

USDA Plant Collecting Expedition for Berry Crops

Southern Quebec, Canada

13 to 18 August 2016

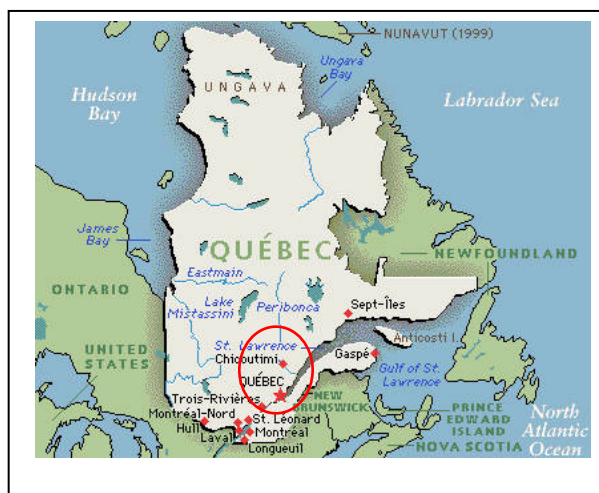
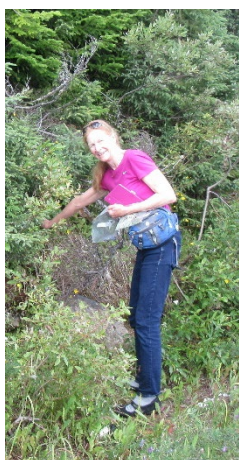


Fig. 1 (L) Michael Dossett and (R) Kim Hummer.

Executive Summary

From to 13 to 18 August 2019, Dr. Michael Dossett and Dr. Kim Hummer, USDA, Corvallis, Oregon, collaborated on an expedition to collect berry genetic resources near Quebec City,

Quebec. The region of the plant collection is within the red circle on the map. About 30 seed samples of *Vaccinium*, *Rubus*, *Gaultheria*, and *Fragaria* were obtained. Repeat blooming strawberries and raspberries were observed. A northerly sample of *Vaccinium corymbosum* from Lac Saint-Pierre, Villeroy, was also obtained.

Participants (Fig 1):

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Introduction

Native North American berry germplasm is under-represented from Northeastern Canada. Dr. Hummer and Dr. Dossett had the opportunity to collect germplasm from southern Quebec near Quebec City in August 2016. They were specifically looking for the most northern locality of *Vaccinium corymbosum* as mentioned by Dr. Sam Vander Kloet in his *Vaccinium* monograph of North America (Vander Kloet). Additional low growing blueberry species as well as red raspberries and strawberries were also on the target list to collect.

Procedure

Dr. Michael Dossett and Dr. Kim Hummer were funded through other sources to attend meetings in Quebec City in August of 2016. They had the opportunity to collect samples near Quebec City on 13 August 2016 through 18 August 2016. Fruit samples were collected and hand carried to Abbotsford, B.C., for cleaning. Canadian Phytosanitary certificate was obtained and provided for shipping germplasm to the US.

Table 1. Itinerary

13 August 2016	Travel from Quebec City to Lac Saint-Pierre Villeroy on Route 20
17 August 2016	Saint-Laurent-de-l'île-d'Orleans,
18 August 2016	Stoneham-et-Tewkesbury, La Grand Faun, pulloff from Rt 175 about 1 hour drive north from Quebec City
18 August 2016	Lac-Jacques-Cartier, Scenic pulloff from Rt 175 about 1.5 hour north of Quebec City
18 August 2016	South Saguenay by route 175
18 August 2016	North Saugenay, Rue de la Carriere
18 August 2016	Market at Saugenay
18 August 2016	Becancour
18 August 2016	Trois-Rives Lake Mekinac
18 August 2016	Saint-Roch-de-Mekinac Grande Piles
18 August 2016	Return

Table 2. Costs of the trip for USDA PEO

Item	Cost	Comments
Gasoline for trip	350	
Preparation of samples, cleaning of seed in Canada, obtaining phytosanitary certificate	100	
Shipping of samples	50	
Total	\$500	

