

Horticulture in Quebec

Modern agriculture was first practiced in Canada in the area now known as Quebec. Before the European conquest of Canada, North American Indians grew the so-called "four sisters"—bean, corn, pumpkin, and squash. At first, French settlers grew wheat, barley, and oats, among other types of seed imported from Europe (Hedrick, 1950). Wheat was later plagued with fungal and insect (midge) pests that prohibited its use as a staple (Jones, 1945). They substituted Indian corn for wheat and learned to use corn in various foods and bread. They also discovered that peas could be reliably grown in the Hochelaga (now Montreal) area, earning them the name "pea-soupers."

Louis Hébert, who settled in Quebec City in 1617, is recognized as the first horticulturist in Canada. Using seed imported from France, he raised fruit, flowers, and assorted vegetables (Bernier, 1988). Agricultural education in Quebec began in 1670 with a practical training program at the Petit Séminaire at St. Joachim (Steppler, 1988). This program was begun by Bishop Laval and continued until 1715. The School of Agriculture of Ste. Anne de la Pocatière opened in 1859 and became part of the Faculty of Agriculture of Laval Univ. in 1962. Another superior school of agriculture, which became affiliated with the Univ. of Montreal in 1908 and existed until 1962, was founded by Dom Antoine Oger and Louis Beaubien. The Trappist Fathers directed the school, which was located near the monastery and known as l'Institut Agricole d'Oka (Létourneau, 1959). McGill Univ. began to offer agricultural courses in the 1850s. McGill's Macdonald College was established as an agricultural college in 1907 (Steppler, 1988). The first agricultural society of Canada was founded in the province of Quebec in 1792 (Dick and Taylor, 1988).

Typical nordic horticulture, as practiced in the province of Quebec, is characterized by minimal use of irrigation, limited fertilization of fruit trees, frequent use of drainage and subsoiling, and the use of mulches. Quebec vegetables are grown on both mineral and organic soils. In Quebec, hot, humid summers are preceded by cold, wet springs that are followed by pleasant autumns with cold nights and bright sunny days. In the Montreal area, the frost-free period ranges from 125 to 140 days (Dubé and Chevrette, 1982). Winters can have minimal temperatures of -40C. These extremely cold winters have occurred only

twice in this century. However, moderately severe winters, sometimes referred to as test winters, occur at least once per decade and may have disastrous effects on the apple crop (Granger, 1981, 1994). The severe winter conditions often preclude overwintering of pests and diseases. Consequently, in Quebec, there are fewer such problems than for crops grown farther south.

Quebec fruit production represents ≈1.75% of the total provincial agricultural income (\$30 × 10⁶ Canadian). Apple is the major fruit crop, with minor production of sour cherry, pear, and plum. Quebec apple production ranks third in Canada with a farm gate value of \$25 × 10⁶ (Canadian dollars) and a total production of more than 125,000 t annually (Table 1). Apple is grown on ≈82,000 ha, in a region within a 1-h drive from Montreal. Thirty-five percent of provincial apple plantings are in high-density blocks with dwarf and semi-dwarf apple trees trained in the vertical axis, slender bell, spindle bush, or triple axis palmette systems. There are 75 packing plants, most of them equipped to pack >2000 t of apples annually. Storage facilities, half of which have controlled atmosphere, are available for 60% of the crop.

Quebec accounts for half of the Canadian strawberry production with an annual crop of 9000 to 12,000 t. Strawberries are primarily produced for the fresh market. Several new strawberry cultivars have been produced by a joint breeding program between Agriculture and Agri-Food Canada and McGill Univ. Quebec exports tissue-cultured strawberry plantlets to the United States. Lowbush blueberry production, ≈10,000 t annually, is primarily located in northern Quebec (Lake St. Jean region). In addition, some highbush fields have been established in the Montreal area. About 1000 t of red raspberries are produced annually, primarily for the U-pick market. The area of cranberry bogs harvested in the province has increased from 80 to 250 ha since the mid-1980s and is projected to increase significantly within the decade.

There is a small but thriving wine industry in southern Quebec. The province is the most important maple syrup producer in North America. There are 7500 maple syrup producers in Quebec with an annual production that ranges from 10,000 to 15,000 kl.

