

Why did that Tree Die? Blame it on the Bugs!

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Insects are an integral component of urban forest ecosystems; they contribute to pollination, support wildlife habitat and biodiversity, and regulate key environmental processes such as decomposition and soil fertility. However, insects can also cause significant damage to urban trees, particularly if they are not in their native range. In this blog post, I will cover some of the most common insects responsible for tree mortality in Canadian cities, including Halifax: emerald ash borer, elm bark beetle, and brown spruce longhorn beetle.

Emerald ash borer, or *Agrilus planipennis*, is a type of jewel beetle that hides its potential for widespread tree canopy destruction under a shiny metallic green exterior. Native to eastern Asia, emerald ash borer (EAB) was introduced to North America in the 1990s and has spread into areas in Ontario, Québec, Manitoba, New Brunswick, and, more recently, Nova Scotia. EAB larvae feed on different layers of wood in the tree, creating galleries (or tunnels) under the bark and thus damaging the tree physically while disrupting normal flows of nutrients and water. The first signs of EAB infestation is dieback at the tops of the canopy; branches may appear bereft of leaves when they should be full. Other signs may include small shoots at the base of the tree, as energy is funneled towards creating more foliage in the face of stress.

By that point, it is unfortunately just a matter of time before the tree succumbs. EAB has a high mortality rate - it is estimated that within 8-10 years of EAB introduction into an area, 99% of ash trees are killed. Although ash trees in Halifax have mostly been spared to date, populations of EAB have been spotted in recent years in the city, highlighting the importance of proactive management and tree replacement plans to make up for future losses in ash trees that may occur.



Photo of Emerald Ash Borer (EAB) emerging from ash tree in Montréal, Québec, with tell-tale “D-shaped” hole as adults exit the tree at the end of the life cycle (photo credit: Sophie Nitoslawski)

Elm bark beetle, or *Hylurgopinus rufipes*, is a native elm beetle species. This bug gets a bit of a bad rap because of its role in propagating Dutch Elm Disease (DED). It serves as a vector (which means that it carries) the fungus *Ophiostoma ulmi*, an invasive pest itself first introduced to North America in the 1920s. Complicating things, the fungus can also be carried by other elm beetle species native to Europe and Asia, which have also been introduced to North America. The fungus proliferates in the galleries created by these beetles in elm trees, and although trees try and fight back using a special defense system to block fungal movement throughout the tree, this system also creates stress and can actually cause dieback and decline in the tree canopy. The first signs of DED are upper branches looking wilted and yellow in summer, and eventually some tree roots eventually die from lack of nutrients.

DED started affecting elm trees in Canada in the 1940s, and today a large majority of mature elm trees have been lost in cities across Ontario, Manitoba, and Québec. Nevertheless, with the help of an aggressive pest management program, the City of Winnipeg boasts one of the largest surviving urban forests of elm trees in North America. Halifax, too, still has many large elms lining its streets, providing shade and canopy to residents of the peninsula.



Photo of galleries created by European bark beetle (photo credit: University of Minnesota Extension)

This final bug may already be familiar to you, as it was first sighted in Point Pleasant Park. Brown spruce longhorn beetle, or *Tetropium fuscum*, is native to Europe and was likely introduced to the Port of Halifax via wood packaging. Spruce trees (*Picea rubens* and *Picea abies*) are the main hosts and the trees most at risk, which is concerning given the prominence of red spruce in the Acadian Forest; large spruce trees can take as little as a couple of years to die after infestation. Key symptoms of affected trees include tiny exit holes in the bark, streams of resin down the tree trunk, and yellowing needles.

Twenty years ago, Point Pleasant Park was heavily hit. It is estimated that over 10,000 spruce trees were affected. Although the spread of this bug across Nova Scotia proves risky for the softwood industry, urban woodlands and forests are also vulnerable - along with the many important benefits that these trees provide for park goers. Thankfully, it appears that the spread of the beetle is relatively slow, and peri-urban forests around Halifax are regularly monitored and, if necessary, treated to mitigate the impacts of the pest.



Photo of brown spruce longhorn beetle (photo credit: Georgette Smith, Canadian Forest Service)

Insects, especially invasive ones, will likely continue to cause issues in urban forests across Canada. Many urban forest management plans also have pest management strategies, as urban foresters look forward and try to anticipate future pests and their potential impacts. Beyond the municipality, provincial and federal governments also have a role to play in identifying and stopping the spread of invasive species that could cause damage to our urban forests. More information on tree pests can be found here:

<https://treecanada.ca/resources/canadian-urban-forest-compendium/15-insects-and-diseases-of-urban-forests/>

<https://www.invasivespeciescentre.ca/invasive-species/meet-the-species/invasive-insects/>