

Hazelnut Recommended Varieties and Research Activities

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Topics

- Cultivar trials
- Recommended varieties
- Research activities

Cultivar Trial – North field

Planted 2008

Cultivar	Yield (kg/tree)						
	2011	2012	2013	2014	2015	2016	Total
Butler	0.8	2.0	2.8	0.8	3.0	2.2	11.7
Gene	1.3	2.2	2.7	0.5	2.6	2.7	10.9
Grimo 186M	0.3	1.3	2.9	0.8	2.3	3.4	10.7
C-16	0.5	0.9	2.0	1.0	1.8	3.7	9.3
C-28	0.2	0.7	2.0	0.4	2.2	0.3	5.8
C-409	0	0.4	1.8	0.2	1.4	1.9	5.1
Lewis	0.2	0.1	2.6	0	0.1	0.09	3.2
Jemtegaard	0.3	0.7	0.9	0.6	0.3	0.2	3.1
Clark	0.2	0.6	1.8	0	0.1	0.6	3.3
Barcelona	0.3	0.1	1.1	0.2	0.3	1.0	3.5

Cultivar Trial – South field Planted 2009

Cultivar	Yield (kg/tree)					
	2012	2013	2014	2015	2016	Total
Gene	1.12	1.6	0.08	2.1	3.1	8.2
Slate	0.89	0.9	0.40	1.5	3.9	7.9
Gamma	0.95	2.8	0.03	0.9	2.4	7.1
Jefferson	0.41	2.5	0.02	1.2	0.7	4.7
Yamhill	0.25	2.3	0	0.2	1.8	4.6
Santiam	0.56	1.5	0	0.7	1.6	4.5
Hall's Giant	0.52	1.6	0.05	1.2	0.2	3.5
G-17	0.17	0.3	0	0.6	1.9	2.8
Delta	0.12	0.5	0	0.6	1.2	2.2
Epsilon	0.17	0.8	0	0.0	0.2	1.2
Barcelona	0.26	0.2	0	0.2	0.6	1.0
Tonda di G	0.08	0.05	0.02	0.2	0.0	0.3
Sacajawea	0	0	0	0.0	0.0	0.0

Winter injury



Winter survival of hazelnut trees in North and South field at Simcoe Research Station (zone 6b) after cold winter 2015. Winter injury was scored from 0 to 5 (0=dead, 5= no damage).

North field		South field	
Genotype	Winter survival	Genotype	Winter survival
C16	5	Gamma	5
C28	5	Theta	4.9
Gene	5	Gene	4.7
C409	4.8	Santiam	4.4
Grimo 18	4.8	Slate	4.1
Butler	4.4	Jefferson	3.4
Barcelona	3.2	Hall's Giant	4.2
Jemtegaard	2.1	Delta	4.1
Clark	1.8	G-17	3.9
Lewis	1.7	Epsilon	3.1
LSD	0.5	Barcelona	2.4
		Yamhill	2.1
		Tonda di Giffoni	1.5
		Zeta	0.8
		Sacajewea	0.2
		LSD	0.8

Cumulative percentage of dead hazelnut trees in North and South field at Simcoe Research Station since 2009.

North field		South field				
Genotype	2015	Genotype	2011	2013	2014	2015
C16	0	Gamma	0	0	0	0
C28	0	Gene	0	0	0	0
Gene	0	Santiam	0	0	0	0
C409	0	Yamhill	0	0	0	0
Grimo 18	0	Slate	0	0	0	0
Barcelona	0	Hall's Giant	0	0	0	0
Clark	0	Epsilon	0	0	0	0
Lewis	0	Jefferson	0	0	8	8
Butler	8	G-17	0	0	8	17
Jemtegaard	17	Barcelona	0	0	8	17
		Delta	0	0	25	25
		Tonda di Giffoni	0	8	25	33
		Theta	0	0	42	42
		Zeta	0	0	25	50
		Sacajewea	58	58	67	92