Table 1. List of plants obtained

Collection Number	Species	Date Collected	Local	Local number	Type
Q-16-01	<i>Rubus strigosus</i> L.	8/13/2016	CRUB	2772	seed
Q-16-02	<i>Rubus hispidus</i>	8/13/2016	CRUB	2773	seed
Q-16-03	<i>Rubus setosus</i>	8/13/2016	CRUB	2774	seed
Q-16-04	<i>Fragaria virginiana</i> subsp. <i>Virginiana</i> Not sent to US.	8/13/2016	CFRA	2290	plant
Q-16-05	<i>Mentha canadensis</i> L.	8/13/2016	CMEN	737	plant
Q-16-06	<i>Rubus canadensis</i>	8/13/2016	CRUB	2775	seed
Q-16-07	<i>Rubus strigosus</i>	8/13/2016	CRUB	2776	seed
Q-16-08	<i>Vaccinium</i> hybrid (<i>V. corymb.</i> x <i>V. angustifolium</i>)	8/13/2016	CVAC	2240	seed
Q-16-09	<i>Vaccinium myrtilloides</i>	8/13/2016	CVAC	2241	seed
Q-16-10	<i>Vaccinium corymbosum</i>	8/13/2016	CVAC	2242	seed
Q-16-11	<i>Vaccinium oxycoccus</i>	8/13/2016	CVAC	2243	plant
Q-16-12	<i>Aronia melanocarpa</i>	8/13/2016	CARO	14	seed
Q-16-13	Mix of <i>V. myrtilloides</i> and <i>V. angustifolium</i> . Sample lost	8/17/2016		NOT available	
Q-16-14	<i>Vaccinium angustifolium</i>	8/17/2016	CVAC	2244	seed
Q-16-15	<i>Rubus strigosus</i>	8/18/2016	CRUB	2777	seed
Q-16-16	<i>Vaccinium angustifolium</i>	8/18/2016	CVAC	2245	seed
Q-16-17	<i>Vaccinium myrtilloides</i>	8/18/2016	CVAC	2246	seed
Q-16-18	<i>Gaultheria hispidula</i>	8/18/2016	CGAU	33	seed, plant
Q-16-19	<i>Vaccinium angustifolium</i>	8/18/2016	CVAC	2247	seed
Q-16-20	<i>Rubus strigosus</i>	8/18/2016	CRUB	2778	seed
Q-16-21	<i>Ribes glandulosum</i>	8/18/2016	CRIB	1646	seed
Q-16-22	<i>Rubus strigosus</i>	8/18/2016	CRUB	2779	seed
Q-16-23	<i>Rubus strigosus</i>	8/18/2016	CRUB	2780	seed
Q-16-24A	<i>Fragaria virginiana</i> subsp. <i>Virginiana</i> Not sent to US	8/18/2016	CFRA	2291	plant
Q-16-24B	<i>Fragaria virginiana</i> subsp. <i>Virginiana</i> Not sent to US	8/18/2016	CFRA	2292	plant
Q-16-25	<i>Vaccinium angustifolium</i>	8/18/2016	CVAC	2248	seed
Q-16-26	<i>Rubus setosus</i>	8/19/2016	CRUB	2781	seed
Q-16-27	<i>Gaultheria procumbens</i>	8/19/2016	CGAU	34	plant
Q-16-28	<i>Rubus canadensis</i>	8/19/2016	CRUB	2782	seed
Q-16-29	<i>Rubus strigosus</i>	8/19/2016	CRUB	2783	seed
Q-16-30	<i>Rubus strigosus</i>	8/19/2016	CRUB	2784	seed

Table 1. Collection information by sequential number.

Collection Number	Species	Date Collected	Locality	Type	Latitude	Longitude	Elevation (m)	Notes
Q-16-01	<i>Rubus strigosus</i> L.	8/13/2016	Lac Saint-Pierre, Villeroy, Rest area off Route 20	seed	46.3884	-71.8435	130	Edge of mixed woods (primarily birch and red maple) near entrance to rest area (westbound). Thin canes with few spines and heavy glaucous bloom. Foliar virus symptoms evident on some plants. Some fruit collected approximately 0.5 km further east and south of Route 20 along Chemin Canyon.
Q-16-02	<i>Rubus hispidus</i>	8/13/2016	Lac Saint-Pierre, Villeroy, Rest area off Route 20	seed	46.3884	-71.8435	130	Small patch near entrance to westbound rest area at edge of birch/red maple woods.
Q-16-03	<i>Rubus setosus</i>	8/13/2016	Lac Saint-Pierre, Villeroy, Rest area off Route 20	seed	46.3884	-71.8435	130	Short plants (30-60 cm) with rugose leaves and dense spines growing at edge of birch/red maple woods at westbound rest area.
Q-16-04	<i>Fragaria virginiana</i> subsp. <i>virginiana</i>	8/13/2016	Lac Saint-Pierre, Villeroy, Rest area off Route 20	plant	46.3884	-71.8435	130	
Q-16-05	<i>Mentha canadensis</i> L.	8/13/2016	Lac Saint-Pierre, Villeroy, Rest area off Route 20	plant	46.3884	-71.8435	130	
Q-16-06	<i>Rubus canadensis</i>	8/13/2016	Lac Saint-Pierre, Villeroy	seed	46.3772	-71.8568	130	Edge of roadside (Chemin Canyon).

