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Leaf Scorch and Winter Drying of Woody Ornamentals

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Leaf Scorch

Leaf scorch may occur on any species of tree or shrub. This foliar symptom indicates that not enough water is reaching the leaves. Leaf scorch is generally not infectious; however, a bacterial infection has been associated with leaf scorch in some trees.

Symptoms

Leaf scorch of deciduous woody ornamentals, such as maple or oak, may begin as a yellowing between the veins or along the leaf margins. As the problem becomes increasingly severe, the affected tissue dies, dries out and turns brown (See picture above and Figure 1). Frequently, browning may occur without any previous yellowing symptoms.

When needled evergreens like pine are affected, they turn brown at the needle tips. As the problem continues, the browning may progress down the needle.

Leaf scorch may occur on one branch, on one side of the plant or over the entire plant. Often the symptoms are most prominent on the upper branches. Premature defoliation may occur in severe cases and, if moisture stress continues over several seasons, small twigs and branches in the upper crown may die back. Later, larger branches may also die.

Bacterial scorch (Figure 2) may differ from noninfectious scorch in several ways:

- scorch symptoms appear late in the growing season,
- the dead tissue along the leaf edge may have an undulating pattern,
- dead tissues are often separated from green, healthy tissue by a narrow yellow band,
- premature leaf drop may occur,
- affected leaves may curl abnormally,
- infected trees often show symptoms for several consecutive years before finally declining noticeably.

Causes

Leaf scorch occurs when water is lost from the leaves faster than it can be replaced from. the soil.

If a tree does not have enough water, the deficit will first show up in the part of the leaf furthest from the veins, because veins are the source of the leaf s water. As a result, areas between the veins and edges of the leaves may dry up while the tissue nearest the veins remains alive.

Figure 1. Marginal leaf scorch on linden.

Figure 2. Bacterial scorch of pin oak.

Leaf scorch has many possible causes since any factor which interferes with the plant's taking up water or moving it to different areas within the plant can cause a water deficit in the leaves. Some conditions which may lead to leaf scorch are described on the next page.

Drought

Leaf scorch may be associated with a lack of soil moisture due to drought. In this case, there just is not enough water available to replace the moisture lost through the leaves.

Hot weather

Even when adequate soil moisture is present, leaf scorch may occur during hot, sunny weather, especially when these conditions are accompanied by hot, drying winds. A sudden spell of windy, hot weather immediately after a long wet, cloudy period can lead to scorch.

Soil-related problems

Plants growing in shallow soils that overlie rock or a hard pan are likely to show scorching. Soils that are heavy, poorly drained or compacted lack enough oxygen to maintain a healthy root system. Roots literally suffocate in these conditions.

In addition, soils can be too well-drained (light, sandy soils). If they do not retain moisture, they need more frequent deep watering to prevent drought-¬related scorch problems.

Previous stresses

Adverse weather conditions (drought, wet weather, etc.) may damage root systems and predispose trees and shrubs to further stresses. Resulting problems can continue over many years. Secondary organisms may also invade these damaged roots, compounding the problem.

Physical injury to the roots

The construction of buildings, sidewalks, patios and driveways, and trenching for utility lines cause root loss, disrupting the tree or shrub's water supply. The severely damaged root system cannot absorb enough water to meet the foliage's needs. Changes in grade can also injure roots.

Pavement over roots

Layers of asphalt or concrete over root systems prevent enough water from reaching them. New paved surfaces over established root systems not only reduce water penetration into the soil, but also can suffocate existing roots, making water uptake impossible. Paved surfaces around existing plants reduce the moisture and oxygen available to the root system.

Changes in grade

Whenever soil is added to or removed from the root zone of an established tree or shrub, injury can occur.

Heat build-up

Heat reflection from buildings and paved surfaces can lead to leaf scorch problems. Only the parts of the plant directly exposed to heat build-up are likely to be affected.

Excess salts

Deicing salts used to remove ice from streets, sidewalks and driveways can kill roots when the salts wash into the root zone. Leaves of salt-damaged plants may scorch after leafing out in the spring. Excess fertilizer applied to the root zone can also injure the roots.

Gas leaks

Oxygen is forced out of the soil when an underground gas leak occurs. Roots suffocate because they can't get enough oxygen.

Transplant shock

Improper transplant techniques and/or poor follow-up maintenance can damage roots, which in turn can cause scorch symptoms on the foliage.

Physical injury to the trunk

Injury from lawn mowers, string trimmers and construction equipment can result in partial or complete girdling of the trunk.

Girdling roots

When the tree's own roots either fully or partially girdle the trunk, water cannot easily travel to the leaves.

Root diseases

Fungal root rots cause root losses which keep the plant from taking up enough water to meet its needs.

Cankers

Large cankers can result in the girdling of branches and/or the trunk and thus restrict the flow of water to the foliage.

Vascular diseases

Wilt diseases such as Verticillium wilt and Dutch Elm Disease disrupt water conduction through the vascular system. The initial wilt symptoms associated with these diseases may he followed by scorch.

Bacterial scorch disease

The bacterium Xylella fastidiosa has been widely associated with scorch symptoms on elm, oak, sycamore, maple and mulberry. The organism is also referred to as a fastidious xylem inhabiting bacterium (FXIB) and may he carried by leafhoppers.

Control

1. Try to determine the underlying reasons for the problem and, if possible, correct them. If you need to move a newly placed plant to a better site, this effort is worthwhile.
2. Water thoroughly during dry periods. Woody plants not receiving one inch of rainfall per week may need supplemental watering, especially newly transplanted trees and shrubs. Mature. moisture stressed woody ornamentals may also require supplemental watering. Water over several hours using a soaker hose to direct water into the root zone.
3. Avoid fertilizing until the moisture-related problem is resolved Then, apply a complete fertilizer in the fall to promote new roots and foliage.
4. Use mulch around the base of young trees and shrubs to help conserve soil moisture.

Winter Drying

Broadleaf evergreens and needled evergreens are subject to a winter condition similar to leaf scorch. This condition is called winter drying. Rhododendron, magnolia and pine are the Kentucky plants commonly affected.

Symptoms

Affected leaves dry out and turn brown along the margins and at the tips (Figure 3). Often the foliage droops and the plant has an overall wilted appearance. Winter drying may also lead to the dieback of twigs. These symptoms may not become apparent until late winter or early spring.

Cause

Evergreens lose moisture from their leaves all winter, with greater losses on windy, sunny days. The plant must replace any water lost through the leaves by water from the roots. However, when the soil is frozen, the plant cannot get any moisture. In essence, then, this leads to drought-like conditions and leaf scorch results. Winter drying is more likely on sensitive plant species exposed to direct sun and drying winds.

Control

1. Place sensitive plant species in protected locations in the landscape.
2. Continue to water plants, as needed, into the late fall.
3. Mulch around the base of the plants to help conserve soil moisture. A layer of mulch can also help prevent complete freezing of the soil in the root zone.
4. Wrap susceptible plants in burlap to protect them from drying winds.

Figure 3. Winter drying of rhododendron leaves.

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