RESEARCH NOTES

LAURENTIAN FORESTRY CENTRE
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Ice Damage and Management of Maple Stands

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The know-how of sugarbush owners

In January 1998, an ice storm of unprecedented magnitude struck eastern North America, causing moderate to severe damage in more than 15,000 km^2 of forest. Many North American Maple Project (NAMP) stands were damaged by the freezing rain, some of them severely. According to DesRochers and Allen (2001), the risk of damage in undisturbed (non-sugarbush) maple stands was 1000 times higher than in sugarbush stands. Selection thinning and sanitation practices have been found to favour sugarbush resilience (DesRochers et al., 2003). From 1988 to 1997, in the sugarbushes of eastern Canada, operations were carried out more frequently, but thinning intensity was lower with each operation (Table 1).

From 1988 to 1997, sugarbush owners in eastern Canada harvested a higher percentage (Figure 1) of affected or declining trees and a higher percentage of trees with severe injuries than in the overall population (Figure 2). By contrast, in non-sugarbush maple stands, healthy trees and trees with few injuries were harvested. Maintaining a high basal area per hectare helps to reduce ice storm damage in sugar maple and other deciduous species alike (DesRochers and Allen, 2001).

Table 1.
Thinnings in NAMP stands in eastern Canada, 1988-1997

	Non-sugarbush	Sugarbush
Percentage of stands thinned	43%	71%
Number of thinning operations / stand	1	1 to 8
Basal area harvested (%) / thinning operation	8%	3.2%

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Figure 1.

Percentage of healthy, affected, declining and dying trees in the overall population and among the live trees harvested in maple stands, in relation to type of management.

