

PROBLEMS AFFECTING URBAN TREES IN QUEBEC CITY

by Dery, Rocray et Associes¹

Abstract. The study of approximately 5,000 trees growing in the Quebec City area permitted the identification of the major problems related to the urban environment. These trees include ornamentals, those they grow along streets, and those in urban parks and woods. The results show that abiotic diseases are far more important and cause much greater damage than biotic diseases.

In comparison with forest trees, city trees growing in back yards, parks and recreational areas are confronted with disturbances which affect very rapidly their health and vigor. Many studies have been conducted and carried out on the perturbations causing wood decay and losses in our natural forests, but little is known about the insects and diseases which kill our city trees, nor about their importance.

Since the summer of 1980, consultants Dery, Rocray et associes have studied many trees in the Quebec City area. The firm has gathered and compiled information that was eventually presented as a report to the Ministère de l'Environnement in March '82. The report discusses: 1) the species frequently encountered, 2) the principal causes of deterioration, 3) The qualitative and quantitative scale of severity for the problems encountered, 4) the interrelations that exist among the causes, and, finally, 5) proposes recommendations aimed at more appropriate protection for urban trees.

Methods

All the information needed to carry out the study was gathered with inventories that were especially conceived to evaluate with precision the health of trees growing in an urban environment. Four types of inventories were chosen.

Expert appraisalment. The tree evaluation done on privately owned trees (more than 400) were noted on a special form. Most of these trees were ornamentals.

Systematic inventories. This type of inventory was used on private and public land having hundreds of trees. These were numbered to make compilation easier. The systematic inventory is more elaborate and has a greater precision than sample-plots and randomly selected transects.

Sample-plots. Within public parks and extended urban woods, sample-plots were used because of the great number of trees. This type of inventory gives a picture of the site, without studying each tree in particular. The sample-plots represented approximately 5% to 10% of the total area for each site.

Randomly selected transect. To complete the information on each site, we made randomly selected transects in combination with sample-plots.

For the purposes of the study, we have divided the trees into three classes in relation to their geographical location: ornamental trees, right-of-way (ROW) trees, and trees in wooded sites (See details in Table 1).

Results

The urban environment contains a vast variety of tree species that forms a heterogeneous population. Thus, this population is susceptible to a large number of diseases and insects which are specific to each genus. On the other hand, the great diversity of species keeps most pathogenic agents to an endemic level that does not affect the entire population. This chapter considers the trees most frequently encountered in the Quebec City area, the disturbances that affect them, and their importance to the tree's health. Table 2 lists the ten most important species in this region; this table also includes the geographical class to which they belong.

The following diseases and insects were the most commonly observed during the study.

¹Presented by Pierre-Emile Rocray at the Northeast Forest Pathology Workshop in May 1982.

Abiotic diseases

Injuries. Injuries were caused to roots, trunk and branches by mechanized machinery such as lawn mowers, snow blowers, automobiles. They were also caused by objects attached to branches and boles.

Construction and grade change. Contractors do not care about or are not aware of the cultural requirements of trees. Trees surrounding newly built houses are seldom chosen for conservation on the criterion of health; in fact, they are most often chosen for their height and their appearance.

Transplantation shock. Many trees were in bad condition and even dying because they had been selected without taking the site into consideration. Others were not planted in the proper manner.

Chemicals. Many tree owners care too much about their plants and want protection against pathogens and insects. They do not follow the directions on labels, or use appropriate apparatus for the application. The result: burned foliage. Chemical problems also include over-fertilization.

Temperature. During the winter of 1981 (especially during February), the Quebec region experienced successive periods of temperatures well below freezing. Many trees such as *Malus* sp., *Betula* sp., *Populus* sp., *Aesculus hippocastatum* and *Quercus rubra* died as a result of this perturbation.

Salt. Ornamentals and ROW trees growing along city streets were adversely affected by the use of deicing salt.

Table 1. Classes of trees in relation to their location.

Location	Ornamen- tals trees	Parks and forests trees		ROW trees
		Private	Public	
Sillery				
—Boise no 1		298		
—Boise no 2		190		
—Office Municipal d'Habitation	55			
—Bois de Coulonge			x	
—Parc de la Falaise			x	
—Rues Thornhill, St-Louis				32
Sainte-Foy				
—Bureau Directeur gen. Elections	48			
—Boise de Norvege			x	
—Boise des Quatre-Bourgeois			x	
—Chemin Sainte-Foy				73
—Rues Chauveau, Borduas				18
—Bourlevard Laurier				65
Sillery et Sainte-Foy				
—Service de consultation	421			
Quebec				
—Boise des Franciscaines			x	
Total:	524	488	4,300	188

Biotic diseases

Cytospora canker. This disease frequently affected the Colorado spruce and the white spruce.

