



Using Arborist Wood Chips as Landscape Mulch

WASHINGTON STATE UNIVERSITY EXTENSION FACT SHEET • FS160E

Landscape mulches are important components of environmentally sustainable gardens and landscapes. Unlike soil amendments, mulches are simply materials laid on top of the soil rather than worked into it. Select the right mulch and you reap the benefits of healthier soils and plants; chose the wrong mulch and the only plants that thrive are the weeds. This fact sheet teaches home gardeners how to use arborist wood chip mulches in their landscapes.

Benefits of Arborist Wood Chips

In areas where trees are a dominant feature of the landscape, arborist wood chips are one of the best mulch choices for trees and shrubs. Studies have found wood chips to be one of the best performers in terms of moisture retention, temperature moderation, weed control, and sustainability. In many urban areas, arborist wood chips are available free of charge (Figure 1), making them one of the most economically practical choices.

Unlike uniformly textured sawdust and bark mulches (Figure 2a), arborist wood chips include bark, wood, and often leaves (Figure 2b). The chemical and physical diversity of these materials resists the compaction often

found in sawdust and bark mulches. Additionally, the materials vary in their size and decomposition rate, creating a more diverse environment that houses a diversity of microbes, insects and other organisms.



Figure 1. Arborist wood chips are often available free of charge.



Figure 2a. Bark mulch. Figure 2b. Arborist wood chips create a diverse environment for plants.

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A biologically diverse soil community is more resistant to environmental disturbance and will in turn support a diverse and healthy plant population.

Wood chips are considered to be slow decomposers, as their tissues are rich in lignin, suberin, tannins, and other complex natural compounds. Thus, wood chips supply nutrients slowly to the system; at the same time they absorb significant amounts of water that is slowly released to the soil. It is not surprising that wood chips have been cited as superior mulches for enhanced plant productivity. Wood chips have been especially effective in helping establish trees and native plants in urban and disturbed environments.

Arborist wood chips provide substantial weed control in ornamental landscapes (Figure 3). The mechanism(s) by which wood chips prevent weed growth are not fully understood, but likely includes light reduction (preventing germination of some seeds and reducing photosynthetic ability of buried leaves), allelopathy (inhibiting seed germination), and reduced nitrogen levels at the soil-mulch interface (reducing seedling survival).



Figure 3. Few weeds can survive in correctly applied wood chip mulches.

While there are imported wood mulches available for purchase at nurseries and home improvement centers, they are not as cost-effective as locally produced wood chips, which are often free. In a society where using locally produced materials are increasingly popular as a measure of sustainability, arborist wood chips are a natural choice. Finally, the reuse of plant materials as mulches keeps them out of the landfill – a benefit with both economic and environmental attributes.

Frequently Asked Questions About Arborist Wood Chips

Q: Will woody mulch acidify my soils?

A: No. In field situations it is difficult to significantly alter soil pH without the addition of chemicals. Temporary changes in pH may be found in the decomposing mulch

layer itself, but these have little effect on underlying soils. Significant changes in soil pH can only occur after decades or centuries of mulch use.

Q: Don't woody mulches, like cedar, leach allelopathic chemicals that kill other plants?

A: No. Many living, growing woody plants contain allelopathic chemicals, which can prevent seeds from germinating or kill young seedlings. Most compounds have no effect upon established plants. Cedars (*Thuja* spp.) have not been found to have this ability. Even *Juglans nigra* (black walnut), the best known allelopathic species, has not been shown to have negative effects when wood chips are used as a mulch.

Q: Will mulches made from diseased trees infect healthy trees?

A: No. Most studies indicate that diseased mulch cannot transmit pathogens to the roots of healthy trees. Under no circumstances should wood mulch be worked into the soil as an amendment: not only is this a poor planting practice, but increases the likelihood of disease transfer. Using diseased wood chips as a soil amendment puts them into close proximity to roots where subsequent tissue injury or environmental stress could lead to infection.

Fungal communities found in wood chip mulches are generally decomposers, not pathogens. Under healthy soil conditions, beneficial and harmless fungi (Figure 4) can outcompete pathogens for space on plant roots that grow into mulch layers. Furthermore, healthy plants are not susceptible to opportunistic pathogens such as *Armillaria* and *Phytophthora*, which are widespread, but inactive in well-managed soils.



Figure 4. Fungal hyphae in a wood chip mulch.

Q: Aren't wood chips a fire hazard?

A: No. Coarse textured organic mulches, like wood chips, are the least flammable of the organic mulches. Fine textured mulches are more likely to combust (Figure 5), and rubber mulch is the most hazardous of all tested landscape mulches. If organic mulches are kept moist, they are less



Figure 5. Fine textured mulch like sawdust holds very little water and burns easily.

likely to catch fire. If you use flamers for weed control in areas near wood chips, be sure to soak the mulched area first.

Q: Won't wood chip mulches tie up nitrogen and cause nutrient deficiencies in plants?