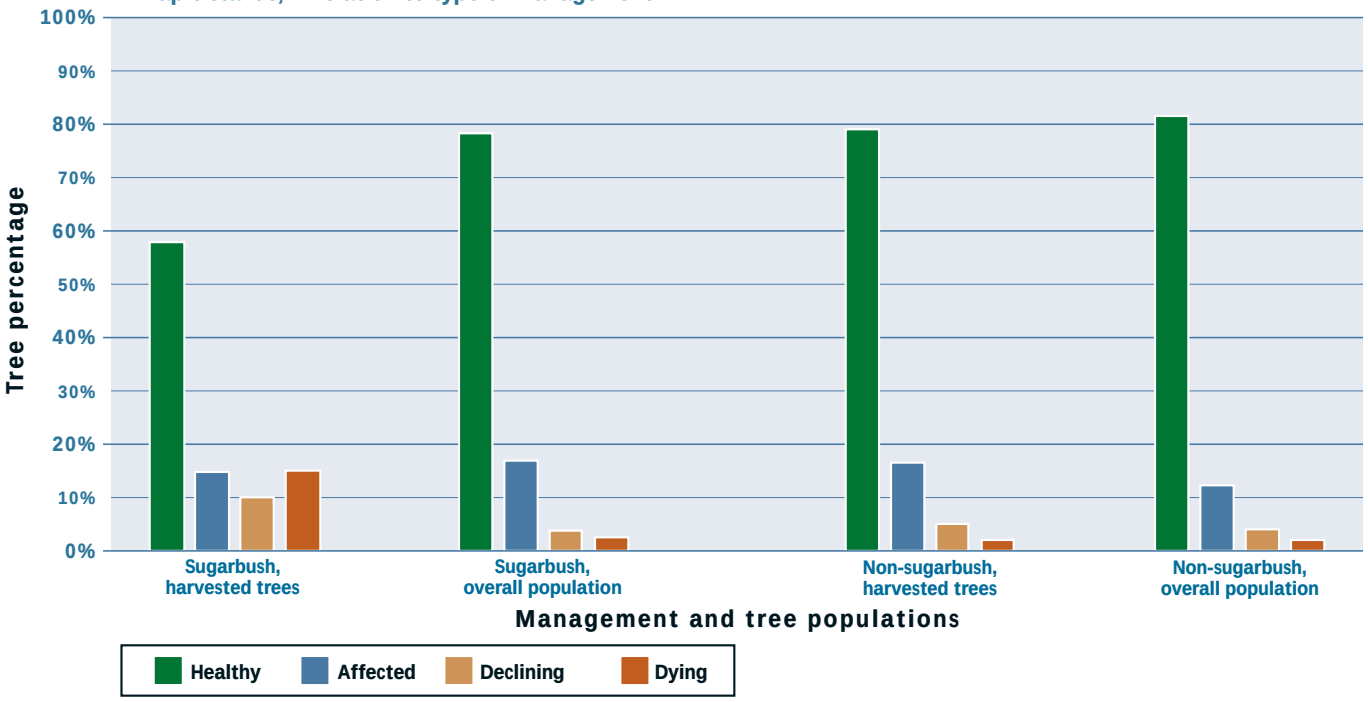
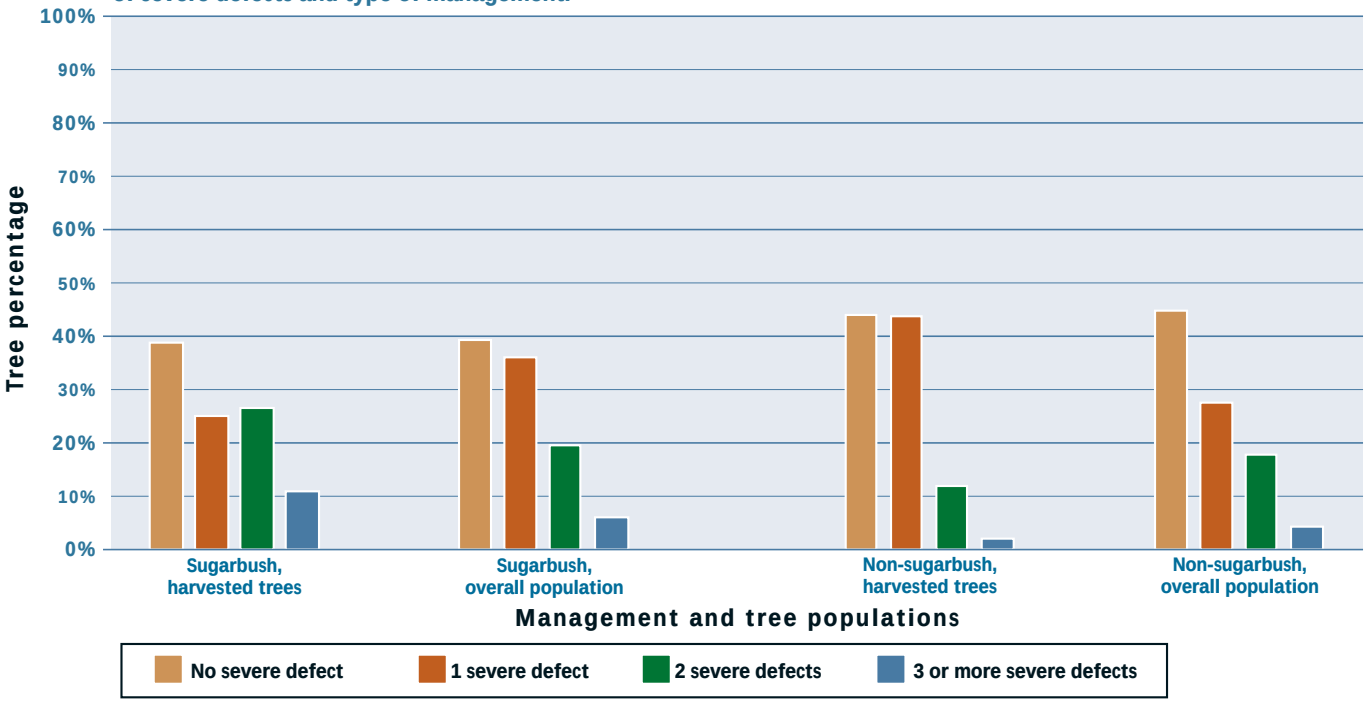


