

## Butternut: What Are Its Odds Against Canker?

The continuing spread of butternut canker poses the greatest threat to the survival of the butternut, which has been protected under the *Species at Risk Act* since 2005. Furthermore, growing conditions that are favourable to the health and the establishment of the butternut are increasingly rare. The following are possible solutions suggested by Canadian Forest Service (CFS) researchers for helping this endangered species.

### The culprit

Butternut canker is an infection caused by the fungus *Ophiognomonia clavigignenti-juglandacearum*. It has been found across the entire geographic range of butternut in North America, but we do not know for how long it has been present. However, the low genetic variability and the high level of virulence characterizing this pathogen indicate that it is probably an exotic pest. In Quebec, the fungus was first reported in 1990.

The fungus is carried from tree to tree by wind, rain and a variety of insects. The cankers caused by the infection usually appear in the tree crown, and then in the lower parts of the tree. The infection spreads downward as fungal spores are washed down by rain along the branches and trunk. Exposed roots are very often infected.



Photo: NRCan

Canker on the base of the tree.



Photo: NRCan

Dead branches in the crown of an infected butternut.

In the spring, cracks in the cankers leak a black fluid resembling ink. In the summer, sooty black spots appear on the cankers; a whitish margin sometimes forms around them. Brown or black patches can be seen underneath the bark. Cankers, which are comprised of bare wood covered with sparse or continuous strips of bark, get larger as they get older. Over time, the cankers multiply and join together, killing the affected branches. When the cankers girdle the trunk, the tree dies.

### Cautious intervention

The fight against butternut canker is no small matter. CFS researchers recommend various measures that mostly aim at protecting healthy trees by favouring vigorous growth and a good seed production. Creating openings in the forest canopy surrounding butternut trees increases the amount of light they are exposed to, which promotes their growth and leads to their dominance in the area. The impact of this measure on the health of butternut trees is currently being studied.

# Branching Out

from the Canadian Forest Service - Laurentian Forestry Centre

The following concrete measures are recommended in forest stands to limit the spread of the disease and conserve the healthiest trees.

- Conserve all butternut trees with less than 50% crown dieback and a canker-free trunk, as well as those with less than 30% crown dieback even if 1 to 25% of the main stem's circumference is affected by cankers.
- Any tree should be removed when over 25% of the main stem's circumference is affected by cankers, as should trees with at least 50% crown dieback, even if the stems are canker-free.
- High-value trees can be conserved by pruning the affected branches and excising trunk cankers. These measures must be carried out in compliance with standard NQ 0605-200/2001 ("Entretien arboricole et horticoles"), particularly regarding the sanitization of cutting tools.

It should be noted that a permit is required for all measures involving butternut trees on federal land.



Photo: NRCan

Young canker on a butternut tree.



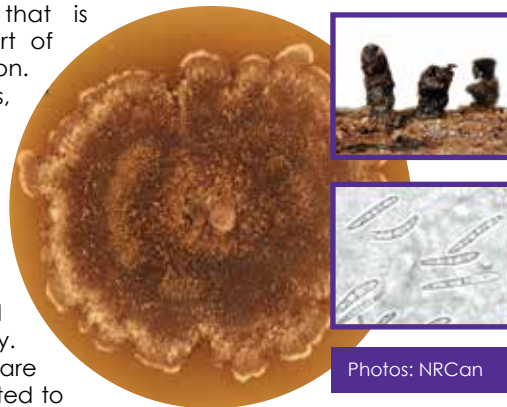
Photo: NRCan

Healthy butternut tree.

## Does nature hold the key?

Cutting trees that are not infected with butternut canker may accelerate the disappearance of this species and significantly reduce the genetic pool of resistant butternut trees. It is therefore essential to locate and protect uninfected butternut trees, thus taking advantage of the genetic resistance to canker that is believed to exist in part of the butternut population. For the past few years, Environment Canada has been funding CFS research by means of the Interdepartmental Recovery Fund in order to locate potentially resistant trees and assess this resistance, which could lead to species recovery. Potentially resistant trees are propagated and inoculated to confirm their resistance. Preliminary results show that some inoculated trees seem to be resistant and put defense mechanisms into place, such as compartmentalization.

Protecting butternut trees requires considerable attention. The conservation of this noble deciduous species, which is prized for its wood and nuts and for being an integral part of the biodiversity of our forests, deserves all the efforts that are dedicated to it.



Photos: NRCan

Signs that make it possible to identify butternut canker without a doubt: the appearance of a culture; stromatic columns visible with a magnifying glass on infected branches (top right); conidia produced by the cultures or stromatic columns (bottom right).

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