

## EFAO 2023: Working Research Protocol

# Planting methods for ezleaf type lettuce

**Farmer-researcher(s):** Jeremy Stojan, Fresh City Farms - Central

**Project type:** Research trial

**Research priorities:** Soil health, Weed control

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## About the farm

Fresh City Farms is a for-profit organic grocery business that started out 12 years ago as a kind of urban farm CSA. Now the grocery delivery side of the business has vastly grown, but the farm has stayed relatively small. The farm itself moved to a new location in North York last year and now is a 1.5 acre urban market garden following organic practices. We sell through our online store and have an on-site farm stand. We focus on higher value bunching greens and cut salad mix, though grow a wider variety of veg for the on-site stand.

## Objective

How Fresh City Farms can effectively grow Salanova and ezleaf with less time input.

## Background

We grow a lot of Salanova and ezleaf on our farm, with 10 or 11 successions of 4 x 100 ft beds. At our current spacing this is 3000 transplants every two weeks just for this crop, which takes a large amount of labour. We want to trial three methods of growing Salanova and ezleaf:

1. Transplant as usual; *compost added before transplanting*
2. Direct seeding with a jang seeder; *compost added after seeding*
3. A step-in method inspired by seeing transplants just root when discarded onto the bed where we place the transplants on the ground at our regular transplant spacing and then roll over them with an earthway seeder to squish their roots to the ground; *compost added after stepping-in.*

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### Experimental Design

#### Field Layout

For the first four succession plantings of lettuce, Fresh City Farms will set-up their comparison across four successions, with two replicate sections per treatment in each succession, as follows:

SUCCESSION 1		SUCCESSION 2		SUCCESSION 3		SUCCESSION 4	
Bed1	Bed2	Bed3	Bed4	Bed 5	Bed 6	Bed 7	Bed 8
4x25' SI	4 x 25' TP	N/A	4x25' DS	4x25' SI	N/A	4 x 25' TP	4x25' DS
4x25' DS	N/A	4 x 25' TP	4x25' SI	4x25' DS	4 x 25' TP	N/A	4x25' SI
4x25' SI	4 x 25' TP	N/A	4x25' DS	4x25' SI	N/A	4 x 25' TP	4x25' DS
4x25' DS	N/A	4 x 25' TP	4x25' SI	4x25' DS	4 x 25' TP	N/A	4x25' SI

DS = direct seeded; TP = transplanted; SI = step-in transplanted; N/A is transplanted lettuce that will not be included in the trial.

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The team will:

- Manage the beds in the same way, using no-till methods including silage tarps to clear beds
- Add and record compost and other fertility at the same rate for all beds and treatments - 2 wheelbarrows compost, 20lbs bone meal/ 100ft bed - to be finalized with spring soil test
- Mix 15 lettuce varieties throughout the beds - (intercut, rhone, ezflor, ilema, ezpark, hampton, burgundy, red incised salanova, green incised, red butter salanova, green sweet crisp salanova, red sweet crisp salanova, green oakleaf salanova) Seed is all fully mixed for direct seeding, and for transplanting.
- Record # of transplants and seed used for each treatment (weigh in, weigh out for each treatment)
- Clear-cut beds at harvest and record yield and DTM for each treatment
- One team member will do all transplanting, seeding, weeding and harvesting for consistency (direct seeding with seeder may be done by farm manager) and record time taken for each method, including seeding transplants, direct seeding beds, transplanting, compost/amendment application, filling in gaps with transplants, weeding, harvesting. Things not included in time: getting tools, setup for seeding/transplanting, watering seedlings, and irrigation of crops.
- Keep the team member harvesting consistent throughout

### Statistical model

We will use an analysis of variance (ANOVA) to assess the three establishment methods across the four replicate plantings.

## Measurements

### *Labour*

- For consistency of measurements, one team member will do all transplanting, seeding, weeding, and harvesting. They will record the time taken for each task including seeding transplants, direct seeding beds, transplanting, compost/amendment application, filling in gaps with transplants, weeding, and harvesting. Direct seeding with a seeder may be done by the farm manager. Things not included in time: getting tools, setup for seeding/transplanting, watering seedlings, and irrigation of crops.
- They will record time in a log sheet with date, start time, finish time, duration, and activity type. There will also be room for notes for any observations at each stage.

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### *Yield*

- **Timing of harvest:** When the lettuce has reached the ideal size, and the ground between the plants is no longer visible, the plantings will be cut. The timing will depend on judgment, but timing of the different methods will be standardized over the four replicants and will be recorded.
- **Standardization method:** For each replicate and succession, the team will record the DTM of the first treatment that is ready. Harvest days are 3-4 days apart (Tuesdays, Fridays), so if the other plantings are not quite ready, they will be reassessed for the next harvest day. The team will use the information on harvest lags among treatments to harvest subsequent successions. Example: the first transplanted lettuce is ready at day 30, then the step-in method is ready at day 33 (three days later), then the direct-seeded method is ready at day 40 (10 days later). For the next replicate in warmer weather, the transplanted lettuce is ready earlier due to heat, at 27 days, so we would try to harvest the step-in method three days later like in replicate one at 30 days, and 10 days later for direct-seeded at 37 days.
- **Time of day:** The team will harvest at the ideal time when most of the dew is drying off the plants, but they haven't started to wilt in the day's heat.
- **Weighing:** The team will weigh and record each replicate section separately and immediately before washing, in tared rubbermaid harvest bins, in lbs.
- **Notes:** Any notes about disease, pests, or any other observations about growth habit will be recorded at time of harvest.
- **2nd cut:** If plants regrow sufficiently they will be cut a second time, at a set timing after the first cut. This will be established in the first replicate, and will be the same for all the treatments, as a set number of days after the 1st cut. They will all be recut unless quality is too poor to sell, then 2nd cut will be recorded as 0 lbs.

