheet for Printing](#)

Marketability at market

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

- How do the different varieties of beans sell at market? Were people interested in them?
- [Datasheet for Printing](#)

Flavour and texture

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

- Notes on Flavour (sweet, bitter) and texture (crisp, smooth)
- Flavour and texture will be taken once a year in the middle of harvest season
- [Datasheet for Printing](#)

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

[Datasheet for Printing](#)

Photos

Please take photos of the following times/items:

- Farmer-research with FLRP sign
- Germination
- Transplanting into the field (during and finished)
- Direct Seeding into the field

EFAO 2023: Working Draft Research Protocol

- Flowering/ flowers
- Bean pods
- Ideal marketable, and unmarketable bean
- Harvest actions shot
- Other

Statistical model

Statistical analysis or design here

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
Late April/Early May	Seeding Planting 1	
Late May/Early June	Seeding Planting 2	
April - October	Take Observations	See above
April- October	Submit Data	
October 31	Submit any outstanding data	
December 15, 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 be in email contact with Aarathi as key points of the project over the season.

EFAO 2023: Working Draft Research Protocol

References

- [Lab lab or Dolichos bean Techsheet from Department of Horticulture Government of Tamilnadu](#)

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			Approx. \$55	EFAO will cover seed costs
Rhizobium inoculant			in-kind	
Row covers and hoops for both varieties + insect netting		Four replicates (2 rows x 30ft) = 240'	in-kind	
Bamboo poles or T-posts and netting/tomato twine for vining variety			in-kind	
Broadfork, Tilther, Rake & Jang seeder			in-kind	
Compost, Chicken manure & alfalfa meal			in-kind	
Drip tape & leader hose			in-kind	
Total			\$55	

Farmer-fee

\$1000 for single farm randomized and replicated (3-4 reps) trials; \$500 for conducting the trial, and \$500 for submitting the data on time!

EFAO 2023: Working Draft Research Protocol

Invoices for Farmer-Fees

Farmer-fee

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

Memorandum of Understanding

Please fill out the MOU at <https://airtable.com/shrc1mclYcx5Aq6Ex>