TORONTO
Parks, Forestry & Recreation

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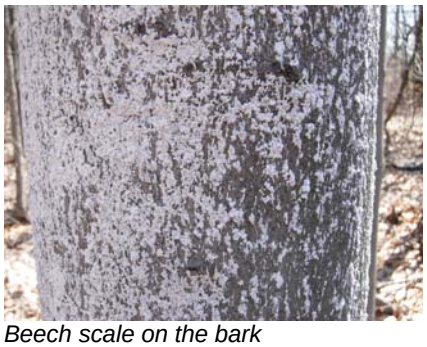
Forest Health Care

Beech Bark Disease

Beech bark disease is a devastating disease of beech trees. It is caused by a complex of a beech bark scale (*Cryptococcus fagisuga*) and species of *Nectria* fungi. Beech scale was introduced to Nova Scotia in 1890 from Europe. Beech bark disease started its spread through the Maritimes in the 1930's. It has only recently been detected in Ontario.
The beech bark scale is a tiny (0.5-1mm) sap-feeding insect. It has three stages in its life cycle: egg, crawler and adult. The adults are wingless, legless and covered with white woolly wax. The insect reproduces asexually and has only female individuals in the population. Eggs are laid in early July on the bark of beech trees. Crawlers hatch about 4 weeks later and start to look for a suitable place to feed on the bark. Feeding causes a wound in the bark. They spread from tree to tree by wind. The beech scale has one generation per year and it overwinters as an immobile crawler.
The second agent responsible for causing beech bark disease is a *Nectria* fungus. Three different species from the *Nectria* genus have been found to infest beech trees through feeding wounds made by beech scales. The fungus colonizes the bark, cambium and sapwood, causing cankers to form beneath the bark.


Beech scale on the bark


Tarry spot on the dead bark


Dead stripes on the bark

Host and Damage

American beech is susceptible to beech bark disease, however a small proportion of individual trees of the beech stand can resist infestation. European beech is resistant to the disease.

A heavy infestation of beech scale can weaken the tree, but serious damage occurs only after *Nectria* fungi invade and kill bark that is already stressed by scale infestation. White woolly wax on the tree where the bark is rough is the first symptom of scale activity. Heavy infestation of beech scale can cover entire tree stems with white wax. The discoloration of scales, followed by their disappearance is the first symptom of disease. The scales fall off after the underlying fungus kills the bark. Brown slime flux often oozes from dead parts of the inner bark, causing tarry spots to appear on the bark. The fungi may affect large areas of the tree, completely girdling it. Leaves on dying trees do not reach their full size, turn yellow and later brown, remaining on the tree through autumn.

Beech bark disease develops in three stages:
-***advancing front***, where trees are infested with beech scale, but not yet infected by *Nectria* fungi.
-***killing front***, where trees infested with beech scale are infected by *Nectria* fungi. It usually happens several years after beech scales first appear. Many trees die.
-***aftermath zone*** is characterized by some residual big trees and many small root-sprout trees that are affected and damaged by beech bark disease.

Specific Management Practices for Control of the Beech Bark Disease:

- The *Nectria* fungus cannot be controlled, once it infects the tree. Heavy infection may lead to stem breakage. In urban areas it can create a hazard to people and property. Infected trees with patches of dead bark should be removed.

- To prevent beech scale infestation, do not transport firewood from infested areas between July and November, when crawlers are mobile.

- Scales can be removed from some individual trees by scrubbing the bark with a soft brush or using water from a high pressure nozzle, however it is difficult to reach them on the upper part of a large tree.

- Most scales can be controlled by using dormant oil, applied after leaf drop in fall or before bud break in spring.

General Management Practices to Improve Plant Health:

- Water your trees during dry spells. Infrequent, but deep soaking preferably during the early morning hours is recommended. Water absorbing roots are located in the upper 25 cm of the soil and extend outward well beyond the canopy dripline.

- Place organic mulch, (e.g. wood chips), or living mulch, (e.g. ground covers) around the tree base to keep the soil moist for longer periods and encourage healthier roots.

- Avoid any unnecessary excavating, grade changes, soil compaction, root cutting or hard resurfacing around trees as these activities destroy vital roots which may lead to tree decline or death.

- Refrain from using high levels of salt or herbicides around trees.

Forest Health Care is a holistic approach to tree care that focuses on improving the health of trees in an urban environment. Our objective is a healthy, sustainable urban forest. Trees in urban forests are often stressed by compacted soil, drought, poor planting and pruning techniques, air pollution, road salt, damage from construction and much more. Trees planted in the right sites and properly maintained are less likely to suffer and are more resistant to pest problems.

Pest problems are managed using a decision making process that considers the following:

- Identification of the host and the pest.
- Monitoring of the host and the pest.
- Selection of the appropriate management strategy.
- Evaluation of the management plan.

Our focus is on pest management programs that are environmentally, socially and economically sound.