WASHINGTON STATE UNIVERSITY
EXTENSION

SOIL HEALTH

C075

GUIDE TO MULCHES

Mulches are materials that are applied to the surface of the soil. They are intended to remain on the surface and differ from soil amendments which are intended to be incorporated into the soil. Some materials can be used as both mulch and a soil amendment, such as finished compost. Cover crops and plants used as ground covers are sometimes referred to as "living mulches," and are covered in separate WSU Spokane County Extension publications.

Adding organic or rock mulch to gardens can be a quick way to beautify landscapes. Mulches provide much more than beauty, however. The primary benefits of most applications are conserving water, suppressing weed growth, and evening out soil temperature extremes. Organic mulch can also add nutrients. In addition, many mulches can decrease soil surface crusting, protect plants from soil-born infections, slow or prevent erosion, and protect the trunks of trees and shrubs from damage by lawn equipment. There are several more benefits from spreading mulch that depend upon the type of mulch used, the time of year it was spread, and the area where it was applied.

Mulch comes in many forms, from shredded bark and straw to decomposed granite and river rock. There are advantages and drawbacks to each type. **Organic mulche**s are made from materials that once were alive. They include bark, compost, arborist chips, shredded leaves, dried grass clippings, pine needles, evergreen boughs, other plant material, and certain manures. **Mineral or inorganic mulches** include all varieties of landscape rock and gravel. **Synthetic mulches** include plastic sheeting, woven landscape fabric, rubber mats, and shredded tires. Although rubber mats and tires contain some natural organic rubber, we are classifying them as synthetic because they contain more than 6o percent synthetic rubber made from petroleum-derived hydrocarbons.

There is not one perfect mulch. But understanding the attributes of different materials can help you choose the best material for a particular purpose and location.

Organic mulches

Organic mulches are the best choice if the gardener wants to increase soil organic matter, improve soil structure, and provide food for important soil-dwelling organisms. An important consideration when choosing an organic mulch is whether the desired outcome is for seasonal or annual benefit. Winter mulches are used primarily as insulation for woody landscape plants and to protect the bare winter soil in vegetable and annual gardens from crusting, wind and water erosion, and disease suppression. Summer mulches are normally applied in vegetable or annual gardens after the soil begins to warm in the spring. They are applied for the three primary benefits mentioned previously — retaining water, reducing weed growth, and moderating soil temperatures. Non-seasonal organic mulches are usually replaced every one to two years depending upon which of several material options are chosen.

Organic mulches should be spread 6" away from the trunk of trees out to the drip line if possible, and never piled up like a volcano touching the trunk. This practice, while popular in many parts of the country, invites insect and rodent damage.

Mineral or inorganic mulches

Mineral or inorganic mulches, such as rock and gravel, are considered permanent installations and are best used around foundation plants. A drawback with most rocks is that they reflect solar radiation and can cause a very hot landscape environment during the summer months.

Synthetic mulches

Synthetic mulches, including plastic sheeting and landscape fabric, have improved over the last few years and are often used in commercial agricultural and horticultural production. These products are not, however, generally recommended by WSU Extension for home use.

The amount of mulch to apply depends on the texture and density of the mulch material. The smaller the particles the less depth should be applied. Excessive amounts of fine-textured mulches can suffocate plant roots.

MULCH MATERIALS — ORGANIC

Compost: Use 1 to 3 inches in vegetable gardens and flower, and shrub beds. Homemade compost is best because you can control the composting process for a weed-free and disease-free finished product. However, this only works if the home composter is vigilant about proper composting processes. Homemade compost gives gardeners the added benefit that nutrients from their own yards are recycled back into their own soil. It also avoids the hassle and expense of transporting and disposing of garden "wastes." Compost can vary significantly in nutrient content, however.

Bagged steer manure: This product can be spread 1 to 2 inches on the garden much the same way as compost. Nutrients in bagged manures vary widely and will not be listed on the bag unless it is being sold as a fertilizer. Over-application of manure can cause a build-up of soil salts.

Arborist wood chips: WSU professor Linda Chalker-Scott has done extensive research on the benefits of using arborist wood chips as mulch in areas where trees are a dominant feature of the landscape. Do not confuse wood chips with bark. As the name implies, arborist chips come from tree and tree limb removal and usually contain bark, wood, and leaves. Wood chips can be hardwood or softwood and are often available from municipalities, utility companies, or private arborists without charge. Arborist chips maintained at a depth of 4 to 6 inches will effectively control weeds and promote beneficial fungal growth.

Bark: A 2 to 3-inch layer of bark with the grade "chunk" usually is enough for weed suppression. They are resistant to compaction and movement by wind.

Leaves: It is best to shred the leaves coarsely, using a shredder or your lawn mower. Whole leaves have a tendency to blow away. Leaves shredded too finely can also be a problem in that they can mat and not allow water to penetrate into the soil properly. You should avoid using leaves with powdery mildew and another obvious disease. A 2 to 3-inch layer of leaves provides good weed control and leaves will add nutrients to the soil over time.

Grass clippings: The best use for grass clippings is to leave them on the lawn. They decompose rapidly, adding nutrients back into the soil. If you choose to use grass clippings for garden mulch, it is best to use dry (brown) clippings, not fresh clippings, to prevent the formation of a solid decomposing mat that can prevent water from moving through it. A 2-inch layer is usually enough to

prevent weeds as long as the clippings themselves do not contain weed seeds from the lawn. Be extra careful never to use clippings from lawns that have been treated with herbicides, including weed-and-feed type products.