A: No. Many studies have demonstrated that over time woody mulch materials will increase nutrient levels in soils and/or associated plant foliage (Figure 6). However, there is a nitrogen deficiency at the boundary between the mulch and soil, which probably inhibits weed seed germination.



Figure 6. Plants mulched with wood chips do not have nitrogen deficiencies.

Q: Will woody mulches attract termites, carpenter ants, and other pests?

A: No. Many wood-based mulches are not attractive to pest insects but are actually insect repellent. For instance,

cedar (*Thuja*) species produce thujone, which repels clothes moths, cockroaches, termites, carpet beetles, Argentine ants, and odorous house ants. In general, termites prefer higher nutrient woody materials such as cardboard, rather than wood chips.

Action List for Using Arborist Wood Chip Mulches in the Landscape

Begin mulch application before annual weeds are established. Mulch is most effective in suppressing weeds before weed seeds germinate. Therefore, bare soil should be mulched as soon as practical, especially in the spring and fall when weed seed germination is at its peak. If this is not possible, the most effective, non-chemical way to remove weeds prior to mulching is to mow them as close to the ground as possible, followed immediately by mulching.

Prune or mow perennial weeds at the root crown.

This is best done in early spring when root resources are lowest; generally just as leaf growth begins (Figure 7). Extensive pulling of perennial weeds from unprotected soil is not recommended, as this disturbance will destroy soil structure and increase erosion, especially in sandy soils or in sloped areas. It is better to keep unprotected soil undisturbed. However, you can pull resprouting perennial weeds in landscaped areas covered in mulch; the mulch layer prevents erosion and facilitates pulling.



Figure 7. Mowing undesirable plants before mulching keeps soils undisturbed and reduces regrowth.

Remove particularly aggressive weeds from the site. Weeds that easily go to seed or can reroot themselves after they've been dislodged should be composted or disposed with green waste materials.

Add a thin underlayer of mulch. Before installing wood chips for the first time, create a thin underlying layer of a more nutrient-rich mulch (like compost, Figure 8) if there are concerns about nutrient deficiencies. This "mulch sandwich" approach is a logical one that mimics what you would see in the mulch layer of a forest ecosystem. It's not required, though, and over time a wood chip mulch will develop this same structure as the lower layers break down.



Figure 8. A layer of compost underneath coarse wood chips adds extra nutrients.

Use fresh chips unless there are still concerns about disease. Some of the nutrient value (particularly nitrogen, if the chips contain leaves or needles) will be lost in the composting process. Using fresh chips ensures that some of the foliar nitrogen will feed the landscape rather than the compost pile.

Install chips to the desired depth. A successful wood chip mulch must be deep enough to suppress weeds and promote healthy soils and plants: research has demonstrated that weed control is directly linked to mulch depth, as is enhanced plant performance. A review of the research on coarse organic mulches and weed control reveals that shallow mulch layers will enhance, rather than prevent weed growth (Figure 9). All plants, including weeds, respond positively to the benefits of organic mulches, particularly the increase in soil water retention. Wood chips maintained at a depth of 4 to 6 inches will control weeds without detracting from appearances.

Keep mulch away from trunks of trees and shrubs. Piling mulch against the trunks of shrubs and trees creates



Figure 9. When mulch layers are too thin, weeds will grow rapidly.

a dark, moist, low oxygen environment to which above-ground tissues are not adapted. Fungal diseases require a moist environment to grow and reproduce; piling mulch on the trunk provides exactly the right conditions for fungi to enter the plant. Likewise, opportunistic pests are more likely to invade a plant whose bark is wet due to excessive mulching. Rather than creating mulch volcanoes (Figure 10), instead, taper the mulch down to nearly nothing as you approach the trunk. This donut-shaped application will protect the soil environment as well as the above-ground plant tissues.



Figure 10. Mulch volcanoes may enhance pest and disease problems.

Keep mulch away from building foundations.

Although wood chips do not attract termites or other pests, they and other mulches can act as a bridge allowing pest insects to enter houses and garages. Maintain a narrow strip of bare soil next to the foundation to prevent infestations.

Reapply mulch as needed to maintain desired depth; replacement rate will depend on decomposition rate. Once mulch is applied, little management needs to be done other than reapplication to maintain minimum depth. High traffic areas are most likely to need replacement.

Further Reading

Bell, N., D.M. Sullivan, and T. Cook. 2009. Mulching woody ornamentals with organic materials. Oregon State University EC1629-E. <http://ir.library.oregonstate.edu/xmlui/bitstream/handle/1957/19900/ec1629-e.pdf>.

Chalker-Scott, L. 2007. Impact of mulches on landscape plants and the environment – a review. *Journal of Environmental Horticulture* 25(4): 239-249.



By **Linda Chalker Scott**, Washington State University Puyallup Research and Extension Center.

This publication has been adapted with permission from *Arborist Wood Chip Mulches – Landscape Boon or Bane?* Chalker-Scott, L. 2007. *MasterGardener Magazine* 1(3): 21-23.

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FS160E

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