



LEAF SCORCH OF WOODY PLANTS

Leaf scorch is a widespread noninfectious disease or disorder that may occur on any species of tree or shrub. Woody plants commonly affected in Illinois are listed in Table 1. Scorch is most common following prolonged periods of dry, windy weather or bright sunshine when the roots are unable to supply water to the foliage as rapidly as it is lost through the leaves by transpiration. Injury also is most common where plants are growing in an unfavorable location, such as in sandy or gravelly soil, near obstructions or pavement that restricts the area for root growth, or on an exposed windy slope. In fact, leaf scorch may occur each year in such unfavorable locations, or when injury to a part of the root system is permanent and severe, regardless of weather, adequate soil moisture, or other conditions.

In mild cases of leaf scorch, the leaves remain attached, and little damage results. In more severe cases, plants may drop many of their leaves prematurely, although such plants do not die. Where leaf scorch occurs each year, such perennial stress will gradually weaken the plant, making it more susceptible to opportunistic pathogens, to attack by secondary insects, to injury by severe winter weather, and to other environmental problems.

Symptoms

Scorch usually develops on broad-leaved plants as an irregular yellowing, browning, or bronzing of tissues between the veins or along the margins and tips of leaves (Figures 1 and 2). These leaf areas are the last to receive water from the roots; therefore, they are the first to show scorch symptoms. All the leaves on a branch are generally more or less uniformly affected. As the season progresses, affected leaves may turn entirely brown and wither. If scorch is severe, shoots may die back, and the foliage may appear black and burnt. The most severe symptoms appear when scorch occurs as tender new leaves emerge from the bud in early spring.



Figure 1. Leaf scorch on red oak (D.F. Schoeneweiss).



Figure 2. Leaf scorch on maple (W.E. Clark photo).

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Narrow-leaved evergreens, such as arborvitae, fir, hemlock, pine, spruce, and yew, express leaf scorch as a brown or purple brown discoloration of the needle tips. When scorch is severe, half or all of a needle may turn brown. Scorch injury on narrow-leaved evergreens may result from hot, dry weather in summer or from strong, dry winds when the soil is frozen. Symptoms may not become apparent for a month or longer after initial injury occurs.

The position of the leaves most severely affected by scorch can often be used to distinguish this disorder from such infectious diseases as leaf spot, blight, or anthracnose. Scorch-damaged leaves are usually most abundant on the side of a tree or shrub that is exposed to prevailing winds and excessive sunlight. Leaves blighted from fungus infection are usually scattered throughout the top and are usually most infected on the lower, more densely shaded parts. In addition, the majority of foliar infections caused by fungi occur under warm, moist conditions.

CAUSES

Leaf scorch may be induced by internal physiological disturbances; a nutrient deficiency; transplant shock; fastidious xylem-inhabiting bacteria; unfavorable weather conditions, such as low temperatures, high winds during cold or hot weather, excess water or drought; girdling roots; soil area too restricted for good growth or a paved surface over the roots; shallow, compacted, or poor soils; a change in the soil grade or an altered water table; toxic concentrations of one or more chemicals (e.g., deicing salt, fertilizer, or pesticide); air pollutants; root destruction from nearby construction work (e.g., from constructing buildings, digging utility trenches, or installing curbs or sidewalks); heavy infestations of sucking or boring insects; nematode, insect, or rodent damage to the roots; a diseased root system; wood rot; wilt disease; and large girdling cankers.

CONTROL

Scorch is usually less severe on trees and shrubs well adapted to the area. Any practice that promotes root development and improves general plant health will aid in reducing leaf scorch. Although the affected leaves will always show symptoms, new foliar growth may escape scorching if the control measures outlined below are followed.

1. Woody plants should be planted in a fertile, well-drained soil at the same depth the plants grew in the nursery and with an adequate supply of organic matter. The planting hole should be dug two to three feet wider and a foot deeper than the root ball to prevent crowding. Avoid planting shock by pruning back branches by about one-third if this was not already done at the nursery.
2. Thoroughly water plants low in vigor, especially during periods of drought. The soil should be moist to a depth of 10 to 12 inches following irrigation. It is critical to supply at least an inch of water per week (900 gallons for a 30- by 50-foot area) to recently transplanted trees and shrubs during dry periods. A slow soaking of the soil is usually most effective. Feeding lances or needles are a convenient means of soaking the soil around the roots.
3. Fertilize woody plants based on a soil test and the directions printed on the fertilizer container. The soil pH, available phosphorus (P_1), potash, and micronutrients should be adjusted to optimal levels for plant growth. Nitrogen should be applied annually based on the area to be fertilized, the type of plant, and the diameter of the trunk. Usually it is best to fertilize in early spring or late fall.

