



FARMER-RESEARCHER

Nathan Klassen, Nith Valley Organics

FUNDING

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South Asian-style red carrot variety trial

IN A NUTSHELL

The team at Nith Valley Organics identified Carnelian as a standout south Asian-style red carrot variety.

- The team rated Carnelian to have the best flavour (cooked), suitable market shape and colour, and good yield.
- Rubypak performed well and was good runner up.

MOTIVATION

Nith Valley Organics is a diverse market farm raising certified organic vegetables and livestock in Plattsville, ON. Many of the crew members on the farm are from India. Red carrots, which are culturally significant to them, are expensive and often of poor quality in Ontario. The team is looking to find suitable varieties to increase local availability of this specialty crop, in particular for cooking. They are looking for sweet, red coloured, long carrots that are similar to an Indian red carrot that “looks and tastes like home”.

This trial aims to find a red carrot varieties that are easy to source seed for, will perform best in organic and ecological conditions in southern Ontario and produce a carrot recognizable and delectable for the Indian diaspora community. The information gathered will be used to help farmers identify the best-performing red carrot varieties for the region, both for market garden production and seed production, and to identify varieties that would be suitable parents for future regional breeding projects.

METHODS

FIELD LAYOUT

The team selected and grew six trial varieties seen in **Table 1**. Nathan referred to the Canadian Vegetable Improvement (CANOVI) program red carrot trials for varietal selection.

The team laid out the trial in a 300-foot bed with two rows, and allotted each variety 100 continuous row feet. They flagged the two noncontiguous 12 foot sections of each 100 foot row as two distinct replicates. Employing longer rows enabled them to flag out replicates within a row and mitigate the mixing of varieties, given that there was approximately two feet of spillover with each variety change due to the seeds already present on the seed plate at the time of change.

MEASUREMENTS

The team measured germination, early season vigour, bolt resistance, disease and pest observations, yield, marketability, taste and texture (cooked) and overall performance for each variety in addition to information about crop management.



Harvesting red carrot varieties



Nathan preparing to plant

DATA ANALYSIS

RANDOMIZED REPLICATED TRIALS

To evaluate the red carrot varieties, we used a statistical model called analysis of variance (ANOVA) with a 95% confidence level to calculate the least significant difference (LSD). When the difference between two treatment means is greater than the LSD, we can conclude that there's a consistent difference between two treatments 95% of the time. We could make these statistical calculations because the experimental design at Nith Valley Organics involved replication of the varieties being trialed.

FINDINGS

GERMINATION

All of the carrot varieties performed similarly, with a "Good" germination rating of 75% or more and good early season growth and vigour, competing well against early season weeds, as seen in **Table 2**.

MARKETABILITY

The team harvested all the carrots from each replicate block, sorted them into marketable and unmarketable piles and took their weight to achieve yield numbers.

"DesiRed," which was red carrot seed originally from India, had consistently lower yields and the highest amount of unmarketable carrots. The team described them as "gnarly" and "unrecognizable" compared to what they would have produced in India.

Redsun, Rubypak and Carnelian all had good, consistent yield. Redsun, however, were stubby, Nantes shaped carrots and not the long, tapered shape desired.

At market, all red carrot varieties outsold rainbow carrot mixes and were scooped up fast, leaving the team without surplus to trial selling to specialty grocery stores.