Recommended Provisionally

Cultivar	Hardiness	Nut shape and size
Gene	Zone <u>5</u> *, 6, 7	Pointed, med
Jefferson	Zone 6,7	Round, large
C-16	Zone <u>5</u> , 6, 7	Oval, med
C-28	Zone <u>5</u> , 6, 7	Oval, large
Gamma	Zone <u>5</u> , 6, 7	Round, med
Yamhill	Zone 6, 7	Round, small
Santiam	Zone <u>5</u> , 6, 7	Round, med
Lewis	Zone 7 only	Round, small
Tonda di Giffoni	Zone 7 only	Round, med

5* need to be tested, before recommended

Weather data- Simcoe, ON

Temperatures $\leq -30^{\circ}\text{C}$

Year	Absolute min temp ($^{\circ}\text{C}$)
1872	-31.1
1873	-32.2
1881	-32.8
1884	-37.8
1885	-30
1934	-32.2
1945	-31.7
2015	-34.1

Pollinizers

Gene, Slate, C16, Jefferson

Jefferson, Gene, Gamma, Yamhill

Yamhill, Gamma, Santiam, Tonda di Giffoni, Jefferson

Santiam, Gamma, Epsilon, Yamhill

Lewis, Tonda di Giffoni, Gene, Slate

Tonda di Giffoni, Gene, Yamhill, Lewis, Jefferson

C16, Gene, Jefferson, Slate

C28, Norfolk, Jefferson, Gene

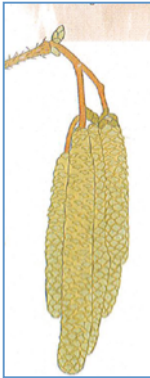
(The first variety is the main cultivar, the second variety is its best pollinizer, additional varieties will pollinate with one or the other of the first two. For best pollination, add varieties in the order listed.)

Stages of flowering (male, catkin)

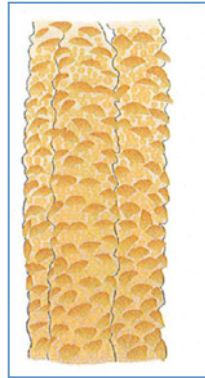
Stage 1



Stage 2



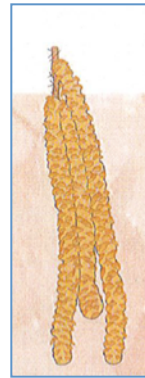
Stage 3



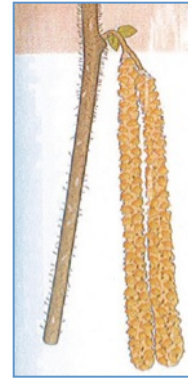
Stage 4



Stage 5



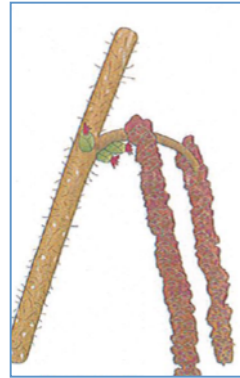
Stage 6



Stage 7

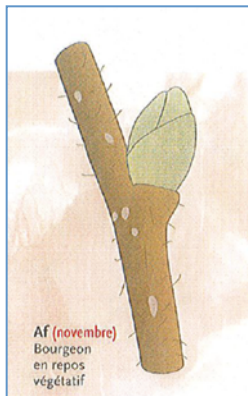


Stage 8



Stages of flowering (female)

Stage 1



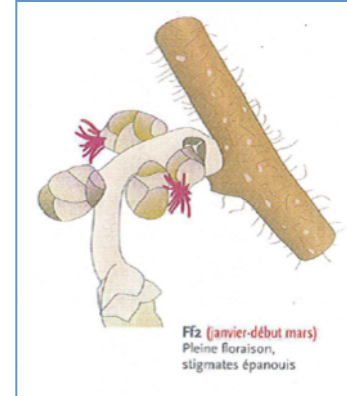
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Stage 3



