

# Mulching Landscape Trees



Mulches are materials placed over the soil surface to enhance landscape beauty, improve soil conditions, protect plants from foot traffic and lawn equipment, and suppress weeds. Mulches can also improve soil structure and fertility. This is important in urban landscapes where soils are often compacted and lack organic matter, especially on new construction sites.

Mulching mimics the natural environment found in forests where leaves and branches blanket the soil surface, replenishing nutrients as they decompose and creating an ideal environment for root growth. Urban landscape trees and shrubs typically grow in much harsher environments with soils modified by human activities (e.g., construction, lawns, and compaction). A 2- to 4-inch layer of mulch can re-create aspects of a forest's soil environment. According to the International Society of Arboriculture, mulching, when done correctly, is one of the most beneficial practices a homeowner can do for the health of a tree or shrub.

Mulches are available in two major forms, organic and inorganic. Tree care professionals prefer organic mulches, such as wood chips, pine needles, hardwood and softwood bark, cocoa hulls, leaves, and compost mixes, since they decompose, improving soil structure and increasing soil fertility. The various organic mulches decompose at different rates and require periodic reapplication. Inorganic mulches, such as gravel, stone chips, river rock, and rubber, do not provide the same benefits as organic mulches as they do not decompose.

The benefits of proper mulching include the following:

- Conserves soil moisture by increasing water infiltration and slowing evaporation

- Improves soil structure, fertility, and aeration as it decomposes
- Moderates soil temperature, protecting roots from extreme summer and winter temperatures
- Eliminates potential tree damage from mowers and trimmers
- Prevents soil compaction by reducing foot and vehicle traffic, allowing roots to “breathe”
- Impedes growth of weeds and grass that compete with tree roots for water and nutrients



*Inorganic mulches, such as this stone, do not provide the same benefits as organic mulches like bark and wood chips*

The benefits of mulching are well documented. However, excessive or improperly applied mulch can adversely affect plants. The International Society of Arboriculture advises to apply mulch properly; if it is too deep, piled against the trunk of the tree, or the wrong material, it can cause significant harm to trees.



## PROPER MULCHING METHOD

- Organic mulches are preferable due to their soil-enhancing qualities. Hardwood bark makes very good, inexpensive mulch, especially when it contains a blend of bark, wood, and leaves.
- Mulch can be applied to landscape trees at just about any time of the year. However, the best time to apply mulch is in the middle of spring, once soil temperatures have warmed enough for root growth to begin.
- Mulch as much of the area as possible, preferably to the outermost edge of the tree's canopy, referred to as the "drip line." Keep in mind, the drip line moves out as the tree grows.
- Apply a 2- to 4-inch layer of organic mulch and no more; use less if the soil is poorly drained. More than 4 inches may harm the tree's root system. If using finely textured or double-shredded mulch, use 1 to 2 inches since these materials allow less oxygen through to the root zone.
- For tree health, keep all mulch material away from the trunk. Allow the root flare (where the trunk meets the soil) to show. The root flare is at or near the ground line and is identifiable as a marked swelling of the tree's trunk where roots begin to extend outward.



*This is a properly mulched tree. Note the mulch is only a few inches deep, not mounded around the trunk. The root flare is visible and the mulch extends to the edge of the tree's crown, or the drip line.*

### Other tips:

- Finely shredded mulches decompose faster and require replenishing more often.
- Before replenishing the mulch each season, check the depth. Some old mulch may need to be removed before adding a new layer.
- Applying new mulch over old mulch in successive years is the same as applying too deep a layer all at once.
- The appearance of old mulch can be "refreshed" by breaking up any matted layers by hand or with a rake.



*On newly planted trees, mulch more than just the root ball. The goal is to promote root development away from the tree. Mulch wide, not deep.*

## AVOID OVERMULCHING

Overmulching landscape trees is common. This is most obvious when mulch extends up the trunk, smothering the root flare and root zone. This practice, known as "volcano" mulching, is never recommended and should not be utilized. As beneficial as mulch is, too much mulch is harmful. Deep mulch may suppress weeds, but it wastes time and money and can cause major health problems that lead to tree decline and possibly death.



*Avoid piling mulch in the appearance of a volcano cone around trees. Volcano mulching, or piling mulch against the trunk, can cause major tree health problems.*

### Problems Associated with Overmulching

- **Oxygen starvation and root suffocation.** Tree roots need oxygen to grow and function properly. When too much mulch covers the soil surface, air may not penetrate the mulch layer and the underlying soil becomes depleted of oxygen. In addition, excessively deep mulch can inhibit water loss through evaporation. Once soil pore spaces become filled with water, diffusion of oxygen into the soil is essentially blocked. When soil oxygen levels drop too low, root growth declines, making it impossible for the plant to take up water and nutrients. Plant death may result if too many roots decline.

