

Mulching the Landscape

Anne M. Streich, Associate Professor of Practice
Zac J. Reicher, Extension Turfgrass Specialist
Kim A. Todd, Extension Landscape Specialist



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One of the best and simplest ways to protect plants and soils in the landscape is to apply mulch. All mulches, whether organic (living source) or inorganic (non-living source) do the following:

- insulate plants and plant roots from the effects of extreme temperature fluctuations;
- reduce winter injury by minimizing temperature variation and keeping plants from heaving out of the soil;
- help maintain cooler soil temperatures during summer;
- reduce water loss through evaporation and help maintain even soil moisture;
- protect exposed roots, tree trunks, and landscape plants from damage by lawn mowers and string trimmers;
- reduce soil compaction caused by people and equipment by diverting traffic around landscape beds;
- provide walking surfaces that allow water and air movement and reduce mud;
- reduce erosion, especially on steep slopes and in highly erodible soils;
- reduce transfer of soilborne diseases by protecting aboveground plant parts from splashes;
- reduce rot by eliminating contact between fruits and vegetables and the soil;
- help control weeds.

Whether organic or inorganic, mulches must allow water and air to enter and exit the soil. They should be economical, attractive, relatively odor free, readily available, and stay in place. Mulches are available bagged or in bulk.

Applying Mulches

When applying mulches, application timing, frequency and methods, mulch depth and location, and type of mulch should be considered.

- **Time of application.** Newly installed plants should be mulched as soon as possible. Refreshing or topdressing existing mulch is often done in early spring before emerging foliage makes it more difficult to reach soil under plants. Early spring application of mulch will keep the soil cool, which may benefit cool-season vegetables and flowers but may delay growth or installation of other plants until soil temperatures warm up. Late season organic mulches are applied after at least two hard freezes. Applying mulch earlier in the fall will insulate the soil and keep plants from hardening off. Late season mulching is especially important for recently installed plants to prevent frost heaving — the freezing and

thawing action of the soil that may push plants out of the ground. Evergreens, especially broadleaf evergreens, need to be well-watered and mulched before winter because the leaves will continue to lose moisture throughout the winter. Perennial plants with shallow crowns, such as heucheras, also benefit from a late season mulch, as do strawberries and roses.

- **Application frequency.** Inorganic mulches may need to be replenished when they work their way into the soil, leaving exposed ground. Organic mulches must be replaced on a regular basis as they break down. Rake mulched areas to check the condition and depth before remulching. Raking will also break up naturally occurring water-shedding layers of organic mulches. Water the underlying soil thoroughly before applying new mulch or topdressing existing areas. Organic mulches can be spread by shaking the mulch through a



Figure 1. When possible, include plants in mulched beds rather than creating many individual mulched rings close together.

manure fork or by dumping bagged mulch and spreading it with a rake. Watering organic mulches after installation will increase their ability to hold together and minimize movement during heavy rainfalls or gusty winds.

- **Mulch depth and placement.** The correct depth of mulch to use depends on the type of soil, plants, and the mulch itself. The general recommendation is to apply mulch in an even layer 2 to 4 inches thick around woody plants, and 1 to 2 inches thick around annual and perennial flowers, and vegetables. Layers thinner than the recommended depths may need to be replenished more often and may provide fewer benefits. Very thick layers may reduce the amount of soil oxygen and encourage plants to root in the mulch rather than in the soil. This is particularly problematic in heavy clay and clay loam soils, and in wet conditions. Thick layers also may mat down, especially if the mulch is fine-textured, shedding water, and preventing it from moving into the soil.

The mulch ring or bed line should extend well beyond the root ball or spread of the plant (*Figure 1*). When mulching individual trees or shrubs, imagine a shallow saucer with the plant in the center and a slightly raised edge or lip, which will help hold moisture. Never apply mulch against the bark of trees or shrubs, or over the crowns of annuals and perennials (*Figure 2*). When using mulch next to a building, apply it below the top of the concrete foundation (*Figure 3*). Mulch piled against wood or siding can cause mold or structural insect problems.

- **Types of mulch.** For good plant health, organic mulches are generally preferred over inorganic mulches. Some mulches are used for specific applications while others have many uses. Organic and inorganic mulch types are described in the following paragraphs.



