

# Maple decline: Collar rot and basal canker complex

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When leaves show early fall colors, it may signal potentially serious troubles with the bark, trunk, or roots. The tree in the foreground is showing the effects of collar rot.



Tight girdling roots can cause maple decline symptoms.

Sugar maples along city streets, in parks, and around homes frequently lose their vigor and die slowly a few years after crown symptoms are first observed. Trees of any age appear susceptible, and as many as 80% of the maples in some locations have been observed with indications of "maple decline." Many factors may contribute to decline, but the phenomenon is not fully understood.

Research has demonstrated that many of Wisconsin's maples are declining because of fungal invasion of the root and/or lower trunk. This publication summarizes research results and describes the collar rot and basal canker complex.

## Symptoms and identification

Deterioration of urban maples in Wisconsin often is associated with decay of the trunk at or below the soil line. Deterioration of the bark usually begins where the trunk and buttress roots join, the area known as the root collar. Sugar maples are especially susceptible; Norway and other species of maples are less susceptible.

Suspect maples may show early fall coloration on one to several branches, usually on one side or in the upper crown of the tree. Leaves frequently are smaller and fewer on affected branches, and become prematurely red or yellow. Heavy seed set commonly follows. Affected

branches show progressive decline, and an increasing number of branches show symptoms with each succeeding year. Trees may survive from one to several years after first symptoms are observed.



Fungal collar rot is difficult to detect, and may require soil excavation and/or removal of the suspect bark area for confirmation.

Mature healthy maples, especially woodland trees of seedling origin, usually have basal trunk flare and surface buttress roots at the soil line. Most trees affected with collar rot and basal canker lack such typical root flares at the base of the trunk. This may be a useful clue to suspect some problem in the root collar of the declining maple.

Affected areas often include the lower trunk, the root collar, and the large roots extending from the affected trunk. Root portions more distant from the trunk remain sound.

Examine the bark at or below the soil line for evidence of problems in the root collar area. Carefully excavate the soil for several inches about the trunk, taking care not to damage the bark or roots. You may need to wash off the root collar and adjacent roots for further examination. Check for:

1. Depth of the root collar and buttress roots below the soil surface.
2. Evidence of deep cracks in the bark.
3. Loose bark, or bark that sounds hollow when tapped and which can be easily pulled off. Healthy bark will not pull off easily.
4. Obvious bark discoloration in patches or spots, including water-soaking, and oozing from cracks or openings.

Sometimes girdling roots are also encountered. Girdling roots tightly encircle and constrict the trunk at or below the soil line. If the girdling is severe enough, it may cause the same above-ground symptoms and effects as collar rot. In addition, trees with girdling roots often are affected simultaneously with collar rot, resulting in a complex of reasons for the tree's decline.

The trunk's bark above the soil line also should be examined carefully. Sometimes the bark is loose. Such basal cankers with loose bark are distinct from the collar rot just described and are caused by a different fungus. The bark may slough off the trunk, suggesting lawn mower injury. But when the loose bark is removed, the exposed cambium and wood are discolored. They may be tan, dark brown or somewhat red in pockets, compared with the white or light green of healthy cambium and wood.

Cankers are irregular in shape and vary in size from 1 to several inches in circumference. From 1 to 30 or more cankers may be observed on an individual tree.

Since both collar rot and basal canker often are found on the same tree, the combination is regarded as a disease complex. It is believed that collar rot and basal canker interfere with the upward movement of water and minerals, as well as the downward movement of sugar and other plant foods, resulting in a slow decline and deterioration of the tree.

Maple trees also can decline from mechanical or physical damage to the trunk or roots, toxicity from roadside salt accumulation, micronutrient disorders, environmental stresses, or other factors. The following Extension publications will help identify other causes of tree decline:

- *Deciduous Trees Disorder: Miscellaneous Causes of Decline* (A2414),
- *Identifying Shade Tree Problems* (A3073),
- *Salt Injury to Landscape Plants* (A2970), and
- *Shade Trees Disorder: Decline, Dieback or Early Senescence* (A2510).

## Cause

Two soil-borne fungi appear to be involved. *Phytophthora citricola* is associated with collar rot. A water mold, this fungus is active during wet periods. *Fusarium* is associated with basal canker. Unlike *Phytophthora*, this fungus does not require a wet environment to grow. How these fungi invade the maple is not yet known, but once in the tree, they kill increasing portions of the root and basal trunk tissues. The tree may be girdled at that point, severing all or part of the root system from the foliage and branches.

## Control

### Establishing the maple tree

Since the symptoms are associated with sugar maples transplanted from nursery stock, give special attention to the way trees are planted. Buttress roots of affected trees are nearly always several inches too deep! The problem apparently occurs in part because many transplanted trees develop their roots several inches below, rather than near or over, the soil surface as they do in the forest. Plant trees shallowly with roots positioned very near the soil surface.

At planting, set the tree in the ground so that it will be growing at the same level or slightly higher than the level it was growing at in the nursery. For bare-root and container-grown stock, dig a hole that is 1 foot wider and 6 inches deeper than the root mass. Put a 6-inch mound of soil in the hole and set the tree on the mound. For balled and burlapped stock, the hole should be slightly less deep than the ball and 1 foot wider. Carefully distribute the roots so that they are directed to grow outwardly, thus diminishing the chances of a girdling root. Roots that may eventually girdle the trunk should be cut off at transplanting.

Because the tree is not planted deeply, it probably will require staking for a time after transplanting. Support the tree by driving stakes along opposite sides of the tree. Fasten straps *loosely* around the stakes and trunk. Allow enough slack so the tree can move somewhat in the wind. Remove supports after a year.

Mulching the tree, preferably with composted bark, should encourage shallow root formation, reduce the moisture stress, and protect the bark from mechanical or physical injury.

Young maples are very susceptible to winter sun scald. For protection, wrap the trunk with tree wrap paper or strips of burlap. For the first two years, wrap the trunks of young maples in the fall to protect them from winter sun scald injury. Remove the wrapping each spring.

For more information about establishing new trees, see Extension publication *Selecting, Planting, and Caring for Your Shade Tree* (A3067).

### Treating the diseased maple

No control measures have been developed to treat trees already showing decline symptoms. However, the following suggestions may help to reduce the stresses on diseased trees:

- a. If trees are not showing severe decline, fertilizing and watering during dry periods may restore tree vigor and delay further spread of the cankers.
- b. Remove the soil from the root collar area. If practical, leave the area exposed. The chances of attack by soil-borne pathogens probably are greatly increased when soil contacts the tree trunk rather than just the root system. It may help to replace the soil with composted hardwood bark. Research in other states indicates that such material suppresses the activity of these fungi on other ornamentals.
- c. If serious girdling roots are found, surgically remove them. Although research in Michigan has shown that removing girdling roots from Norway maples has not improved tree condition, recovery seems very unlikely if deep girdles are left intact. If you do try this strategy, be aware that several roots may be involved. Be sure to remove all girdling roots.



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