



Mulch Basics

What Is Mulch?

A mulch is any material, organic or inorganic, that is placed on top of the soil in a garden or landscape. Mulches are one of a gardener's most valuable tools and an essential component of low-maintenance landscapes.

Benefits of Mulches

Aside from their decorative value, mulches offer many benefits to your soil and plants. Mulch reduces the amount of water lost through evaporation by shielding the soil from the sun's drying rays. It keeps the soil cooler during the summer and acts as an insulator through the cold winter months lessening the effects of fluctuating temperatures on plant roots which in turn decreases their susceptibility to frost heaving. Organic matter is added to the soil as the mulch breaks down. Increasing the soil organic matter will improve a soil's moisture and nutrient holding capacity, structure, and drainage. Mulch also encourages the activity of beneficial soil organisms. Weed growth is suppressed by the use of a mulch as is the spread of some plant diseases. Mulched plots are less prone to erosion.

Organic Versus Inorganic

Organic mulches are derived from natural materials that decompose over time. As organic mulches decompose, they add nutrients and organic matter to the soil and beneficial microorganisms like nitrifying bacteria and mycorrhizal fungi are enhanced while undesirable pathogens - those that cause plant diseases are inhibited. Increased amounts of organic matter will improve soil tilth and drainage, increase soil moisture retention, reduce soil compaction, and attract earthworms. Because organic mulches decompose, they need to be replaced. Depending on the type of mulch used, replacement intervals vary from one to four years.

Inorganic mulches include stones, geotextile mats and landscape fabrics, and plastic mulches. Landscape fabrics and plastic mulches deteriorate with time and eventually require replacement. Inorganic mulches usually are more tedious to install and may require irrigation because water penetration may be limited. Some inorganic mulches are designed to reflect the sky to confuse and keep insects from landing on plants. Many do not have a natural appearance and are often covered by an organic mulch for decorative purposes.

General Tips for Applying Mulches

- *Do not place mulch directly against plant crowns or tree bases.* Mulch placed directly in contact with stems or tree trunks may retain excess moisture around the base of the plant that can favor the development of diseases like crown rot. Mulch piled around plants may serve as lodging for bark and stem eating rodents.
- *Mulch applied too thickly can cause problems.* A wood-derived mulch may undergo high temperature decomposition causing it to dry out. The mulch may then be colonized by fungi that create water repellent conditions throughout the mulch. Water is unable to penetrate the mulch and reach the soil and plants fail to receive adequate moisture. Mulching too deeply can also cause the soil to remain continuously wet contributing to root and stem rot problems in addition to depriving plants of needed oxygen. Apply a mulch layer no more than 1 to 3 inches thick.

- *Thoroughly water newly installed wood or bark mulches.* Many good quality mulches are stored in large piles that reach high temperatures. When the mulch is spread or bagged, the high-temperature tolerant microorganisms that inhabit the mulch die as the mulch cools. If the mulch is allowed to dry out or remain dry, nuisance fungi can colonize the mulch and create a water-repellent surface.
- *Add a source of nitrogen to garden soils before applying wood-derived mulches.* Soil microorganisms that decompose organic materials such as wood-based mulches are effective competitors for limited soil nitrogen. This may cause temporary nitrogen deficiencies especially in annual and perennial plants. Yellowing of leaves often indicates a nitrogen deficiency. Lightly incorporate a source of nitrogen such as bloodmeal, urea or a high nitrogen lawn fertilizer before applying mulch.