Figure 2. Mistakenly creating a “volcano” by placing mulch in a cone around the tree trunk may encourage insect and disease problems on thin-barked trees such as maples. It also may provide protected access for small rodents and other animals, which can severely injure the bark and cambium.

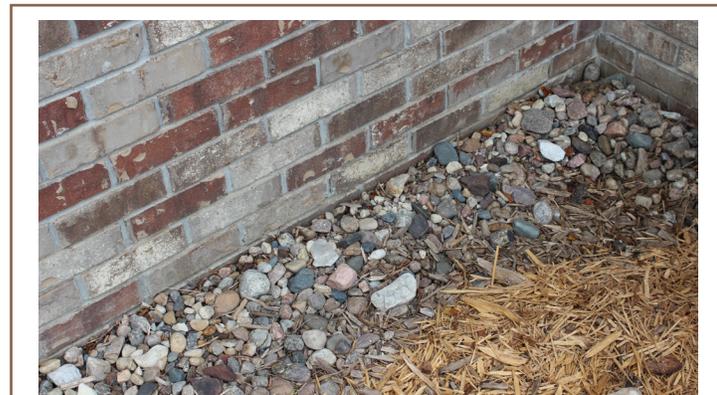


Figure 3. If organic mulch is being used for plant health and appearance next to the home, consider a 1 foot wide band of inorganic mulch against the foundation to deter termites and other pests. Although wood mulch does not usually attract termites, it can provide an access route to the home for an existing termite population.

Organic Mulches

Organic mulches are derived from plants and include wood chips, shredded or chunked bark, pine needles, grass clippings, leaves, straw, and sawdust. Local suppliers may have unique organic mulches that are byproducts of other operations, such as soybean hulls, corncobs, or shredded alfalfa. Organic mulches break down over time, add organic matter to the soil, and improve soil structure. In sandy soils, this may increase water-holding capacity. In clay

soils this can improve water drainage. Small amounts of organic mulches may be incorporated into the soil when beds are renovated or removed. However, nitrogen may need to be added at that time to prevent nitrogen deficiency in plants as microbes break down the carbon-rich mulch. Some consumers do not like organic mulches because of their tendency to move out of landscape beds and because they need to be regularly refreshed or replaced.

- **Wood chips and shredded hardwood.** Wood chips and shredded



Figure 4. Mulch of a single type of wood, such as pine, cedar, or cypress, is most often available bagged. Bags are easy to handle, and the mulch may be free of weeds due to high temperatures in the bags during shipping. Bagged mulch is often more expensive than bulk mulch.



Figure 5. Bulk mulch is typically of mixed species, and may include trees removed due to storm damage or recycled Christmas trees. Bulk mulch may be free in many cities or as a service of power companies and parks departments.



Figure 6. Coarse bark wood chips, bulk hardwood mulch, and finely chipped hardwood mulch offer homeowners different options for appearance in the landscape.

hardwood can be produced from the bark and branches of almost any type of tree or recycled wood pallets (Figures 4-6). Wood chips are typically flattened and slightly rounded, and range in size from 1 inch to 4 inches. Shredded hardwood mulch may be almost stringy in appearance. Depending on the process used, the texture of shredded hardwood mulch can be very fine to coarse, with individual pieces 6 inches or more in length. High quality wood mulch may need only a light topdressing each year, with full replacement being necessary after two to four years depending on the use of the area.

Both bagged and bulk mulches are available in many colors. Homeowners also can purchase spray dyes specifically formulated to recolor existing mulches without producing toxins. These dyes are created from vegetable and water-based dyes and natural pigments in coal and iron.

- **Pine straw.** Pine straw is a uniform color and texture, and adds fragrance to a landscape (Figure 7). It decomposes slowly, requiring less frequent topdressing, and does not reduce soil pH quickly. It is easy to refresh by raking, although thick layers may mat down. Pine straw is used extensively in southern states. It is becoming more widely available throughout the country in either bales or bags.
- **Corncoobs, soybean, and alfalfa mulch.** Chopped corncoobs are generally weed free, lightweight, and easy to handle. They decompose very slowly and can be used around perennials, trees, and shrubs. They can be dyed various colors to match other landscape features. Corn-cob mulch is not widely available. Mulches made from the chopped stems and plant debris following harvest of soybeans and alfalfa show promise for adding nutrients to the soil when they decompose. These products are available on a limited basis.
- **Grass clippings.** Grass clippings are typically used in annual and

perennial beds and vegetable gardens but not around woody plants. Only clippings from a well-managed and relatively weed-free turf should be used. Most herbicide labels prevent using clippings of a herbicide treated lawn as a mulch for up to a year after application. Grass clippings should be dried before use as mulch (Figure 8). Fresh grass clippings are high in water and nitrogen and will readily ferment. The heat and ammonia that is released from fermentation can damage plants.