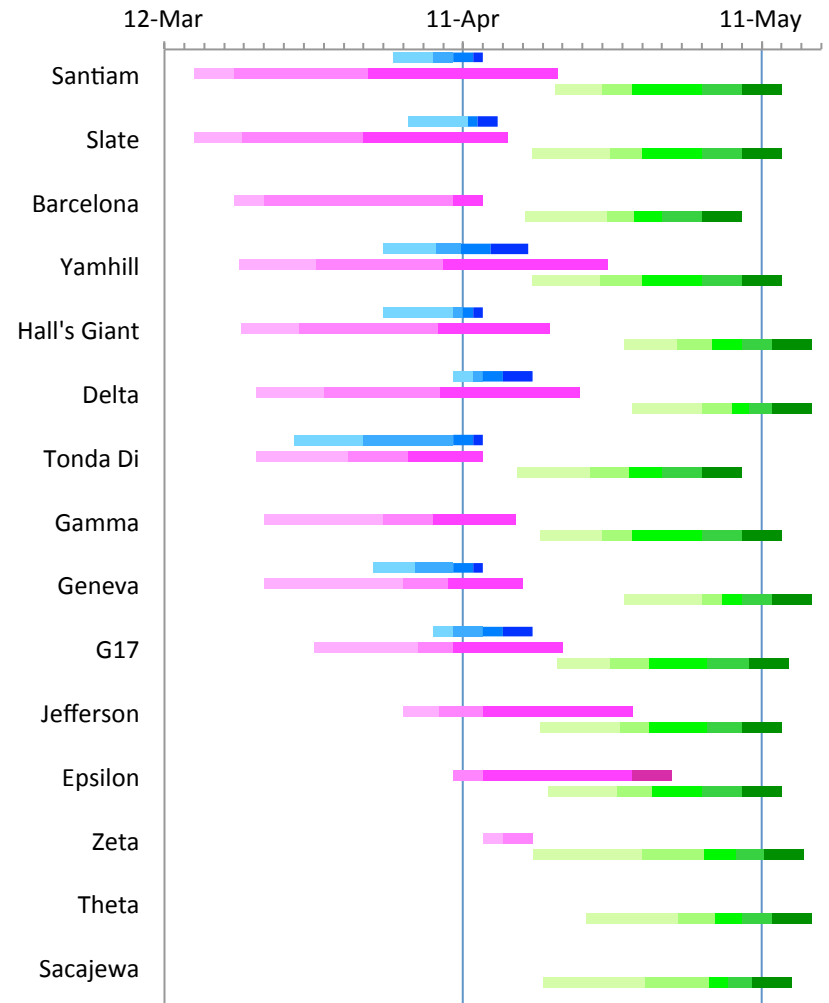
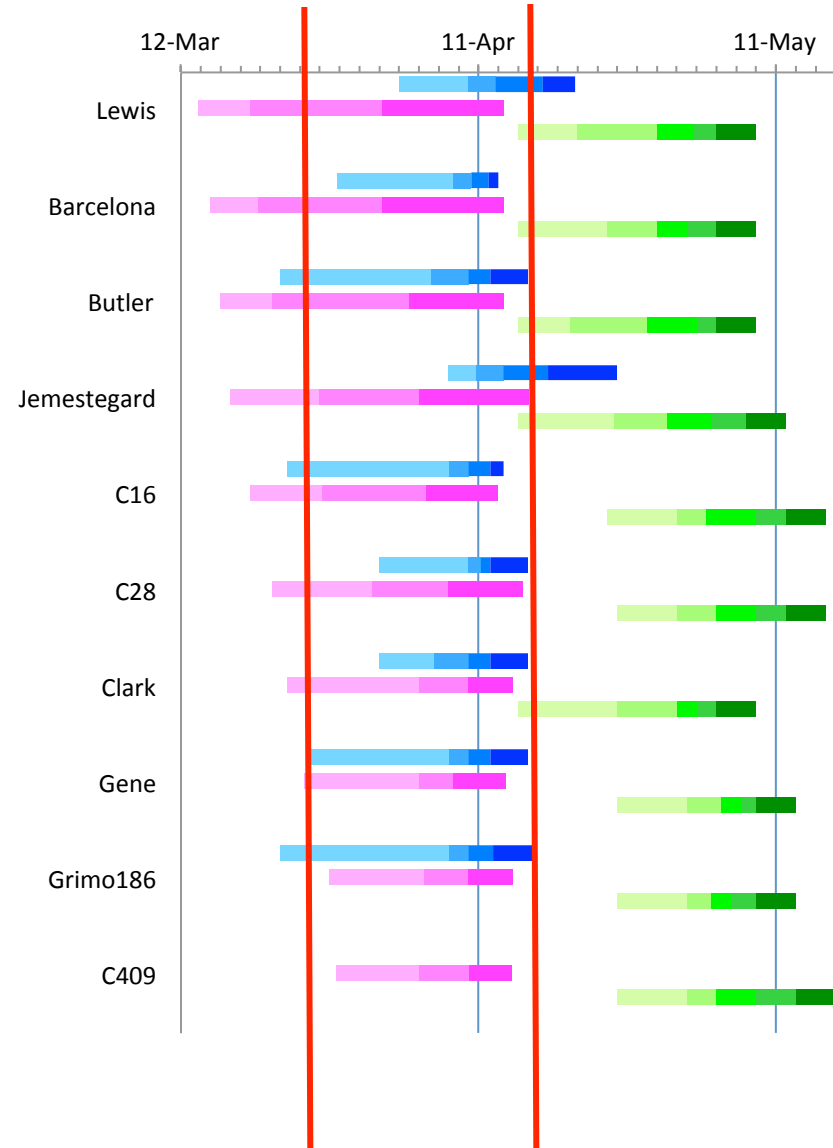
Stage 4