Quebec produces a wide range of vegetable crops for both domestic and export markets (Table 2). Potato, sweet corn, onion, and carrot are the most important vegetable crops produced in the province. Vegetable production is centered around Montreal. This region has both mineral and organic soils (Fig. 1).

In Quebec, potatoes are grown on ≈17,500 ha, producing ≈400,000 t annually. Seed potatoes are mainly produced in the lower St. Lawrence and Lake St. Jean areas (5- to 9-h driving distance from Montreal), while table

potato production is centered between Montreal and the U.S. border (1-h driving distance). ASHS-95 participants may view potato storage facilities and processing and packing plants.

Ornamental horticulture is a rapidly expanding area. An estimated 3500 retail outlets employ more than 25,000 people. Turf production (4000 ha) is valued at \$15 × 10⁶ (Canadian dollars) annually. There are 300 producers of nursery stock, and an estimate of more than 12 × 10⁶ flats of annual flowers and vegetable transplants are produced yearly. Interior plant production in Quebec may approach \$15 × 10⁶ (Canadian dollars) with 70% of sales from cut flowers (Giasson, 1994).

Horticulture in the province is supported by a network of academic and government institutions. The Univ. of Montreal, McGill Univ., the Univ. of Quebec at Montreal (located on the island of Montreal), and Laval Univ. (in Quebec City) all offer courses in the horticultural sciences. The Research Institute in Plant Biology at the Univ. of Montreal is located in the buildings of the Montreal Botanical Garden. The professors and students of this institute conduct research, teach graduate-level courses in plant biology, and host researchers from other countries. Occasionally, they participate in technology transfer and help solve specific local problems associated with the environment. Their expertise mainly focuses on micropropagation, hybridization or mutation, and the role of plants in water purification of ecosystems.

In 1990 the Horticultural Research Centre of Laval Univ. was instituted to provide education to graduate students and to conduct horticultural research in crop management, cytology, chemistry, genetics, expert-system development, engineering, soil physics, soil microbiology, phytopathology, and entomology. Currently, researchers also are helping local industry personnel and consumers obtain more diversified and better quality products. The Univ. of Laval has been instrumental in establishing a strong greenhouse industry in the province. Horticultural experiments are conducted at the Jos Rheume experimental farm at Ste. Croix de Lotbinière and at Ste. Foy, Quebec. The main research conducted at Laval includes both fundamental and applied studies to improve the production of greenhouse vegetable (e.g., tomato, lettuce, cucumber, pepper) and floral crops (e.g., roses, geraniums, lilies).

Of special interest to ASHS-95 participants will be the Macdonald Campus of McGill

(continued on p. 1563)

Table 1. Estimate of commercial production and value (in Canadian dollars) of apples in Canada by province for 1994.

Location	Production (t)	Value (\$000)
Canada	563,954	134,124
Ontario	206,857	43,900
British Columbia	153,098	51,859
Quebec	125,165	26,149
Nova Scotia	71,633	10,001
New Brunswick	7,201	2,215

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¹ASHS-95 Program Committee Chair.

Front cover: Montreal Botanical Garden (photo courtesy of Montreal Botanical Garden).

(continued from inside front cover)

Univ. in Ste. Anne de Bellevue, location of McGill's Faculty of Agricultural and Environmental Sciences, the Morgan Arboretum, and Ecomuseum of the St. Lawrence Valley. The Plant Science Dept., which has extensive land areas, including orchards, research plots, the Lods Agronomy Research Centre, and McGill Herbarium, will be open to visitors during the ASHS Annual Meeting.

Canadian federal and Quebec provincial agriculture stations conduct research and provide extension support to Quebec growers and horticulturists. The Agriculture and Agri-Food Canada Research Station at St-Jean-sur-Richelieu, located 30 km from Montreal, will interest ASHS-95 participants. The station includes four experimental farms and houses 23 research scientists working in a wide range of disciplines. The Ministère de l'Agriculture des Pêcheries et de l'Alimentation du Québec have extension officers in each of the 12 regional zones. The Food Research and Development Centre of St. Hyacinthe is helping various processing companies develop better quality horticultural products for the market. The center is a federal institution under the direction of Agriculture and Agri-Food Canada and is a sizeable, modern research laboratory worth visiting.