Pine needles/pine straw: Up to 8 inches of pine needles can be applied if left uncut, less if applying shredded needles. Pine needles make an excellent winter mulch in the vegetable garden and as insulation around roses and other shrubs. Many gardeners prefer to shred the long needles making them easier to handle, but that can be a hassle, and leaving them long will usually work just fine. Since pine needles take decades to decompose, many gardeners rake them up in the spring and reuse them the following late fall. Pine needles do not acidify the soil as was once thought. They are lightweight, readily available in Spokane County, and almost always free if you are willing to rake and bag them. WARNING: pine needles should never be used as a summer mulch in landscapes at risk for wildfires.

Straw: Straw and hay are not the same things, but baled straw and hay can look so similar that it is sometimes hard to tell the difference from a few feet away. Straw is the stalk of wheat, Timothy, rye, oats, or barley and is used primarily as animal bedding. Apply up to 8 inches in the spring vegetable garden, especially around strawberries and other small fruit that often touch the soil. Depending upon the moisture it receives, straw can decompose quite rapidly so you may have to replenish it a couple of times during the growing season to keep the weeds down. Straw can contain grain seeds that become weeds themselves and other undesirable seeds from plants that were allowed to grow unchecked in the crop. Check with your supplier to make sure this product is okay to use as garden mulch.

Hay: Hay is a general term for dried forage crops used as feed for horses, cattle, and other livestock. Hay is also used as feed and bedding for many small animals such as rabbits and chickens. Most hay consists of either legume crops like alfalfa or clover (a good source of nitrogen), grasses, or a combination of both legumes and grasses. Some hays contain seeds that may become invasive in a home landscape. Gardeners should be careful that they understand the plant material(s) in hay products before they use this material as mulch.

Newspapers and cardboard: Newspaper and cardboard sheet mulches can be effective weed control but there are problems that should be noted. They can induce anaerobic conditions if used on wet, poorly drained soils. When wet, the layers of paper are compacted, creating an impermeable barrier to water and gas exchange. Newspaper and cardboard sheet mulches can also become hydrophobic if allowed to dry out, causing rainfall or irrigation water to sheet away rather than percolate through. This is particularly true of regions with droughty summers or well-drained soils.

MINERAL/ROCK MULCHES

Pea gravel: Pea gravel is a good material for garden paths. It is also a good choice for areas around container plants. It suppresses weed growth, retains moisture, and doesn't decompose like organic mulch.

Crushed rock/lava rock: Many people like the manicured look of rock mulch. It can be expensive but it does not need to be replaced often. It can't blow away and resists compaction. Eventually, debris can accumulate on top of the rocks and unless removed will allow weed seeds to germinate. If weeds do take hold in rock mulch it is hard to manually remove them because of the texture of the mulch. Many gardeners use leaf blowers to control unwanted debris. A more drastic measure is to apply black plastic sheets or weed fabric under the rock. We do not recommend this practice, however.

SYNTHETIC MULCHES

Black plastic: Black plastic (polyethylene) is not recommended as a mulch in home landscapes. Black plastic is impermeable, robbing plant roots and soil-dwelling organisms of vital water and oxygen. Debris can collect on top of this type of mulch allowing weeds to germinate. Another problem with this material is that it will deteriorate over time, especially if exposed to sunlight, leaving small pieces of plastic in and on the soil.

Woven weed barrier fabrics: This mulch will initially allow some minor oxygen and water exchange to the soil but will eventually become clogged and create the same issues as black plastic. Weeds easily germinate on top of the fabric and root into or through it. Both plastic and woven plastic fabrics disrupt the life cycles of many pollinators and other soil invertebrates.
Fabrics and plastic can be good choices for large-scale vegetable production where regular maintenance and replacement is easily performed. In most cases, home and urban landscapes should choose other mulch materials.

Shredded tires and rubber mats: Because these products contain more than 60 percent synthetic rubber made from petroleum-derived hydrocarbons, once ignited they burn extremely hot and are difficult to extinguish. Therefore, they should never be applied in areas at risk for wildfires. Recent research also links a toxin called 6PPD-quinone in tires to harmful aquatic pollution, especially for Coho salmon.

SOURCES AND MORE INFORMATION:

Soils, Compost, and Mulch (video), Dr. Craig Cogger talks about how to sample your home soils. This site is also a gateway to several WSU Gardening publications
http://gardening.wsu.edu/compost-and-mulch/

Gardening with Mulches — Oregon State University
https://extension.oregonstate.edu/sites/default/files/documents/12281/gardeningwithmulch.pdf

The Myth of Pretty Mulch, Bark Mulch and Sawdust — Washington State University
https://s3.wp.wsu.edu/uploads/sites/403/2015/03/bark-mulch.pdf

Types and Uses of Mulch in the Landscape — Cornell University
https://chemung.cce.cornell.edu/resources/mulch-in-the-landscape

Wood Chip Mulch — miracle, myth…or marketing. WSU Dr. Linda Chalker-Scott
https://s3.wp.wsu.edu/uploads/sites/403/2015/03/wood-chips.pdf

Colorado State University — Mulches for Home Grounds
https://extension.colostate.edu/topic-areas/yard-garden/mulches-for-home-grounds-7-214/

Tire-related chemical largely responsible for adult coho salmon deaths in urban streams
https://news.wsu.edu/press-release/2020/12/03/tire-related-chemical-largely-responsible-adult-coho-salmon-deaths-urban-streams/

The Myth of Rubberized Landscapes — WSU Dr. Linda Chalker-Scott
https://s3.wp.wsu.edu/uploads/sites/403/2015/03/rubber-mulch.pdf

Arborist Chips, WSU
https://pubs.extension.wsu.edu/using-arborist-wood-chips-as-a-landscape-mulch-home-garden-series