4. Prune the tops of plants with restricted or reduced root systems to (a) reduce the amount of water that must be supplied by the roots and (b) obtain a better balance between top and roots. Light general pruning of deciduous trees and shrubs is recommended to help reduce the total foliage load that must be supported by the root system. Dead, dying, crossing and interfering branches should also be removed.
5. Where the soil is heavy and compacted, some improvement will result from mechanically loosening the surface layers of soil or from inserting a series of upright agricultural tiles, which will permit water to penetrate more rapidly and in greater amounts.
6. The installation of drain tiles also will be beneficial where scorch results from the inability of roots to absorb water because of excessively wet soils, or where the roots are buried by a soil fill. Serious root damage caused by deep or compacted fill soil cannot be corrected.
7. Leaf scorch in very valuable trees – especially broad-leaved evergreens – can be prevented, or at least reduced, by spraying the foliage with an antitranspirant before the regular summer or winter "scorching period" is expected. Carefully follow manufacturer's directions when using any product.
8. The browning and drying of evergreen foliage in winter can be avoided to some extent by watering the trees and shrubs thoroughly during summer droughts and in late autumn and by adding several inches of an organic mulch (e.g., sawdust, wood chips or shavings, salt hay, ground corncobs, pine needles, or oak leaves) over the root zone after watering. In winter, the mulch will prevent deep freezing or alternate freezing and thawing of the soil; in hot weather, the mulch will keep the soil cool.
9. Small evergreen trees and shrubs growing in exposed locations, especially broad-leaved plants, can be protected from direct sunlight and drying winds during the winter months by erecting a lath, cheesecloth, canvas, or burlap screen. Place the screen two feet away from the plant on the south and southwest sides. Better still, grow these plants in a more protected location.
10. Scorch due to exposure from such things as excessive fertilizer, deicing salt, herbicide, dog urine, trash fires, leaking sewer or gas mains, girdling roots or strangling wires, vehicle exhaust, and heat reflected from buildings or pavement can be prevented only by removing or avoiding the specific cause or causes.
11. Avoid root injury when digging near trees and shrubs. When roots must be cut, reduce top growth to obtain the proper top-to-roots ratio.
12. Check for root, trunk, or branch diseases – especially large cankers, a vascular wilt, or root rot. All of these diseases can produce leaf scorch symptoms. Removal of a limb or the entire plant may be necessary.

Table 1. Woody Plants Grown in Illinois That Are Commonly Affected by Leaf Scorch

Alder	Golden-chain	Plane tree, London
Almond	Gooseberry	Plum
Apple	Hackberry	Poplar
Arborvitae	Hawthorn	Privet
Ash	Hemlock	Quince
Aspen	Hickory	Quince, flowering
Barberry	Holly	Redbud
Basswood	Honeylocust	Redwood, dawn
Beautybush	Honeysuckle	Rhododendron or Azalea
Beech	Hop hornbeam	Rose
Birch	Hornbeam	Russian olive
Blueberry	Horse chestnut or Buckeye	Sassafras
Boxelder	Hydrangea	Serviceberry
Boxwood	Juniper	Siberian pea tree
Buckthorn	Katsura tree	Smoke tree
Buttonbush	Larch	Snowberry
Catalpa	Lilac	Sour gum
Cedar	Linden	Sourwood
Cherry	Locust, black	Spirea
Coffee tree, Kentucky	Magnolia	Spruce
Cork tree, Amur	Mahonia	Sumac
Cotoneaster	Maple	Sweet gum
Cottonwood	Mimosa or Judas tree	Sycamore
Crabapple	Mock orange	Tree of heaven
Cranberry bush	Mountain ash	Tulip tree
Currant	Mulberry	Virginia creeper
Dogwood	Ninebark	Walnut
Douglas fir	Oak	Wayfaring tree
Elderberry	Pagoda tree, Japanese	Willow
Elm	Peach	Wisteria
Fir	Pear	Witch hazel
Firethorn	Pecan	Yew
Forsythia	Pine	Zelkova
Ginkgo		