



CLIMATE CHANGE ADAPTATION PROGRAM

Yield, pH and Sugar Content of Tomato Varieties Grown in Unheated Greenhouses in the North Cariboo

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Yield, pH and sugar content of tomato varieties grown in unheated greenhouses in the North Cariboo (2016)*

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The goal of the research was to provide information that will help all growers with tomato production in Quesnel and in the north, thereby opening doors for future projects centered on small-scale food production in the region. Horticulture and agriculture are becoming increasingly viable and important in our region, and there is currently a lack of scientific research specific to northern regions around the best practices and viability of commercial tomato production in unheated greenhouses.

Geographic Applicability

This study was conducted in the North Cariboo (Quesnel), but is applicable to any unheated greenhouse operation in the Cariboo.

Commodity relevance

This study was conducted on tomatoes, and may not have relevance to other greenhouse commodities such as peppers or cucumbers.

Timeline

2016

Study Objectives

To determine:

- The best tomato varieties to grow in unheated greenhouses in the north;
- Whether consumers prefer the taste of heirloom over greenhouse hybrid varieties;
- Whether tomato quality/yield ratios differ between plants grown above ground in pots or those grown in the ground.

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Design

Plants were grown in unheated greenhouses at the College of New Caledonia Quesnel Campus (in pots) and EdgeWood Farm (in the ground) in the summer of 2016.

Four types of tomatoes were tested:

- 1) Greenhouse hybrid (GH)
- 2) Heirloom (H) & Heirloom hybrid (HH)
- 3) Paste (P)
- 4) Cherry (C)

Growth, disease and pest occurrence (for data, see “Links”), sugar content, pH and taste preference were tested.

Limitations

Yield data from the EdgeWood greenhouse could not be obtained due to difficulties in separating study plants from the U-Pick commercial plants.

Due to abnormal cool, humid days during the study year, there was an increased amount of disease occurrence.

Next steps

Based on the results of this study, the team moved into a second year of research focused on the effect of soil moisture content (%) on tomato Brix sugar content (%). The findings of those studies will be made available in the spring of 2018.

Key Findings

- The Greenhouse hybrid group had the highest yielding varieties.
- Tomatoes grown in the ground were found to be slightly less acidic than those grown in pots.
- Some varieties exhibited a difference in sugar content depending on whether they were grown in ground or in pots.
- Golden cherry (C), CobraF1 (GH), New Girl (GH), Giant (GH), Russian Oxheart (H), Perfect Flame (HH) and Roma (P) were the preferred varieties in terms of overall taste.

Table 1. The highest yielding varieties of each type of tomato were (yield data of all varieties found under “Links”).

Type	Variety	Yield
Cherry	Mountain Magic	7.0kg
	Sweetheart	5.6kg
Greenhouse hybrids	Early Girl	12.0kg
	Premio	11.5kg
	Ultra Boy	11.5kg
Heirloom & Heirloom hybrids	Perfect Flame	9.5kg
	Big Brandy	7.4kg
Paste	Big Mama	8.1kg

Climate Adaptation Implications

Unheated greenhouses extend the growing season, require less energy inputs, and help produce more predictable yields. Producers need to find varieties that are best suited to their growing conditions, and are resistant to pests and diseases. In greenhouses, space is limited, so varieties that are chosen must produce and taste good.

Table 2. The pH and Brix Sugar Content (%) of cherry, greenhouse hybrid, heirloom and heirloom hybrid, and paste tomatoes grown in unheated greenhouses in the ground (at Edgewood Farm, Quesnel) and in pots (CNC Quesnel Campus). For a complete list of varieties tested, refer to the complete research summary (under “Links”).

	pH		Brix Sugar (%)	
	Ground	Pot	Ground	Pot
<i>Cherry</i>				
Bumblebee	4.20	3.92	6.5	6.0
Mountain Magic	4.30	4.33	6.5	6.5
Red Candy	4.20	4.16	7.8	5.0
Sun Gold	4.14	4.19	8.5	9.5
Sweet Heart	4.23	4.21	7.5	8.5
Tomatoberry	4.24	4.24	7.5	7.0
<i>Greenhouse Hybrid</i>				
Cobra F1	4.30	4.12	5.0	5.0
Early Girl	4.35	4.12	6.0	5.5
Giant	4.23	4.15	5.0	5.0
New Girl	4.41	4.12	5.0	5.5
Pink Cupcake	4.30	4.25	4.8	5.0
Premio	4.22	4.07	5.5	5.5
Ultra Boy	4.34	4.22	5.0	5.5
<i>Heirloom and Heirloom Hybrid</i>				
Bonny Best	4.33	4.20	6.8	6.0
Cherokee Purple	4.24	4.23	5.0	5.0
Old German	4.54	4.21	5.0	5.0
Perfect Flame	4.10	4.05	5.5	5.5
<i>Paste</i>				
Big Mama	n/a	4.16	n/a	5.0
Roma VF	n/a	4.16	n/a	5.0
San Marzano	n/a	4.29	n/a	5.5
Supremo	n/a	4.25	n/a	5.0

***Table only showing varieties grown in both locations. Bolded values denote that the variety has either the lowest pH (most acidic) or the highest Brix sugar content (%).**

Links

The complete research summary may be found on this link:

<http://www.cnc.bc.ca/Assets/Applied+Research/Tomato+Notes.pdf>

Follow these links for additional CNC Applied Research Projects:

www.cnc.bc.ca/research/Projects.htm

Tomato Variety Options for Heated and Unheated Greenhouse Production:

<http://www.johnnyseeds.com/growers-library/vegetables/protected-culture-greenhouse-trials-recommended-varieties.html>



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