



Oak Wilt: A Threat

Borders are powerless when it comes to stopping the spread of forest insects and diseases. New insects are increasingly likely to enter Canada due to increased cross-border trade as well as climate change. If circumstances allow it, these exotic pests could decimate trees that have not developed a strong defence mechanism against them, causing the pests to further spread outside their area of origin. As a result, these newcomers can seriously compromise Canadian forests. Research is therefore becoming an important tool to curb the spread of insects and diseases, including the fungus responsible for oak wilt.

Oak wilt is a vascular disease caused by the fungus *Bretziella fagacearum* that obstruct sap circulation, leading to rapid death of infected oaks. First reported in Wisconsin in 1944, oak wilt is now found in more than 24 U.S. states. Although the presence of DNA from this pathogenic fungus was detected on insects captured in Ontario in June 2019, the disease is not yet present in Canada.

If it were to reach Canada, oak wilt could have a serious impact on oak populations. That is why the Canadian Food Inspection Agency is currently regulating the import of oak logs to limit the risk of introducing this disease. The arrival of this disease in Canada would likely have serious trade and environmental implications, given that Canada exported \$74 million worth of oak lumber in 2015 and that oak plays a vital ecological role in the urban and natural forests of eastern Canada.

The spread and natural evolution of oak wilt

The pathogenic fungus responsible for this disease is spread mainly in two ways. It is transmitted either locally by root grafts from an infected tree to neighbouring trees, or by reproductive structures (mats or mycelial pads) of the fungus that develop under the bark of infected trees. These fungal structures emit volatile compounds that attract certain species of beetles. Spores adhere to insects that visit the mycelial pads, such as sap beetles, and can be spread to healthy trees where they can enter trees through wounds. Transporting infected logs would also promote the propagation of the fungus over longer distances.



Oak wilt – close-up of fungal mat on peeled stem.
(Minnesota Dept. Natural Resources - FIA)

Branching Out

from the Canadian Forest Service - Laurentian Forestry Centre

Infection occurs primarily in the spring and, although all oak species can be infected, their vulnerability varies from one species to another. For example, infection by the fungus is particularly virulent in red oaks, which usually die within a single season. This rapid death is due to the fact that the fungal spores can be translocated to all parts of the tree. White oak is different; the distribution of spores is limited to the current year's growth tissue. The tree can often survive the infection for years with relatively few symptoms. Its decline is therefore slower. The main symptoms associated with this disease are: 1) leaf browning followed by early leaf drop; 2) wilting of twigs starting at the tips and spreading inward to the crown; 3) brown streaks under the bark of wilting twigs; and 4) extensive defoliation. The bark of affected trees may also show vertical splits.

Early detection: everyone on the lookout!

Detection is an essential step in limiting the spread of oak wilt should it reach Canada. Early detection enables rapid response and control of the disease to protect Canadian oaks. The Canadian Food Inspection Agency, the Ontario Ministry of Natural Resources and Forestry, the Ministère des Ressources naturelles et des Forêts du Québec, the Canadian Forest Service and various local agencies are working together to prevent the introduction and establishment of this disease in Canada. If you come across an oak tree that is displaying typical symptoms of this disease and suspect that it may be affected, please contact your local Canadian Food Inspection Agency office.



Oak wilt - foliar symptoms on northern red oak.
(F.A. Baker, Utah State University)



Oak Wilt – vascular discoloration in white oak.
(F.A. Baker, Utah State University)

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