- **Leaves.** Leaves are readily available and are commonly used in annual and perennial beds and vegetable gardens. They should be shredded and partially decomposed before placing around plants. As with grass clippings, thick layers of leaves may mat down and interfere with water and air movement. Leaf mulches should not exceed 1 inch in depth. Leaves can be incorporated into the soil at the end of the season.
- **Straw and prairie hay.** Straw mulch is unattractive and as a result is primarily used for short-term projects such as seeding turfgrass areas and in vegetable gardens (Figure 9). It conserves soil moisture, limits erosion, and allows the emergence of small seedlings. High quality prairie hay has a finer texture and a less obvious appearance. It may be filled with the seeds of other prairie plants. It is less widely available than straw, and more expensive.

Straw mulches are used regularly in vegetable gardens to keep vegetables and fruit from touching the soil, where diseases and insect pests can affect fruit quality. Wheat straw easily germinates, creating competition with the garden plants. Straw also blows in strong winds, and if laid too thickly, can mat down and shed water. Avoid using straw as a winter mulch as mice and other small rodents may overwinter in it.

- **Sawdust.** Sawdust is readily available in some locations but does not make a good landscape mulch. It breaks down slowly and tends



Figure 7. Let naturally occurring pine needle drop create a mulch or use bailed pine needle mulch to get a similar look.



Figure 8. Grass clippings should be applied in layers no thicker than one inch and should be periodically raked throughout the growing season to reduce matting. Thicker layers will impede water and air movement in and out of the soil.



Figure 9. Straw will decompose quickly; however, some straw mulch contains high levels of weed seed that may germinate and compete with the desired plants.



Figure 10. Rock is available in an almost infinite range of colors, sizes, and shapes.

to cake together, causing water to shed rather than soak into the soil. Additionally, sawdust mulch can cause nitrogen deficiency in desired plants since it's high carbon:nitrogen ratio ties up soil nitrogen during the degradation process. If used, sawdust should be aged one year and applied in a layer no more than 1 inch thick.

- **Newspapers and cardboard.** While not used by themselves, newspapers and cardboard can be the base layer under more attractive and permanent mulches. Newspapers should be laid in thick layers to suppress weeds.

Inorganic Mulches

Inorganic mulches are materials that are produced from nonliving sources and include both mineral and synthetic products. Inorganic mulches rarely break down, or they break down slowly. Rock is the primary inorganic mulch used by homeowners. Rock comes in a variety of sizes, shapes, and colors, including round river rock, lava rock, quartz, granite, gravel or shale chips, and fines. Rubber mulches are becoming more widely available in shredded or chunked form or held together with a binder as a mat or ring.

Many consumers prefer inorganic mulches since they do not break down quickly and only need to be replenished if they work down into the soil. Rock

mulches also may be more stable in wind and rain; however, fine rubber mulch will float in water and/or blow off-site with wind. Inorganic mulches can be difficult to remove when beds are renovated or eliminated. Inorganic mulches will increase reflective heat and soil temperatures. As a result, it may be uncomfortable to spend time in landscapes or view them on sunny days, and increased temperatures may damage plants. When covered with inorganic mulch, soil in landscape beds warms up earlier in the year, which can cause plants to break dormancy and become vulnerable to low-temperature injury.

- **Rock.** Rock mulches increase temperatures around plants, resulting in higher levels of plant stress and greater vulnerability to insect and disease problems. Rock mulches may increase the temperature in outdoor living areas, impacting air conditioning in adjacent buildings. Reflectivity and glare can be issues if light-colored rock is used. Rock is heavy to transport and move. Rock mulch also can become dangerous projectiles thrown by mowers, landscape equipment, and children. Rock mulches are a good choice under downspouts and in dry streambeds and rain gardens to help manage stormwater by slowing the flow and reducing soil erosion.