Stage 5



Pollination period-2011



Grant applications and research priorities

- AAFC-AIP
 - Tissue culture, Nursery management, Orchard management (spacing, training)
- AAC-GF2
 - Cultivar development, Orchard management (irrigation)
- OCE- VIP II
 - Develop suitability maps for various hazelnut genotypes
- Future grants

Opportunities in research

- Production
 - Cultivar trials are ongoing, Joint Performance trials
 - Nursery management
 - Nutrient management
 - Pollination
 - pollen viability of our selections
 - S allele
 - Pollen supply
 - IPM
- Genomics
 - Identify S-alleles
 - Genetic diversity of our germplasm
 - Trait mapping
 - EFB resistant
- Breeding
 - Collecting Canadian germplasm
 - Controlled crosses
 - Selecting

• Acknowledgment

- This project was funded in part through Growing Forward 2 (GF2), a federal-provincial-territorial initiative.

The Agricultural Adaptation Council assists in the delivery of GF2 in Ontario (Project No. 0244)



Thank you

Questions?

Other Research Projects

GF2- Grower Trials



Joint performance trials

Candidate Germplasm From Four Breeding Programs

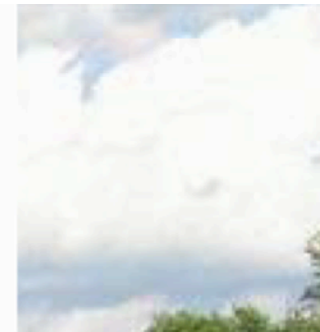
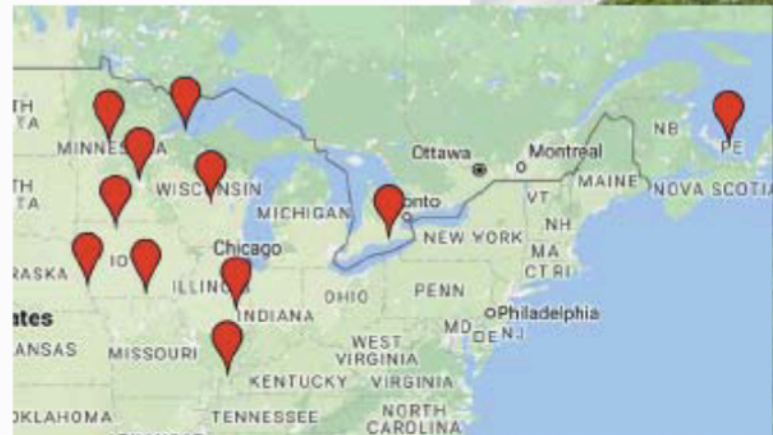
(as of Aug 11, 2016)