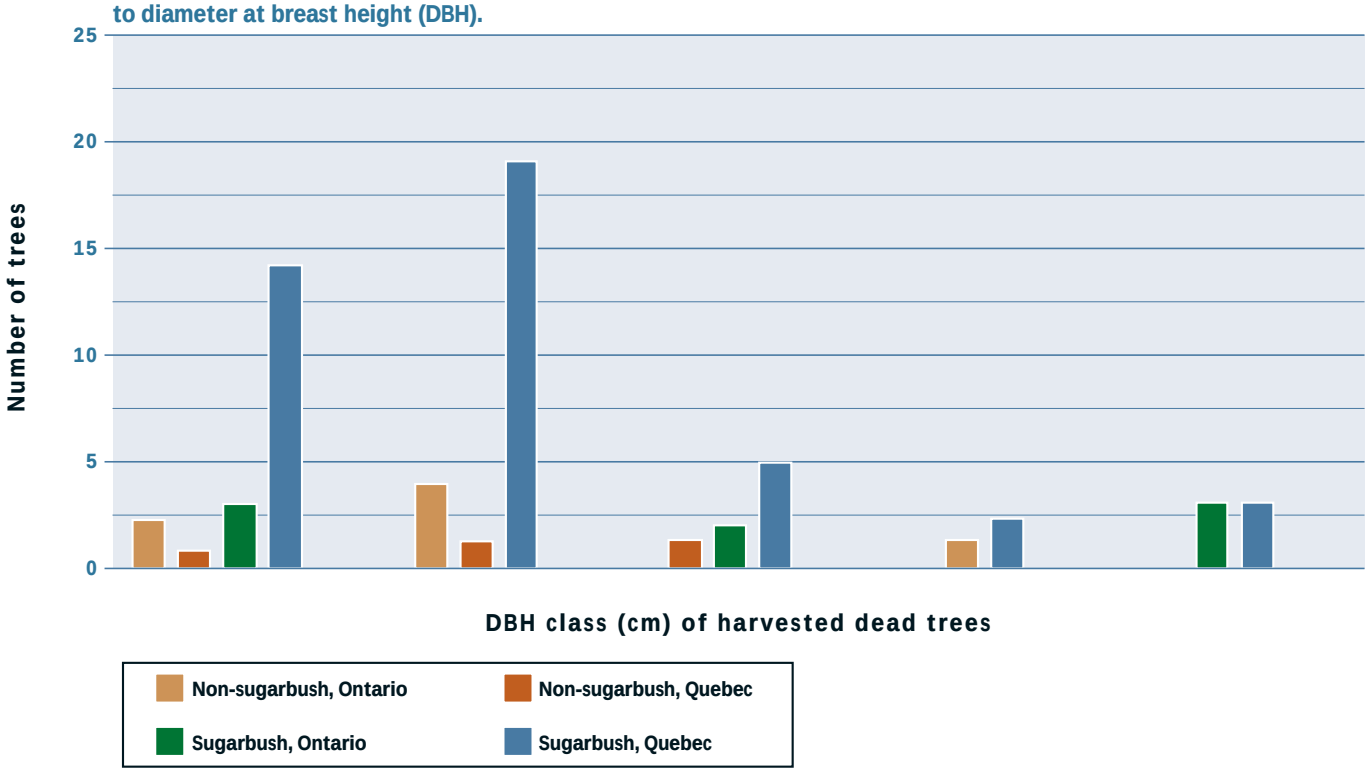
Figure 2.

Percentage of trees in the overall population and among live trees harvested in maple stands, in relation to the number of severe defects and type of management.



During this period, many dead, often large, trees were harvested in sugarbushes, while only a few were harvested in non-sugarbush maple stands (Figure 3). The mean time lag between mortality and harvesting was two and a half years in sugarbush stands and four years in undisturbed maple stands.

Figure 3.
Number of dead trees harvested in Ontario and Quebec in sugarbushes and non-sugarbush maple stands, in relation to diameter at breast height (DBH).