Black knot. Both ornamental and wild black cherry and choke cherry were hit by this disease.

Fire blight. Fire blight is one disease that has an endemic presence on mountain-ash and on hawthorn.

Nectria dieback. The dieback is affecting mostly the Chinese elm, the Norway maple and both European and American linden.

Dutch elm disease. Elms growing in the Quebec region were originally affected by the native beetle. Recent inventories proved that the European beetle is now present in the area.

Table 2. The ten most important species.

Species	Ornamental	ROW	Woodlot
sugar maple, <i>Acer saccharum</i>	x	x	x
paper birch, <i>Betula papyrifera</i>	x	—	x
silver maple, <i>A. saccharinum</i>	x	x	—
Norway maple, <i>A. platanoides</i>	x	x	—
red maple, <i>A. rubrum</i>	x	x	x
pin cherry, <i>Prunus pensylvanica</i>	x	—	x
chinese elm, <i>Ulmus parvifolia</i>	x	x	—
mountain ash, <i>Sorbus americana</i>	x	—	x
apple, <i>Malus</i> sp.	x	—	—
red oak, <i>Quercus rubra</i>	x	x	x

Observed insects

During our inventories, we observed many species of insects, but those that suggested the need for a certain kind of control measure were the following:

- Birch leafminer, *Fenusa pusilla*
- Birch case bearer, *Coleophora fuscedinella*
- Mountain-ash sawfly, *Pristiphora geniculata*
- Spruce budworm, *Choristonevra fumiferana*
- Eastern tent caterpillar, *Malacosoma americanum*
- Forest tent caterpillar, *Malacosoma disstria*
- Sugar maple borer, *Glycobius speciosus*

Quantitative scale. The quantitative scale of severity for the problems observed within our inventories permits us to establish a frequency for each of them, and this, in relation to the principal species of trees affected. Table 3 presents the results obtained for trees growing as ornamentals, in private woodlots or along streets.

Since public woods were inventoried using sample-plots and randomly selected transects, it is impossible to give a quantitative scale for these tree populations.

Qualitative scale. The qualitative scale gives the number of trees affected by a disease or by insects. This scale was established by taking into consideration the following criteria: 1) the presence of severe disturbances that can result in the death of a tree; and 2) the disturbances that most frequently appeared during the inventories. There are many other kinds of diseases that affect trees in all manners. These were not considered in our study because they are less widespread and do less damage to the trees.

Table 3. Quantitative scales for ornamental, private woods and ROW trees.

Location	Number of trees	Disturbances		
		Biotic	Abiotic	Insects
Ornamental	421	173	177	146
Wood	489	68	319	105
ROW	188	98	58	2
Total:	1098	339	554	253

Discussion

Among the diseases and the insects problems we observed during the inventories, many are severe enough to kill trees. Abiotic diseases are the most destructive agents for trees in the urban environment; as a matter of fact, 52% of ornamental trees and 73% of private woodlot trees were affected by these disturbances, compared to respectively 30% and 10% for biotic diseases. Mechanical injuries and construction disturbances (including grade changes) are the abiotic problems most frequently observed. As for biotic diseases, wood decay is the number one destructive agent. Finally, the insect problems that required the destruction of trees are very limited. The sugar maple borer is the most important cause of death in both ornamental and private woodlot trees.

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Dery, Rocray et associes
 831 Marguerite Bourgeois
 Quebec City, Quebec, Canada
 G1S 3W5

ABSTRACT

FELIX, ROBERT. 1982. **Electricity—occupation hazard number one.** *Arbor Age* 2(4): 12-14, 18, 20.

The number one cause of fatalities in the tree care industry is electrocution caused by indirect contact with an energized conductor. This statistic applies to not only those engaged in utility line clearance tree trimming, but those engaged in private tree care as well. Falls, chain saw cuts, and other accidents cause many injuries, but they are rarely fatal. Inadvertent contact with an energized line is a different story. Death almost always occurs. There are more people engaged in line clearance tree trimming than there are in private tree care operations. They deal with electrical hazards every day and rarely do they have an accident, much less a fatality. Contrary to common belief, the line clearance contractors have fewer lost time accidents than those engaged in private tree care.