

Is lettuce seed production in northern Ontario improved using a hoop house?



SEED PRODUCTION
& BREEDING



Farmer-Researcher

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May 2018 - September 2018

In A Nutshell

Northern Ontario faces specific challenges compared to other parts of the province when it comes to seed production, including late springs and early frosts (as early as end of August), followed with a wet fall.

The demand for lettuce and greens seed is high, but these growing conditions make producing lettuce seed outdoors very difficult. This means that northern seed producers cannot produce regionally adapted varieties.

As a potential solution to lettuce seed production in northern Ontario, Peggy compared seed production in a hoop house and uncovered.

Key Findings

- In the hoop house, Peggy grew sellable lettuce seed from 4 of 5 varieties, and sales of the seeds would recoup hoop house material costs in 2.21 years.
- When grown uncovered, none of the 5 varieties produced viable seed.

METHODS

Design

Peggy grew 5 varieties of lettuce both in a **hoop house** and **uncovered** and compared seed yield by weight.

She randomized the position of each variety in the hoop house and uncovered in a paired design with 4 replicates. This design allowed her to test for differences in seed production between the hoop house and uncovered. With only one replicate of each variety under the hoop house and uncovered, the design did not allow us to test differences among varieties.

Figure 1. Peggy's experimental design for lettuce planted for seed production. The bed was 70' and continuous, with 48' of the length under the hoop house and the remaining uncovered.

Hoop House				
Dark Lolla Rosa	Cosmos	Jericho	Straw-flower	Black Seeded Simpson
Peppers				
Celosia	Red Oak Leaf	Snap dragons	Lovelock	Stock
Uncovered				
Jericho	Cosmos	Black Seeded Simpson	Straw-flower	Red Oak Leaf
Peppers				
Celosia	Dark Lolla Rosa	Snap dragons	Lovelock	Stock

Measurements

Along with production notes like bolting and seed set, Peggy weighed all seed harvested from each variety. She harvested seed over a three week period, collecting viable seed by threshing seed heads into a large paper bag, then leaving remaining seed to mature on the plant.



Left: Peggy's hoop house that she constructed from T posts and PVC, following a video published by Utah State University Extension (link in protocol); **Right:** Damage to hoop house from winds that gusted 30 minutes after harvest!

RESULTS

- There was no viable seed produced from any of the lettuce varieties grown uncovered.
- This is compared to the hoop house, **where 4 of the 5 varieties produced viable seed**, with a 8% chance ($P=0.08$) the seed produced is due to chance and not the fact that it was protected.

Table 1

Production dates for lettuce varieties grown in a hoop house and uncovered (brackets). All varieties were seeded May 3 and planted Jun 15.				
Variety	Type	Bolting	Seed Set	Harvest
Black Seeded Simpson	Green Leaf	Jul 16	Aug 20	Aug 24 - Sep 14
Lovelock	Freckled	Aug 24		None
Red Oak Leaf	Red	Jul 24	Aug 24	Sep 7 - Sep 21
Dark Lolla Rosa	Red Curly	Jul 24 (Jul 30)	Aug 24	Sep 7 - Sep 21
Jericho	Green romaine	Jul 24 (Jul 30)	Aug 24	Sep 7 - Sep 14

- Scaling up her numbers to 100 plants of each variety, average retail value at \$3.30/gram was **\$783**.
- With entire hoop house planted, Peggy would be able to sell enough seed over **2.21 years** to pay for the hoop house materials.

Table 2

Results for lettuce seed production in the hoop house. Lettuce planted uncovered produced no viable seed.				
Variety	Germ.(%)	Volume	Retail value at \$3.30/gram for 100 plants	Years to pay off hoop house purchase
Black Seeded Simpson	88		\$1610	0.71
Lovelock	-		-	-
Read Oak Leaf	93		\$367	3.11
Dark Lolla Rosa	91		\$847	1.35
Jericho	97		\$311	3.68
Average	92	139	\$783	2.21

- Because the experimental design did not have replicates of each variety in the hoop house and uncovered, we are unable to use statistics to conclude which variety is most productive. But the trends of seed produced follow Peggy's observations from previous years of growing: Black Seeded Simpson is a heavy seed producer while Lovelock bolts very late!



Top left: Dark Lolla Rosa bolting inside hoop house; **Right:** Black Seeded Simpson at seed set inside the hoop house. **Bottom left:** Planting lettuce outside in the uncovered beds as a control; **Right:** Germination test for the viable seed produced from the hoop house.

TAKE HOME MESSAGE

Hoop houses appear to be an **effective way to grow lettuce seed in northern Ontario**.

There was variation in the weight of seed production from the five lettuces tested. The differences match Peggy's observations from previous years but will need to be validated with additional replicates in future years.

Even with paying off hoop house materials in 2.21 years, this data tells Peggy that selling lettuce seed wholesale by weight is not going to be profitable. Based on a suggestion from High Mowing Seeds, Peggy will try pricing by **seed count** for greater profit. She can do this in future years by calibrating the weight or volume of 1,000 lettuce seeds.

Peggy will also evaluate the return on investment of a more **wind-resistant steel frame** to avoid the destruction by winds experienced this year. Specifically, she's thinking of using one of her existing Hanley caterpillar tunnels with a taller gothic peak, and forcing sides up high to allow for sufficient ventilation. Since lettuce plants are ~ 4' tall at seed set, Peggy must be able to keep good airflow so the seeds don't overheat.

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