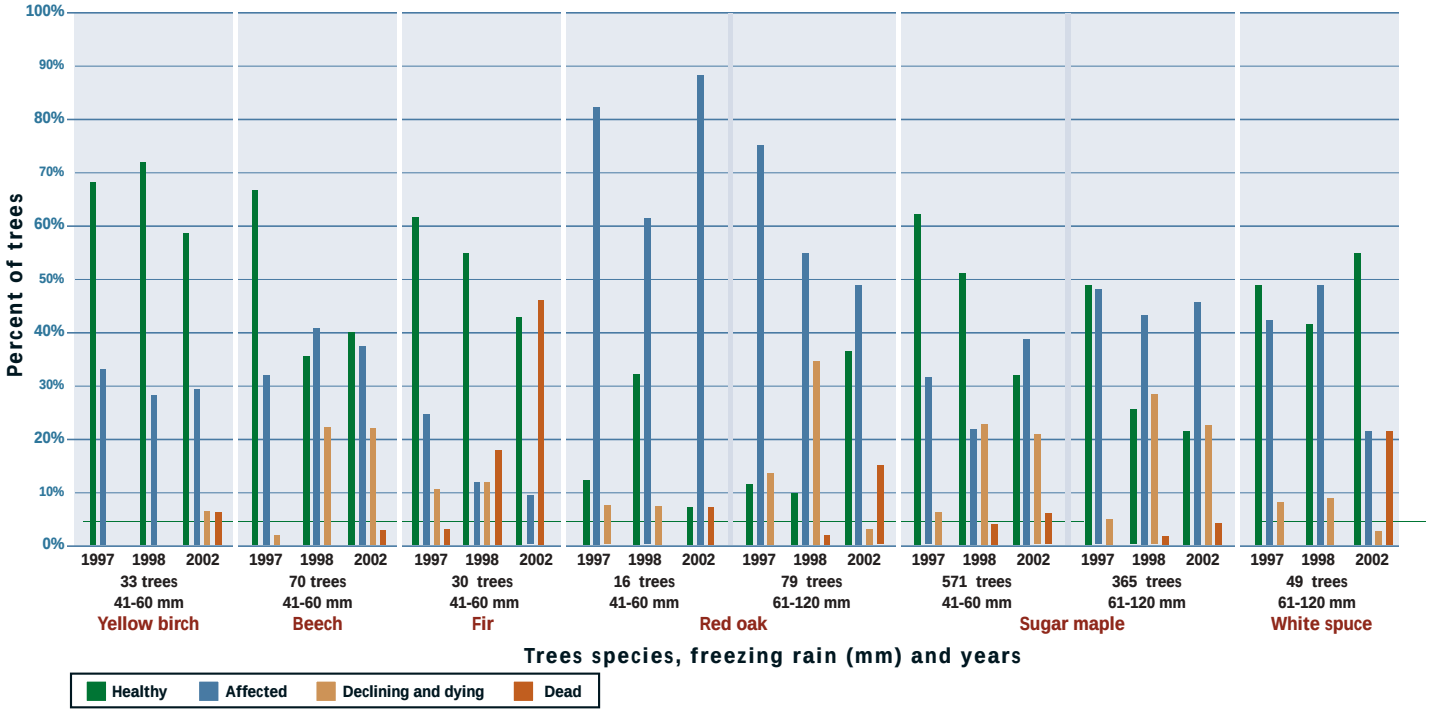


The resilience of forest species

Sugarbush owners nonetheless tend to cut proportionately more associate species in their stands than is the case for the overall population. Yet, these associate species favour the resilience of sugarbush maple stands and should therefore be kept (DesRochers and Allen, 2001). Yellow birch has the greatest resilience to ice damage in the zone that received 41 to 60 mm of freezing rain (Figure 4; DesRochers, 2005). In addition, beech, sugar maple, red oak and basswood are more resistant to freezing rain of this intensity than is balsam fir. White spruce likewise sustains less damage than balsam fir, even when exposed to more intense freezing rain (61-120 mm). Furthermore, observations made immediately after the 1998 ice storm revealed that red maple was five times more likely than the other deciduous species to have crown losses of 10% or greater (DesRochers and Allen, 2001).

Figure 4.

Tree health prior to the ice storm (1997), the year after this storm (1998) and five years after the ice storm (2002), in relation to the species and freezing rain intensity.



Management recommendations

Routine application of the following measures in woodlot management will help to reduce the impact of future ice storms:

1) promote tree vigour through frequent, low-intensity thinnings;
2) maintain stand health by regularly removing defective, non-vigorous or dead trees;
3) foster species diversity;
4) promote the growth of resilient species according to stand type: yellow birch, beech, sugar maple, red oak, basswood and white spruce.

References

DesRochers, P. 2005. Verglas et forêts : reprise et mesures d'atténuation. Actes du colloque «Verglas et forêt : Qu'en est-il cinq ans plus tard?», 28-30 janvier 2003, Sherbrooke, Québec. Centre Acer, Saint-Hyacinthe, Québec. pp. 35-44.

DesRochers, P.; Allen, D.C. 2001. Impact of the January 1998 ice storm on some maple stands in the North American Maple Project. Pages 41-59 *in* Proceedings, New York Society of American Foresters, Ice Storm Symposium, January 29, 1999, Cortland, New York. Compiled by D.C. Allen. USDA Forest Service, Northeastern Area State and Private Forestry, Report NA-TP-03-01.

DesRochers, P.; Hopkin, A.; Hurley, J.E. 2003. Le savoir-faire des acériculteurs canadiens atténue l'impact du verglas! XIIth World Forestry Congress, 21-28 September 2003, Quebec City, Canada. Poster.

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