



The Most Livable
City in America



Leaf scorch caused by drought stress on dogwood
Robert L. Anderson, USDA Forest Service, www.ipmimages.org

Trees and Drought

Identification and Management

Trees require four resources to live: 1) sunlight 2) carbon dioxide 3) nutrients 4) water. Water drives all the processes within a tree from photosynthesis to root growth and nutrient uptake. As trees grow they invest energy in creating a root system that will support them in times when water is a scarce commodity. In urban landscapes we often create situations where the trees' natural drought resistance is damaged or is circumvented. In these situations trees can be irreparably damaged by a lack of water.

Conditions that create drought susceptible trees:

- Construction that disrupts an established root system
- Soil compaction that damages an established root system
- Soil compaction that prevents new root proliferation
- Removal of organic materials that shade and retain soil moisture
- Irrigation that over waters trees, inhibiting tree root production
- Reducing watering schedules during drought periods
- Planting turfgrass and/or perennials immediately adjacent to trees
- Cold winters without adequate snow cover



Prolonged drought will cause twig and branch dieback.

In Minnesota drought conditions tend to occur in three and four year cycles. While trees can survive initial drought conditions, prolonged periods of drought will stress trees making them susceptible to insects and diseases.

Insects that attack drought stressed trees:

- Bronze birch borer on all birch species
- Two-lined chestnut borer on all oak species
- Flatheaded apple tree borer on flowering crabapples and pears
- Conifer bark beetles on pine, larch, and spruce
- Ash and lilac borer on all lilac and ash trees



Drought symptoms on evergreens include browning needles from the tip inward
Photo by Mary Concklin

Management of Trees for Drought Conditions

As with most tree problems, the best management strategy is to prevent trees from becoming susceptible to drought. Roots will grow where resources are plentiful. Water at the drip-line of the tree to increase root proliferation and drought tolerance.

Newly Planted Trees:

It is important to reduce compaction of the soils and create an opportunity for roots to grow beyond the planting hole and root ball. It is also important to reduce the competition for water with other plants, primarily turfgrasses.

- Dig the planting hole to twice the size of the root ball.
- Remove turfgrass and other plants from at least three feet on either side of the tree trunk.
- Apply 2 inches of prescription organic matter around base of tree up to 5 times the width of the planting hole. *Do not* mound against the trunk.
- Irrigation
 - ◇ Water tree with a soaker hose wrapped outside the far edge of the planting hole for two hours every other day for two months after planting and during drought conditions for spring plantings.
 - ◇ Set irrigation system to 2" water on an every other day schedule through the first summer. Cut back to 1" second year after planting (same every other day schedule).
 - ◇ Use a standard garden hose set to a trickle of 2" per hour just outside the edge of the planting hole and move it to each quadrant of the tree for one hour over a period of three days for two months or during drought conditions.
 - ◆ Measure rate using a tuna can and ruler
 - ◆ Drought is < 2" rainfall per week

Mature Trees:

It is important not to disrupt the root system that has been established by the tree. If construction damage or root damage is inevitable, everything possible must be done to preserve the remaining roots. Protective programs should be used to promote the continued growth of these roots and to minimize damage of drought stress.

- Remove at least five feet of turf grass from around the base of tree trunk.
- Apply 2 inches of prescription organic matter around trunk, covering area where turfgrass was removed. *Do not* mound against trunk.
- Apply Cambistat treatment prior to any root damage by construction, this will encourage root growth.
- Use rough cut wood chips to reduce compaction damage from construction equipment.
- Irrigate trees with a soaker hose, garden hose, or irrigation system during drought conditions.
 - ◇ Water 2" per quadrant at least 5 feet from tree trunk twice a week
 - ◇ Measure water using a measuring can and ruler or a rain gauge
- Treat mature trees with systemic insecticide to prevent insect attack and damage.

An integrated approach

When caring for urban trees it is important to make a complete evaluation of all environmental conditions to accurately diagnose all stress factors and prescribe care based on specific circumstances. This prescriptive care will help your tree meet its full potential.



Urban Forestry Institute
11571 K-Tel Drive
Minneapolis, MN 55343



952-252-0552

www.stpaul.gov

www.urbanforestryinstitute.org



651-632-5129



The Most Livable
City in America