Upper Midwest Hazelnut Development Initiative	Grimo Nursery	Hazelnut Consortium	Rutgers University
4 selections	Andrew Aldara Marion Frank Northern Blais Northfolk (C28) Chelsea (C16)	OSU Hybrid Selection Arbor Day Hybrid Selection Grand Traverse	6 selections

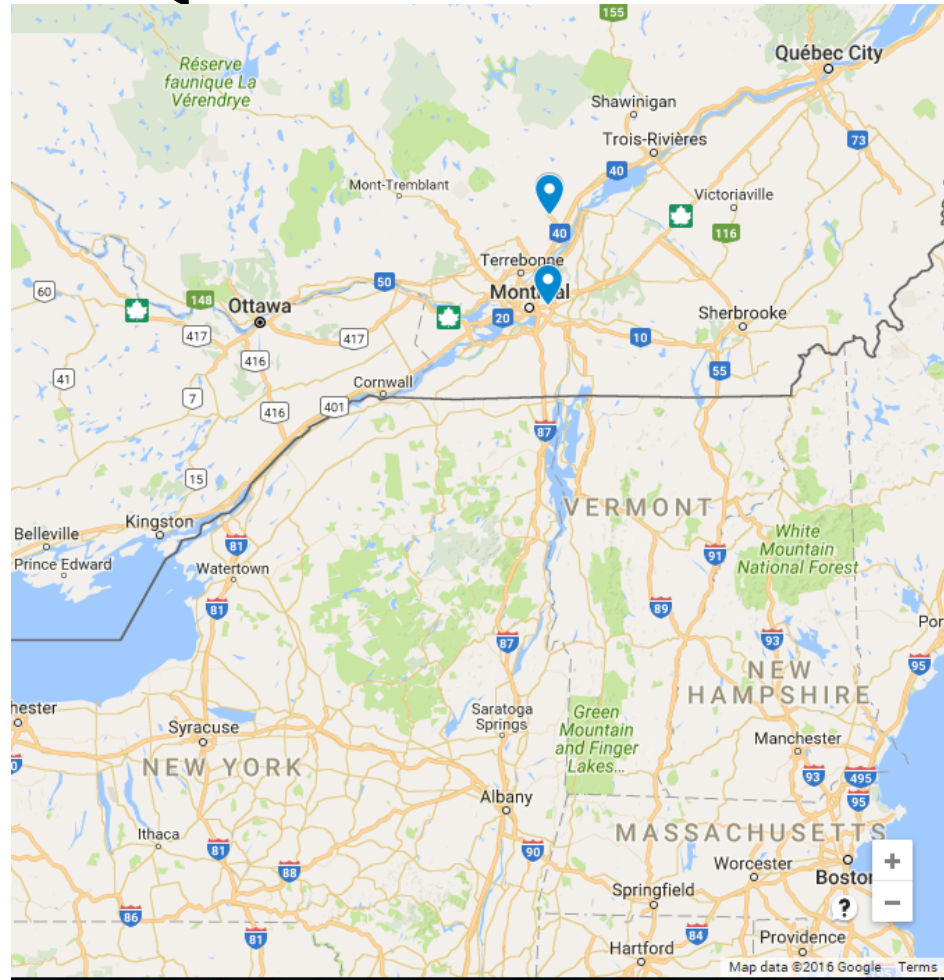
Joint performance trials

Planned Trial Locations (as of Aug 11, 2016)