Q-16-07	<i>Rubus strigosus</i>	8/13/2016	Lac Saint-Pierre, Villeroy	seed	46.3772	-71.8568	130	Edge of roadside (Chemin Canyon). Fruit collected from single anthocyanin deficient plant (pale yellow fruit). Red fruit from same location collected as Q-16-01.
Q-16-08	<i>Vaccinium hybrid (V. corymbosum x V. angustifolium)</i>	8/13/2016	Lac Saint-Pierre, Villeroy	seed	46.3772	-71.8568	130	Plants located along dirt track at edge of bog and throughout bog. Height 0.5 m, fruit small and dark. Phenotypically, plants resemble intergrades between <i>V. corymbosum</i> and <i>V. angustifolium</i> with intermediate stature, leaf sizes and shapes, and low level of bloom on fruit.
Q-16-09	<i>Vaccinium myrtilloides</i>	8/13/2016	Lac Saint-Pierre, Villeroy	seed	46.3772	-71.8568	130	Growing along roadside at edge of bog and edge of wooded path just west of bog.
Q-16-10	<i>Vaccinium corymbosum</i>	8/13/2016	Lac Saint-Pierre, Villeroy	seed	46.3772	-71.8568	130	Three berries collected from single plant that phenotypically resembles pure <i>corymbosum</i> . Because of small sample size, seeds were sown immediately rather than dried and sent to NCGR.
Q-16-11	<i>Vaccinium oxycoccus</i>	8/13/2016	Lac Saint-Pierre, Villeroy	plant	46.3772	-71.8568	130	Growing in sphagnum hummocks in spruce bog. Single clone collected.
Q-16-12	<i>Aronia melanocarpa</i>	8/13/2016	Lac Saint-Pierre, Villeroy	seed	46.2790	-71.8147	126	fruit collected from plants growing along brushy path/right of way under power lines west of road.
Q-16-13	Mix of <i>V. myrtilloides</i> and <i>V. angustifolium</i> . Sample lost	8/17/2016						

Q-16-14	Vaccinium angustifolium	8/17/2016	Saint-Laurent-de-l'île-d'Orleans, Ferme François Gosselin	seed	46.8617	-71.0858	121	Growing in leaf litter at edge of deciduous woods across from cultivated strawberry field. <i>V. myrtilloides</i> mixed in and more common upslope/further into treeline. <i>V. angustifolium</i> predominant in population and dominant closer to edge of woods. Fruit collected from approximately 25 clones
Q-16-15	Rubus strigosus	8/18/2016	Stoneham-et-Tewkesbury, La Grand Faun, pulloff from Rt 175 about 1 hour drive north from Quebec City	seed	47.1006	-71.3436	346	Large open pollinated fruit sample from about 50 plants, About 30 cm dieback on some stems - likely from canes above the snow line. Good druplet fertility in most plants. Growing with <i>Cornus sericea</i> , <i>Prunus</i> sp., and <i>Solidago</i> . On berm and along both sides of fence bordering pullout area.
Q-16-16	Vaccinium angustifolium	8/18/2016	Stoneham-et-Tewkesbury, La Grand Faun, pulloff from Rt 175 about 1 hour drive north from Quebec City	seed	47.1006	-71.3436	346	Peaty area under balsam fir along fenceline with mixed <i>V. angustifolium</i> and <i>V. myrtilloides</i> . Sample mix from ~25 clones
Q-16-17	Vaccinium myrtilloides	8/18/2016	Stoneham-et-Tewkesbury, La Grand Faun, pulloff from Rt 175 about 1 hour drive north from Quebec City	seed	47.1006	-71.3436	346	Peaty area under balsam fir along fenceline with mixed <i>V. angustifolium</i> and <i>V. myrtilloides</i> . Sample mix from ~10 clones
Q-16-18	Gaultheria hispidula	8/18/2016	Lac-Jacques-Cartier, Scenic pulloff from Rt 175 about 1.5 hour	seed, plant	47.6132	-71.2387	773	Slope between west edge of pullout and edge of tree line.