### *Other measurements*

- Seedling rate for DS and # of seedlings for SI and TP methods (weight and seed count estimate and number of seedlings for mass planting and fill-in)
- Survival: number of fill in transplants needed
- DTM: see above in timing of harvest. All DTM will be recorded on harvest days, then a second DTM for the second cut will be recorded. Will attempt to standardize across replicates for consistency, but if some replicates produce big differences in DTMs then observation and judgment will take precedence over trying to mimic the first replicant.

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- Other observations: general notes about the crop health at each stage of work from transplanting, filling in, weeding or harvest can be recorded under Notes. Employees will assess crops with the manager at each stage as well.

### Photos

Fresh City Farms will take photos through the process, including photos of each establishment method, how the crops are growing in each treatment (every week); and harvest methods.

### 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
April 3, 2023	<b>Seed succession 1 transplants</b>	For transplant and step-in methods: 4x128 cell trays each
April 17, 2023	Seed extras transplants	Seed 1.5 tray for DS and SI plantings to fill in gaps
May 1, 2023	Prep beds	Remove tarp, add 2 wheel barrows compost, 20 lbs bone meal to each bed before for transplant method, after for step-in and direct seed methods
May 1, 2023	Field planting	Transplant, Step-in, Direct seed for succession 1: use tape measure and wood stakes for markers to separate plots. Farm manager and one staff work together for the 1st replicant to establish methods. Staff will do the remainder of work for the following replicates.
May 15, 2023	Weeding/fill in	Weed beds and fill in any gaps with transplants in the step in, direct seeded beds; record # of transplanted used to fill in in each method
June 12, 2023	First cut	Observe optimal time to cut each method in succession 1. Cut sections, and log time, date,

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		weight, DTM and other observations.
June 30, 2023	Second cut	Observe optimal 2nd cut, record all details.
April 17, 2023	<b>Seed succession 2 transplants</b>	For transplant and step-in methods: 4x128 cell trays each
May 8, 2023	Seed extras transplants	Seed 1.5 tray for DS and SI plantings to fill in gaps
May 15, 2023	Prep beds	Remove tarp, add 2 wheel barrows compost, 20 lbs bone meal to each bed before for transplant method, after for step-in and direct seed methods
May 15, 2023	Field planting	Transplant, Step-in, Direct seed for succession 1: use tape measure and wood stakes for markers to separate plots. Farm manager and one staff work together for the 1st replicant to establish methods. Staff will do the remainder of work for the following replicates.
May 29, 2023	Weeding/fill in	Weed beds and fill in any gaps with transplants in the step in, direct seeded beds; record # of transplanted used to fill in in each method
June 26, 2023	First cut	Observe optimal time to cut each method in succession 1. Cut sections, and log time, date, weight, DTM and other observations.
July 12, 2023	Second cut	Observe optimal 2nd cut, record all details.
May 8, 2023	<b>Seed succession 3 transplants</b>	For transplant and step-in methods: 4x128 cell trays each
May 22, 2023	Seed extras transplants	Seed 1.5 tray for DS and SI plantings to fill in gaps
June 5, 2023	Prep beds	Remove tarp, add 2 wheel barrows compost, 20 lbs bone meal to each bed before for transplant method, after for step-in and direct

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		seed methods
June 5, 2023	Field planting	Transplant, Step-in, Direct seed for succession 1: use tape measure and wood stakes for markers to separate plots. Farm manager and one staff work together for the 1st replicant to establish methods. Staff will do the remainder of work for the following replicates.
June 19, 2023	Weeding/fill in	Weed beds and fill in any gaps with transplants in the step in, direct seeded beds; record # of transplanted used to fill in in each method
July 10, 2023	First cut	Observe optimal time to cut each method in succession 1. Cut sections, and log time, date, weight, DTM and other observations.
July 24, 2023	Second cut	Observe optimal 2nd cut, record all details.
May 22, 2023	<b>Seed succession 4 transplants</b>	For transplant and step-in methods: 4x128 cell trays each
June 5, 2023	Seed extras transplants	Seed 1.5 tray for DS and SI plantings to fill in gaps
June 19, 2023	Prep beds	Remove tarp, add 2 wheel barrows compost, 20 lbs bone meal to each bed before for transplant method, after for step-in and direct seed methods
June 19, 2023	Field planting	Transplant, Step-in, Direct seed for succession 1: use tape measure and wood stakes for markers to separate plots. Farm manager and one staff work together for the 1st replicant to establish methods. Staff will do the remainder of work for the following replicates.
July 3, 2023	Weeding/fill in	Weed beds and fill in any gaps with transplants in the step in, direct seeded beds; record # of transplanted used to fill in in each method

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July 24, 2023	First cut	Observe optimal time to cut each method in succession 1. Cut sections, and log time, date, weight, DTM and other observations.
August 7, 2023	Second cut	Observe optimal 2nd cut, record all details.
September 30, 2023	Data submission	Submit data to EFAO
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

Once per month, April-Sept

### 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
Pelleted lettuce seed			~ \$100	
<b>Total</b>				

### Farmer-fee

\$1000 for 2023 if trial is conducted and the data is submitted by the deadline; \$500 for 2023 if the trial is conducted but the data is not submitted.



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### 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>