Horning State Farm Demonstration Forest, Plattsmouth, Nebraska (Clare)
JenAgres Research Site #2, Fenton, Iowa (Jensen)
Indian Hills Community College Nut Research Site, Centerville, Iowa (Kaster)
Bayfield Hazelnut Performance Trial, Bayfield, Wisconsin (Fischbach)
West Madison Research Station, Verona, Wisconsin (Fischbach)
University of Minnesota, St. Paul, Minnesota (Braun)
Staples Center, Staples, Minnesota (Braun)
University of Illinois, Urbana, Illinois (Revord)
Dixon Springs Ag Center, Simpson, Illinois (Revord)
Site TBD, St. Charles, Illinois (Revord)
Simcoe Research Station, Simcoe, Ontario (Taghavi)
Queen's University, Kingston, Ontario
Quebec grower site #1
Quebec grower site #2

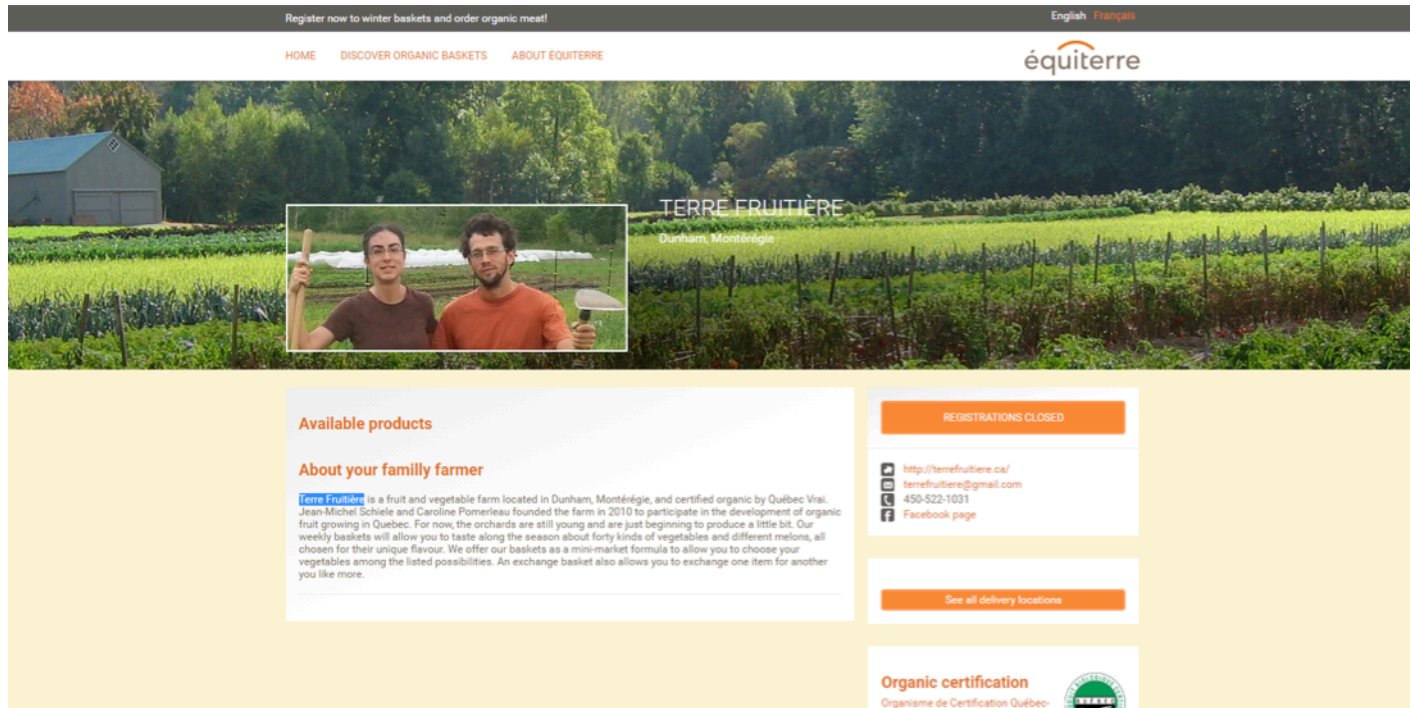


Quebec Growers



Jean Michel Schiele

(South of Montreal, close to Vermont,
warmer climate)