A major Montreal landmark, the Montreal Botanical Gardens has a collection of 26,000 species of native and exotic plants. The central display facilities are undergoing renovation and expansion. Another significant Montreal attraction is the site of the Montreal Florales, gardens initiated in 1980 by several countries and maintained since then by the city of Montreal. The Montreal Biodôme, a unique

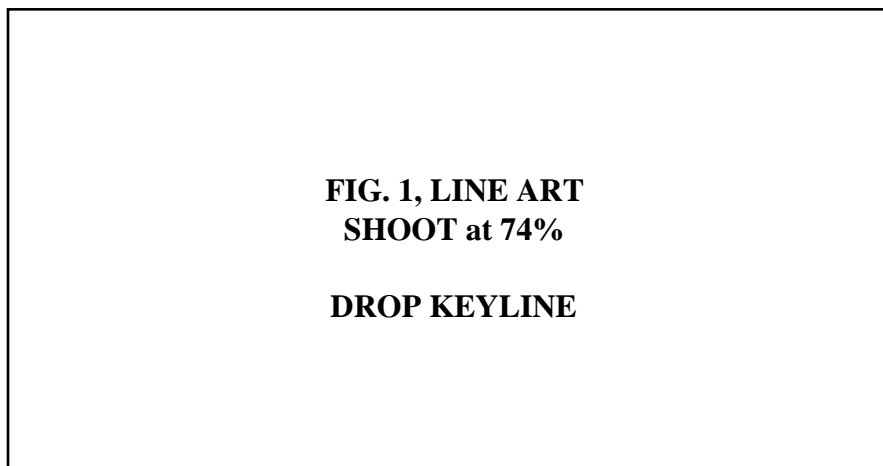


Fig. 1. Map of growing regions for the main horticultural crops of Quebec.

museum of the environment, houses thousands of plants and animals living according to the seasons. From the hot, humid air of the tropical forest to the cool Laurentian forest, from the depths of the St. Lawrence River to the shores of the subpolar regions, young and old experience new encounters with our world at every turn of the road leading through four of the most beautiful ecosystems of the Americas.

An invitation

The diverse attractions of Montreal with its excellent hosting facilities guarantee a record attendance of horticulturists from around the world at ASHS-95 in Montreal this summer. We invite you to the Great Green North from 30 July to 3 Aug. 1995 when ASHS and the Canadian Society for Horticultural Science

meet at the Montreal Convention Centre in Quebec, Canada. Bienvenue!

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Table 2. Canadian vegetable production areas of the main producing provinces in 1994 and percentage of Canadian total.²

Commodity	Canada		Quebec		Ontario	
	ha	%	ha	%	ha	%
Asparagus	4,025	15	605	15	2,920	73
Bean	17,500	44	6,526	37	7,715	44
Beet	2,088	34	944	45	710	34
Carrot	18,067	32	8,192	45	5,775	32
Celery	1,924	31	1,077	56	600	31
Cabbage	10,146	37	3,573	35	3,720	37
Cauliflower	6,718	45	1,997	30	3,000	45
Corn (sweet)	83,137	60	24,587	30	50,110	60
Cucumber	6,406	52	2,360	37	3,360	52
Lettuce	6,854	20	4,013	59	1,380	20
Onion	10,605	55	3,583	34	5,880	55
Parsnip	369	42	---	0	155	42
Pea	44,002	48	10,043	23	21,350	48
Pepper	5,030	73	1,100	22	3,680	73
Radish	1,717	30	951	55	520	30
Rutabaga	5,958	43	1,693	28	2,535	43
Spinach	1,066	46	341	32	490	46
Tomato (field)	27,527	90	2,283	8	24,770	90
Tomato (greenhouse)	331	46	112	34	152	46
Total	253,470	55	73,980	29	138,822	55

²Canada produces 53,702 t of mushrooms, of which Quebec accounts for 1488 t, Ontario for 29,212 t, and British Columbia for 16,431 t.

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