			north of Quebec City					
Q-16-19	Vaccinium angustifolium	8/18/2016	Lac-Jacques-Cartier, Scenic pulloff from Rt 175	seed	47.6132	-71.2387	773	Large population of plants on slope between pullout and highway. Fruit collected from approximately 25 clones. Light color/good bloom. Plants growing in open in isolated clumps, height to 30 cm.
Q-16-20	Rubus strigosus	8/18/2016	Lac-Jacques-Cartier, Scenic pulloff from Rt 175	seed	47.6132	-71.2387	773	Plants scattered in sunny areas between pullout and highway, particularly at the top of the hill. Sample collected from approximately 20 clones
Q-16-21	Ribes glandulosum	8/18/2016	Lac-Jacques-Cartier, Scenic pulloff from Rt 175	seed	47.6132	-71.2387	773	Isolated plants tucked between rocks and forest edge in area between highway and pullout. Sprawling habit, fruit collected from 2 clones.
Q-16-22	Rubus strigosus	8/18/2016	South Saguenay by route 175	seed	48.2513 6	-71.25103	319	Along edge of highway and pullout on east side of road. Rocky roadside area - plants abundant in sunny open areas, especially just above wet swale. Most plants finished fruiting on floricanes and have some tip fruit on primocanes. A few strongly primocane fruiting clones on site as well. Morphotype densely spiny with long stiff bristles. Some primocane fruiting and tip fruiting observed. Plant height to 1 m.
Q-16-23	Rubus strigosus	8/18/2016	North Saugenay, Rue de la Carriere	seed	48.4714	-71.0987	154	Scattered along road edge and forest edge, particularly on west side of highway along Rue de l Carriere. Plants to 1 m.

Q-16-24A	Fragaria virginiana subsp. Virginiana (Plant kept in Canada).	8/18/2016	North Saugenay, Rue de la Carriere, Saguenay-Saint-Honore, off Route 159	plant	48.4729	-71.0975	154	Male clone blooming in bloom on this date - potentially remontant. Plant found approximately 100m NW of hermaphroditic clone Q-16-24B. This species was widespread across location, but these were the only two individuals noted to be flowering.
Q-16-24B	Fragaria virginiana subsp. Virginiana (Plant kept in Canada).	8/18/2016	North Saugenay, Rue de la Carriere, Saguenay-Saint-Honore, off Route 159	plant	48.4714	-71.0987	154	Hermaphraditic clone in bloom on this date - potentially remontant. Collected approximately 100 m SW of male clone Q-16-24A. <i>F. virginiana</i> abundant across location, but these were the only two plants found to be flowering.
Q-16-25	Vaccinium angustifolium	8/18/2016	market Saugenay	seed				Fruit bought at supermarket in Saugenay - labe reads "Saugenay-Lac-Saint-Jean. Bleuetière Shipshaw, D. Rivard 418-290-6584."
Q-16-26	Rubus setosus	8/19/2016	Becancour	seed	46.40578	-72.71294	63	Low spot NW of trail, a few minutes walk down trail from road. Groundcover in area shifts to sphagnum and lichens - appears to be a former bog that is filling in. Plants growing around edges of this area. Approximate GPS coordinates of spot: 46.4067, -72.7108. Mixed conifer/deciduous forest with <i>Pinus strobus</i> , <i>Tsuga canadensis</i> , <i>Fagus</i> sp., <i>Acer</i> sp., <i>Betula</i> sp.

Q-16-27	<i>Gaultheria procumbens</i>	8/19/2016	Becancour	plant	46.4057 8	-72.71294	63	Low spot NW of trail, a few minutes walk down trail from road. Groundcover in area shifts to sphagnum and lichens - appears to be a former bog that is filling in. Plants growing around edges of this area. Approximate GPS coordinates of spot: 46.4067, -72.7108. Mixed conifer/deciduous forest with <i>Pinus strobus</i> , <i>Tsuga canadensis</i> , <i>Fagus</i> sp., <i>Acer</i> sp., <i>Betula</i> sp.
Q-16-28	<i>Rubus canadensis</i>	8/19/2016	Trois-Rives Lake Mekinac	seed	46.8638 8	-72.89424	134.4	Growing on dry exposed slope along edge of service ramp. <i>Vaccinium angustifolium</i> , <i>Gaultheria procumbens</i> , and <i>Cornus canadensis</i> growing near edge of woods at top. <i>Rubus strigosus</i> and <i>Toxicodendron radicans</i> also growing in proximity.
Q-16-29	<i>Rubus strigosus</i>	8/19/2016	Trois-Rives, Grande Anse	seed	47.0094 8	-72.92962	112.8	Two distinct morphotypes present at location based on density of bristles and thickness of canes. One with thin canes and few spines, the other with thick short pigmented spines. Both with glaucous bloom on stem. Plants abundant along east side of road. Sample from ~50 genotypes.
Q-16-30	<i>Rubus strigosus</i>	8/19/2016	Saint-Roch-de-Mekinac Grande Piles	seed	46.7966 3	-72.757409	140.4	Collected along edge of snowmobile/ATV trail south of road in damp mixed forest.