A2414

Deciduous trees disorder: Miscellaneous causes of decline

G.L. WORF and J.E. KUNTZ

Sunscald

Rapid temperature changes occurring during sunny but very cold weather in late winter may cause the bark of young trees to loosen and split as tissue expands and contracts. The bark splits on the south or west side of the tree and, in severe cases, can result in death of the tree during the next few years. Leaves of badly damaged trees typically have a reddish cast the following summer and may drop prematurely. Young silver maples are especially susceptible to this condition.

Field examination is necessary to diagnose sunscald.

Wrapping young trees with sisal kraft paper, burlap or other materials in the fall may help prevent sunscald. Reflective materials such as foil have been shown to work even better than paper and burlap wraps to reduce extreme temperature fluctuations. Temperature extremes may also be reduced by planting trees so they lean slightly to the southwest.

When sunscald does occur, trim off loose bark to hasten surface drying but be careful not to damage the sound tissue. Tree wound compounds will not protect the wounds nor speed up recovery. However, fertilizing and watering the tree may hasten callus tissue formation.

Girdling roots

Sometimes the growth of other entangling roots may restrict main buttress roots and cause serious tree decline. Some girdling is common, but if the roots entwine deeply into the trunk the tree can die from self-strangulation. Frequently, it is necessary to remove some of the surface soil around the tree to determine whether a root girdling problem exists.

A plant disease diagnostic laboratory cannot help identify this problem.

It is important to prevent any conditions that promote root girdling. First, prepare sufficiently large transplant holes whose edges are not compacted, such as those that occur when auger excavations are made. Remove any roots on transplants that appear as though they might grow toward the trunk. Avoid twisting the root system while transplanting, and plant shallow.

Sunscald caused the bark of this tree to split.

Girdling roots growing across the trunk will eventually strangle this tree.

You may be able to remove embedded roots successfully from younger trees, but this rarely saves older trees showing decline. It is not uncommon to find additional girdling roots below those that are removed.

Mower injury

Lawn mowers kill trees by bruising or opening wounds near the soil line. If the physical girdling does not destroy the tree directly, secondary organisms, like fungi, may enter through the open wounds and eventually kill the tree. Young trees are particularly vulnerable, but older trees also can be damaged, especially in parks and other areas where heavy power mowers bruise or cut into the thick protective bark.

Instruct mower operators to avoid wounding trees. Protect young trees from physical damage. Mulching around the tree to prevent grass from growing near the trunk will reduce the chance of injury since mowers do not need to come close.

Mower damage caused the wounds that killed this tree.

Severe defoliation in previous years

Tree vigor is severely strained if a tree loses many leaves and is forced to re-foliate without opportunity to replace the reserve sugars used in the process. This condition has occurred in Wisconsin forests following repeated insect defoliations. For example, "maple blight" killed many sugar maples of various sizes and ages.

Similarly, newly transplanted trees, especially larger trees, can be severely set back and even killed if late spring frosts kill newly formed leaves and insufficient food reserves are present to force replacement buds.

Diagnosis can best be made by examining the condition of the buds, checking the growth rate of the branches in the previous year or two, and determining the tree's history of treatment and stresses during the preceding years.

Prevent heavy defoliation by leaf-feeding insects. A maple whose vigor has been severely weakened by critical leaf loss during the previous growing seasons should be given extra care during the recuperative period. If the tree has not been fertilized in recent years, this probably should be done. Water the tree thoroughly during dry periods and protect it from additional stresses such as leaf insects and diseases, or root injury from soil fill and compaction.

Repeated insect defoliation weakened this maple tree, leading to crown dieback.

Graft incompatibility

Ornamental trees are often grafted on the rootstock of other species and incompatibility occasionally develops between the stock and scion. Such incompatibility can result in the decline and death of the tree with no distinguishing external symptoms. In order to diagnose this disorder it is necessary to examine the graft union. A better diagnosis can be made if the union can be dissected (see photo). However, in many instances, considerable growth dysfunction is evident at the union site.

Trees suffering from graft incompatibility may decline slowly or die quickly. It is not known how often graft incompatibility may be the cause of "unknown" maple decline. While not a common problem, the possibility of graft incompatibility should be considered if no other cause for decline can be found.

There is no treatment for a tree affected by this condition.

Twine and tree wrap girdling

Many trees die, even 10 years after transplanting, from nursery twine or wraps that were not removed when they were planted. Trees may show slow or quick decline when the girdled condition becomes severe enough, or when root development is sufficiently inhibited. Aboveground symptoms mimic those caused by other problems.

Diagnosis is made by excavating and finding evidence of such girdling.

This cross-section of the graft union from a red maple tree reveals incompatibility between the rootstock (scion) and the aboveground portion of the tree.

Gas injury

Serious gas leaks emanating from underground gas utility pipes can damage trees. At one time the use of manufactured gas was rather common, but conversion to natural gas has substantially reduced the incidence of gas injury.

Manufactured gas contains ethylene, cyanogen compounds, hydrocyanic acid, ammonia, and other substances toxic to plants. Natural gas causes no direct injury to vegetation but does cause loss of oxygen in the soil, which is vital to continued root function. The soil oxygen supply is used up by methane-consuming bacteria, leaving large amounts of carbon dioxide in its place. Gassed soil frequently becomes dry, which also contributes to root degeneration. After a gas leak is repaired, oxygen consumption by methane bacteria is slowly reduced, and conditions again become favorable for root growth.

Trees injured by gas may decline slowly or die rapidly depending on the size of the leak; when it occurred (summer is more serious than winter); soil type (heavier soils are more severely affected); and the amount of paving about the tree's roots.

Similar symptoms of gas injury may appear on other vegetation in the immediate vicinity. Deep-rooted plants usually are more likely to be injured. In any case, **call your gas utility company**. These firms have equipment that can detect minute quantities of gas in the soil to determine if a leak exists. Submitting a plant or soil specimen to a disease diagnostician or soils laboratory is of little value in determining gas injury to trees.

After a gas leak is repaired, determine the degree of injury to a tree and its chances of recovery. Seriously injured trees that have lost all leaves or that have been damaged over a period of time probably will not survive. Less severely injured trees may respond to ventilation channels and compressed air treatments in the root area to increase the oxygen supply. Timely watering and fertilizing may also help.

If an examination of the buds and cambium indicates some life remaining, it may be worthwhile to wait a year before deciding whether to remove a valuable older tree.

Authors: G.L. Worf is emeritus professor of plant pathology and James E. Kuntz is emeritus professor of plant pathology and forestry, College of Agricultural and Life Sciences, University of Wisconsin-Madison and University of Wisconsin-Extension, Cooperative Extension. Produced by Cooperative Extension Publishing, University of Wisconsin-Extension.

University of Wisconsin-Extension, Cooperative Extension, in cooperation with the U.S. Department of Agriculture and Wisconsin counties, publishes this information to further the purpose of the May 8 and June 30, 1914 Acts of Congress; and provides equal opportunities and affirmative action in employment and programming. If you need this material in an alternative format, contact the Office of Equal Opportunity and Diversity Programs or call Cooperative Extension Publishing at 608-262-8076.

This publication is available from your Wisconsin county Extension office or from Cooperative Extension Publishing. To order, call toll free 877-WIS-PUBS (947-7827) or visit **cecommerce.uwex.edu**.

A2414 Deciduous Trees Disorder: Miscellaneous Causes of Decline R-04-86