Types of Organic Mulches

| Mulch | Pros | Cons | Comments |
|-----------------|---|---|--|
| Shredded Bark | Keeps soil cool and moist. Readily available. Good weed control. Appropriate for ornamentals. | During especially wet years, sour mulch may be a problem. | Hardwood bark will need to be replaced more frequently than softwood bark. |
| Wood Chips | Decorative, controls weeds. | High carbon wood chips may cause a temporary nitrogen deficiency. Most appropriate for paths or under large shrubs or trees. Susceptible to Artillery fungus. | Wood waste products may be added to this type of mulch product. Sometimes they are colored. Check with your source. |
| Sawdust | Inexpensive. Slow to decompose. | Ties up nitrogen in the soil. Slow water penetration. | Let weather a few months before using. |
| Buckwheat Hulls | Good for small plants, flowers, and vegetable gardens. Very attractive. | Will blow away if placed in windy, exposed areas. Expensive. | Stays in place if kept wet and as it ages. |
| Cocoa Shells | Good for small plants, flowers, and vegetable gardens. Smells like chocolate. | Toxic to dogs. Will blow away if placed in windy, exposed areas. Expensive. May mold. | Wash away any mold that appears. Stays in place if kept wet and as it ages. |
| Hay | Great winter insulator for bulbs, vegetables and perennials. Useful in garden paths and around larger vegetables. | May contain weed seeds. Sometimes blows around when dry. Flammable. | Apply a 4 to 6-inch layer. Hay from late season cuttings is often harvested before it goes to seed. |
| Salt Marsh Hay | Good winter insulator for bulbs, vegetables, and perennials. Useful as a summer mulch. | Will blow around when dry. Flammable. Not always available. | Weed-free as seeds require salt water for germination. Sold locally at some garden centers. |
| Grass Clippings | Great use for unwanted lawn clippings. Free and contains nutrients. | Decomposes quickly. Mixing with peat moss will slow decomposition rate. Weed seeds. | Do not use clippings from herbicide and/or insecticide treated lawns. Apply a 3 to 4-inch layer. Fluff up if clippings begin to smell. |
| Pine Needles | Good for acid-loving plants. Winter mulch for strawberries. | Only available to those that have access to pine trees. | Slow decomposition rate so add organic matter to the soil before mulching if level is low. |
| Leaves | Good winter insulator. Contains a fair amount of plant nutrients. | Will blow around when dry. Maple and poplar leaves tend to pack together. | Chopped leaves do not blow around as easily and look attractive. Apply a 2 to 4-inch layer. |
| Newspaper | Excellent weed suppresser. No longer contains lead in the newsprint. | Does contain carcinogens in small amounts. Flammable when dry. | Put in vegetable garden paths and top with hay or wood chips. Use at least 2 layers. |
| Compost | Source of nutrients. Good for disease control. Improves soil and attracts earthworms. | Immature compost may cause a nutrient imbalance and/or contain high soluble salts. | Compost is ready when raw materials are decomposed and not readily recognizable. |

Types of Inorganic Mulches

| Mulch | Pros | Cons | Comments |
|---------------------------------|--|---|--|
| Stone | Low maintenance mulch. Decorative. Great for pathways. | Weeds can germinate between stones. Stones will filter into the soil over time. Difficult to incorporate amendments into soil under stones. | A layer of black plastic mulch or landscape fabric may keep stones from sinking into the soil. Keep stones from touching plants. Site may be too hot for some plants. |
| Plastic | Most useful in the vegetable garden. Warms soil. Excellent weed control. | Need irrigation system or holes punched in the plastic to allow water to reach plants and soil. | Black plastic mulch is used to warm the soil for heat-loving vegetables. White or silver plastic mulch is said to confuse insects. Red colored mulch may increase tomato yields. |
| Landscape Fabrics (Geotextiles) | Excellent weed control in vegetable garden. Useful for soil stabilization. Specially designed mats for use around trees. | Does nothing to improve the soil. Weeds may grow through upper layer. Will degrade with time. | Layer sheets over one another to prevent weeds from germinating between sheets. Can be covered with a more attractive organic mulch. |

Common Mulch Problems

Artillery Fungus

Artillery fungus (*Sphaerobolus spp.*) colonize organic matter such as wood mulch (as opposed to bark mulch). The tiny, cream or orange-brown fruiting structures are shaped like cups that contain a small black spore mass. The fungus “shoots” the spore mass into the air and it sticks to any surface it hits. The small black spots will be visible on plant leaves and/or home siding, and they are very difficult to remove. Pine or Atlantic white cedar bark nuggets are the most artillery fungus resistant. Cypress also exhibits some anti-fungal properties but it is a non-sustainable product. If wood chips/mulch are used a fresh inch applied each year may help to contain the fungal spores. Incorporating mushroom compost at a rate of 20-40% into existing or new landscape mulch beds may suppress artillery fungus. Mushroom compost is available commercially.

Slime Molds

Slime molds are bright yellow or orange slimy masses reaching a foot or more in diameter. They produce tiny spores, which eventually will dry and blow away. These molds are not a serious problem and can be considered a decorative addition to the landscape. Remove them if you find their appearance undesirable.

Sour Mulch

If a mulch smells like alcohol, vinegar, ammonia, or sulfur it is probably “sour.” The smell is created when a wood-derived mulch is piled high and the inside portion of the pile is deprived of oxygen. This causes anaerobic activity, which creates a build-up of acetic acid in the mulch. The acid build-up is toxic to plants, and if the mulch is spread on the landscape without treatment, the volatile acid will quickly cause plants to wilt and subsequently die. Sour mulch can be treated by spreading it out thinly, soaking it with water, and allowing it to dry. After a few days of airing out, the smell should be gone and the mulch is safe to spread around plants.

Recycled Wood Product Mulches

Some companies recycle discarded wood and wood-based products by shredding them and adding a coloring agent to make them appear suitable for use in the landscape. These commercially produced mulches may decompose faster than natural bark mulches and may contain undesirable substances for use in vegetable gardens and children’s play areas.

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