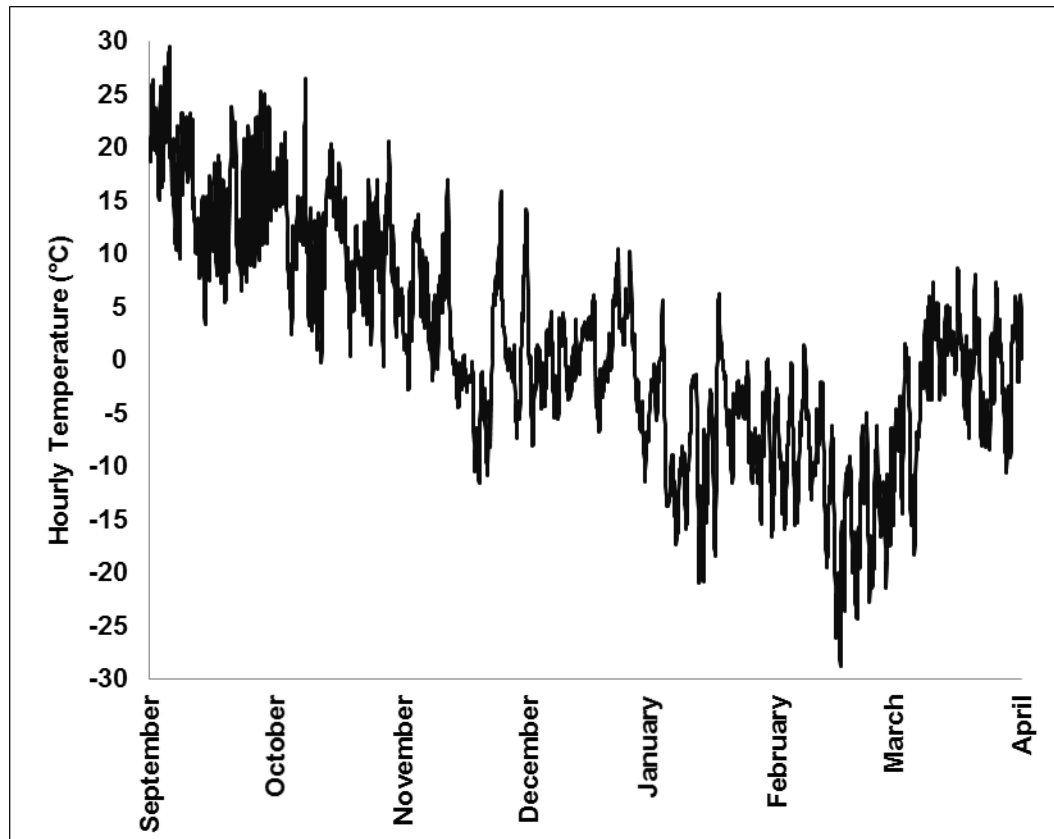
Terre Fruitière is a fruit and vegetable farm located in Dunham, Montérégie, and ce

Alain Perreault

(North of Montreal, colder climate, has two selections to be tested)



Hourly temperatures-Simcoe, ON 2014-15



Pollen compatibility Chart

	Pollen	Male Parent	Gene	Jefferson	Lewis	Yamhill	Tonda	C16	C28
Female parent	Alleles	Expressed	15	3	3 8	8	2	12	?
Gene	15	23	-	+	+	+	+		
Jefferson	1	3	+	-	-	+	+		
Lewis	3	8	+	-	-	-	+		
Yamhil	8	26	+	+	-	-	+		
Tonda	2	23	+	+	+	+	-		
C16	12	25	+	+	+	+	+	-	
C28	?	?							