Use rock with angular shapes to in locations where rolling or shifting may occur. Very large rock creates a visual texture that can detract

from the landscape. Very fine rock, such as decomposed granite chips, can be rolled and packed to create a smooth walking surface adjacent to landscape beds. Rock is available in bags or in bulk (Figure 10).

- **Rubber.** Shredded rubber is a product generated primarily from recycled car tires. Shredded rubber mulch is also combined with a binder and formed into rings and squares that can be placed around trees or laid like tile. Shredded rubber mulches have become widely available for use in home landscape beds, in a range of colors from black to pink to blue. Initial research has shown that toxic materials can leach from rubber as it degrades, potentially adversely affecting plant growth. Shredded rubber also exhibits hazardous fire characteristics. Use of shredded rubber as a landscape mulch is limited and not widely recommended.

Fabrics and Plastics

Although not technically considered mulches, landscape fabrics and plastics are often used as a barrier between the soil and mulches.

- **Landscape fabric.** Landscape fabric is typically a black, woven fabric perforated with small holes to allow air, water, and nutrients — and the seeds of weeds — to move into the soil. Landscape fabric is most often used as liner beneath other mulches and helps prevent movement of inorganic mulches into the soil. The integrity of the fabric is compromised when it is cut to install plants. As organic mulches break down on top of landscape fabric, compost is developed, creating an ideal situation for the germination of weed seeds. Organic mulches used on top of fabric on sloped areas often slide off into adjacent areas. Landscape fabric may inhibit the growth of some rhizomatous and stoloniferous plants. In addition, perennial weeds, such as nut-sedge and dandelions, often have enough energy to push through



Figure 11. Perennial weeds can grow through landscape fabric and seeds of annual weeds that blow into a landscape can easily germinate in mulch placed above landscape fabric.



Figure 12. Landscape fabric is a management challenge when beds contain spreading herbaceous plants. Their root systems will become intertwined with the fabric making it difficult to lift and divide them.

the fabric (Figure 11). Roots often become intertwined with the fabric, causing difficulties when transplanting (Figure 12). Landscape fabrics are not recommended for most settings, although they do prevent rock mulches from working their way into the soil.

- **Plastic.** Plastic is available in different thicknesses and colors. Black plastic can increase soil temperatures by 5°F or more and effectively control most weeds because light cannot reach the seedlings. Clear plastic can increase soil temperatures 10°F or more. Clear plastic is used in warmer climates to pasteurize soils (solarization) prior to planting. It takes 45 to 60 days of solarization for soil to reach high enough temperatures to destroy weed seed and pests. Plastic may be used in early spring gardens to increase soil

temperatures and extend the growing season or to help ripen fruit. Tomatoes and strawberries are crops that may benefit from increased early soil temperatures. Plastic inhibits weed growth but will also inhibit growth of desirable plants. It restricts the movement of air, water, and nutrients to and from the soil. This can result in extremely dry or wet soil conditions, both of which are detrimental to plant health. Plastic is not recommended in landscape beds.

Herbicide Use and Mulches

Although consistent management of mulched areas may often be the only tool necessary for weed control, herbicides can be used in conjunction with organic and inorganic mulches.

Soils in landscape beds typically warm up faster than soil under turf. As a result, many summer-annual weeds such as crabgrass and prostrate spurge will germinate 10 to 14 days earlier in landscape beds than in turfgrass areas. If needed, a preemergence herbicide can be applied to landscape beds in mid-April, prior to adding mulch. Preemergence herbicides also can be applied over existing mulch. Water the herbicide into the soil by using a minimum of ½ inch of irrigation. University research has shown that combining organic mulches and herbicides provides better weed control than herbicides or organic mulches alone. Read the herbicide label to determine if a product can be safely applied to landscape plants and be sure to follow all label directions. Use caution when using herbicides in landscape beds where annuals or new plants are being established. Some herbicides may stunt root development if applied before transplants become established.

Summary

Mulches are an important component of the landscape. When applied appropriately, they conserve soil moisture, moderate soil temperatures, reduce weed populations, and enhance plant health. Select the mulch that is available, meets your budget, and is best suited for the functional and aesthetic needs of the landscape.

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