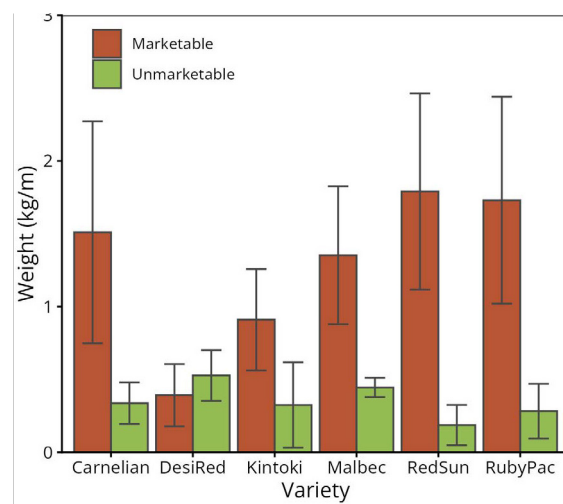


Figure 1. Marketable and unmarketable carrot yield



Staff at Nith Valley Organics harvesting trial red carrots

Table 1. Red carrot varieties trialed by Nith Valley Organics

VARIETY	TYPE	DTM	BREEDER	SEED SOURCE
Carnelian	OP	95	Organic Seed Alliance	Organic Seed Alliance
Kintoki	OP	70	Heirloom	Agro-Haitai
Malbec F1	F1	70	unknown	WH Perron
Redsun F1	F1	70	Bejo Seeds	SeedWay
Rubypak F1	F1	72	Bejo Seeds	Johnny's Select Seeds
Unknown (aka DesiRed*)	OP		unknown	A friend who grows Indian red carrots for himself

*DesiRed was the name given to a check variety, originally sourced from India

TASTE/TEXTURE AND OVERALL PERFORMANCE

When cooked, all varieties had good flavour like “glazed carrots”, with Malbec being the most inconsistent. Interestingly, the check variety, “DesiRed,” was the only variety noted to be sweet when raw and perhaps deserves additional trialing.

Overall, Carnelian stood out in all performance categories. It was rated by the team to have the best flavour (cooked) and suitable market shape and colour. It also performed best in terms of yield, making it a clear winner. It was also noted that Rubypack performed well and made a good “runner up” or backup variety.

Carnelian was also highly rated in the red carrot trials organized by the CANOVI program. An open-pollinated variety bred for organic conditions through the Carrot Improvement for Organic Agriculture (CIOA) project, it showed similar productivity to hybrid red carrot varieties in the CANOVI trials and could be a good open-pollinated red carrot option for ecological growers.



Carrots prepared for the taste test

Table 2. Germination, early season rating, and marketability

VARIETY	GERMINATION RATING	EARLY SEASON RATING	MARKETABILITY	NOTES
Carnelian	75+%	4	5	
Kintoki	75+%	4	5	
Malbec	75+%	4	5	
Redsun	75+%	4	4	Stubby roots and Nantes shape: unsuitable for south Asian market.
Rubypak	75+%	4	5	Slightly more orange core than other varieties, but still acceptable.

Table 3. Flavour rating, overall rating, and whether to grow again

VARIETY	FLAVOUR RATING	OVERALL RATING	GROW AGAIN?	NOTES
Carnelian	4.9 ± 0.07	5	Yes	Top rated flavour. Market suitable appearance and colour, paired with solid yields.
Kintoki	4.4 ± 0.41	2	No	Lacks uniformity in both shape and flavour. Yield was unimpressive.
Malbec	3.0 ± 0.36	1	No	Beautiful appearance; lacking on yield, bolt resistance and flavour. Best variety for cut flower production.
Redsun	3.9 ± 0.16	3	Maybe	A fine variety, but not well suited to the south Asian market due to its Nantes/blunt shape and shortness.
Rubypak	4.2 ± 0.14	4	Maybe	A solid alternative in years when Carnelian is unavailable. Too orange?



Carnelian carrot

NEXT STEPS

With two solid variety choices, Nathan was set to grow more Indian red carrots in 2025. He reported back the following about the 2025 season: "Carnelian was not available at the time we were placing seed orders so we used Rubypak and Redsun. Redsun was the standout crew favourite this year in spite of the blunt tips. It also had good sweet flavour raw which the Rubypak lacked. So the report accurately reflects last year's results, but season by season performance may vary."

TAKE HOME MESSAGE

Nathan concluded:

All in all it was a success, in that we identified varieties suitable for this specialty market. Furthermore, we discovered strong demand in our existing retail markets which so far has been the biggest obstacle to accessing new markets because we didn't grow enough for both. Market suitability—the main factor we were interested in—conveniently pointed to two of the higher yielding varieties!