- **Inner bark death.** The inner bark, also called the phloem, carries photosynthates produced by the leaves to the rest of the tree. When mulch covers the root flare and trunk tissues, they stay constantly wet. This tissue is much different from root tissue and cannot survive under these conditions. Continuous moisture also interferes with respiration by limiting gas (oxygen and carbon dioxide) exchange between living cells in the trunk and the atmosphere. If wet conditions continue long enough, phloem tissue dies and roots are starved of essential carbohydrates.
- **Disease.** Most fungal and bacterial diseases require moisture to grow and reproduce. Over-mulching creates conditions where trunk diseases can gain entry through constantly wet, decaying bark, especially if there are trunk wounds under the mulch. Once established, these plant pathogens can cause fungal cankers and root rots. Cankers caused by these diseases can encircle the tree, killing the inner bark, ultimately starving the roots, and possibly killing the tree.
- **Insects.** Mulch piled against the trunk favors moisture-loving insects, such as carpenter ants and termites, which could colonize and expand decayed areas of the trunk.
- **Rodent damage.** Voles and mice may tunnel under deep layers of mulch for shelter. These pests may gnaw on the nutritious inner bark of young trees, girdling the stem. If girdling is extensive, tree death may result. This often goes unnoticed until the following spring when the tree doesn't leaf out.
- **Excessive heat.** Similar to composting, thick layers of wet mulch may heat up once decomposition begins. Temperatures within mulch piles may reach as high as 140 degrees. This high heat may directly kill the inner bark/phloem of young trees or delay the natural hardening-off period that plants must go through in preparation for winter.

### Correcting Overmulched Trees

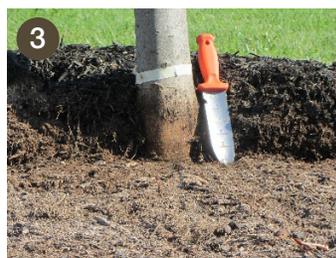
If you believe you have a problem with overmulched trees, carefully dig with a hand trowel to assess mulch depth. Remember, 2 to 4 inches of mulch is sufficient on well-drained soils, less on poorly drained soils. A light raking of existing mulch may be all that is necessary to freshen old mulch and break through the crusted or compacted layers that can develop.

If mulch is piled against the trunk of the tree, visually look for the presence of the root flare where the tree meets the soil line. If the flare is buried, it is essential to uncover it. Begin by carefully pulling mulch back from the tree's trunk until the root flare is exposed, taking care not to damage the bark. A good rule of thumb is

to pull mulch 3 to 5 inches away from young trees and 8 to 10 inches away from mature trees. Spread excess mulch evenly out to the tree's drip line, checking to ensure the depth does not exceed 4 inches. Research has shown that most trees respond rapidly with improved color and vigor once the root flare is exposed and excess mulch is redistributed.

Included here is a series of photos showing where excessive mulch was pulled back from the trunk of a young red maple and redistributed to the tree's drip line. No mulch was removed from the site; it was simply spread out to the proper depth and kept from directly touching the tree's trunk. It is important to note that the amount of mulch used to create the mulch "volcano" was sufficient to properly mulch the tree.

**A word of caution:** you may want to consult with a certified arborist before proceeding with any root flare excavations. Trees are often planted too deep and may have the root flare buried under soil rather than just excess mulch.



- 1) Excessively mulched tree with mulch piled against trunk.
- 2) Hand trowel used to pull mulch back and redistribute.
- 3) Tape marking the original depth of the mulch.
- 4) Excess mulch spread evenly, 2-4 inches deep, out to tree's drip line.
- 5) Mulch pulled back from trunk, exposing the root flare.
- 6) Tree properly mulched using the same amount of mulch.

## SUMMARY

- **Mulch out, not up!** Mulch no deeper than the heel of your hand, generally 2 to 4 inches. Mulch less if soil is poorly drained or you are using finely textured mulch.
- **Back off from the trunk!** Keep all mulch away from the trunk of the tree, allowing the root flare to show just above ground level.
- **Mulch to the tree's drip line, if possible!** Remember, the drip line moves out as the tree grows.
- **Go organic!** Arborists recommend using organic mulches. They provide tree health benefits as they decompose.
- **Keep the trunk dry and the roots moist!**

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*Photos courtesy of David R. Jackson.*

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