

Denver Forestry Division Fact Sheet

Call 720-913-0651 for assistance

Trees and Drought

Prolonged drought causes damage to the root systems of trees. The majority of the absorbing roots are in the top 12" of soil, are very sensitive to drying out, and are the first part of the root system to be affected. When the absorbing roots die, the leaves cannot get enough water to function. In addition to root damage, water stress affects the number of leaves in the buds set for the following season. Water stress also invites borer, beetle and mite infestation.

Symptoms of water stress will not generally show up until the damage has been done. Some damage may not show up until one or two years later. Symptoms include: wilting, yellowing of leaves, leaf scorch-brown and dry areas, premature leaf drop, cracking of the bark on young trees, twig and branch dieback in more severe cases. Needles on evergreen trees will brown from the tip inward. They will also shed more needles in fall than in years with sufficient moisture. Under prolonged drought conditions, trees will show a general thinning of the canopy, and twig and branch dieback. Called defensive dieback, it is the effort of the tree to compensate for root loss.

Tree Planting Guidelines during Drought

Trees benefit our community in numerous ways. In addition to providing beauty, they cool our homes and streets, reduce heating and cooling costs, sequester carbon, filter air pollution, reduce storm water run-off, and provide food and habitat for wildlife.

Before planting trees during a drought, it's important to understand not only the benefits of trees, but also the challenges with keeping them alive and healthy during times of watering restrictions. The following guidelines should be reviewed and evaluated as you consider tree planting at this time:

- Newly planted two-inch trees require approximately 20 gallons of water each week during the growing season (April-October) and the same amount every two to three weeks during the dormant season (November-March) to provide adequate moisture.
- Watering restriction during drought will most likely allow only for hand watering of trees.
- It's important to plant the right tree in the right place. Consider planting xeric trees and make sure there is adequate room for the tree to grow to maturity. Check planting guidelines and permit requirements prior to planting on the public right-of-way. Information regarding permits (which are required for planting along the public right-of-way) can be obtained by calling 720-913-0651.
- Additional guidelines can be found on the Community Tree Alliance (a coalition of forestry and tree care professionals) at www.watersaver.org.
- Proper planting is essential. Many trees are planted too deeply. Refer to proper planting guidelines to increase your chances of a successful transplant.
- Amending the soil with compost improves soil texture and retains soil moisture. Amend the backfill at a ratio of one part compost to three parts native soil.
- Mulch placed at a depth of four inches over the root zone will also help to conserve valuable soil moisture. Mulch is readily available at no cost. Refer to above websites for additional information.

Helping Your Trees Survive Drought

Colorado experiences drought often. When choosing between watering a lawn and a large tree, keep in mind that a lawn can be replaced in a season by sodding, while a large tree will take decades to replace. Trees add a significant value to a home landscape.

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Wilting is an early symptom of water stress. If the tree doesn't recover by morning, it has reached its permanent wilting point. If it stays in this state for a prolonged period without receiving moisture, it will cause permanent damage, and possibly death. It can also cause trees to turn color and drop their leaves early if drought is severe and prolonged.

As a general guideline, most landscape plants, including trees, require approximately 1-1½" of water per week. Newly planted trees will require special attention as they reestablish their root system, as drought stress can cause dieback. In a drought situation, water not only the rootball of the tree, but also the soil surrounding it. Otherwise, the dry native soil will pull the moisture out of the rootball.

It's best to apply the water in one thorough, deep soaking. The soil should be moist to a depth of 12-18". Watch the watering in clay soils-it should be applied at a low rate. Clay cannot absorb water at a high rate and excess will runoff and be wasted, instead of going where the roots need it. Frequent, light waterings only promote the growth of shallow roots that are easily damaged by drought stress.

Deep soakings encourage deeper root growth. One of the most efficient methods is to use a soaker hose. Coil the hose around the tree base, out in a circular pattern. Start about 2-3 ft out from the trunk, and go out to approximately 5 ft beyond the tree's dripline. Water for several hours.

A good method for watering new trees is the basin method. Build up a soil berm around the perimeter of the root ball. This will hold the water in while it drains into the soil. Fill the basin with water and allow it to drain. Repeat twice (or more if needed) until the rootball and soil are thoroughly moistened.

Adding a 3-4" layer of mulch around trees will be very beneficial. Organic mulches are the best choice, as they will add nutrients back into the soil as they decompose. Mulch will help conserve moisture, and cut down on weed and grass competition. This is especially important for new trees, but established ones will also benefit from having weeds and grass pulled away from them, and replaced with mulch. Keep the mulch a few inches away from the base of the trunk itself. The moisture against the trunk base (root crown) can cause disease problems, as well as keeping oxygen away.

Trees that are drought stressed should not be fertilized. Fertilizer can cause further damage to the sensitive absorbing roots. There is some evidence that applications of mycorrhizae fungi (a soil treatment available through tree services) can be beneficial by aiding the roots in absorption.

Watering Trees During a Drought

- Because the root system is 2 - 3 times wider than the height of the tree and no deeper than two feet below the surface, watering wide around the tree is advised.
- Water deeply, slowly and consistently. This will help develop deeper root systems.
- For new trees, which have been in the ground for one to five years, concentrate watering the planting area and the mulch ring, soaking both. Then, lay the hose at the outer edge of the mulch ring, moving it around the edge in 4-6 different areas. Fifty to 75 gallons of water is the minimum amount necessary every 10-14 days.
- For established trees, water the area directly under the branches to the dripline. Larger trees will need a minimum of 175-250 gallons every 10-14 days.
- Mulch trees to the dripline to conserve moisture. Lay down mulch three to four inches deep with a 6" space between the mulch and trunk of trees.
- Water during the winter when the temperatures are 40 degrees or above.

