

## Mulch

Mulching is one of the most important ways to maintain healthy landscape plants. A mulch is any material applied to the soil surface for protection or improvement of the area covered. Mulching is really nature's idea. Nature produces large quantities of mulch all the time with fallen leaves, needles, twigs, pieces of bark, spent flower blossoms, fallen fruit and other organic material.

### BENEFITS OF MULCHING

When applied correctly, mulch has the following beneficial effects on plants and soil:

- Mulches prevent loss of water from the soil by evaporation.
- Mulches reduce the growth of weeds, when the mulch material itself is weed-free and applied deeply enough to prevent weed germination or to smother existing weeds.
- Mulches keep the soil cooler in the summer and warmer in the winter, thus maintaining a more even soil temperature.
- Mulches prevent soil splashing, which not only stops erosion but keeps soil-borne diseases from splashing up onto the plants.
- Organic mulches can improve the soil structure. As the mulch decays, the material becomes topsoil. Decaying mulch also adds nutrients to the soil.
- Mulches prevent crusting of the soil surface, thus improving the absorption and movement of water into the soil.
- Mulches prevent the trunks of trees and shrubs from damage by lawn equipment.
- Mulches help prevent soil compaction.
- Mulches can add to the beauty of the landscape by providing a cover of uniform color and interesting texture to the surface.

- Mulched plants have more roots than plants that are not mulched, because mulched plants will produce additional roots in the mulch that surrounds them.

### TYPES OF MULCHES

There are basically two types of mulches: organic and inorganic. Both types may have their place in the garden.

An organic mulch is a mulch made of natural substances such as bark, wood chips, leaves, pine needles, or grass clippings. Organic mulches attract insects, slugs, cutworms and the birds that eat them. They decompose over time and need to be replaced after several years.

Inorganic mulches, such as gravel, pebbles, black plastic and landscape fabrics, do not attract pests and they do not decompose.

### MULCH MATERIALS

**Organic Mulch Materials:** Your yard "trash" can be recycled as mulch with the advantage of retaining the nutrients found in these organic materials, in addition to saving money otherwise spent in transporting and disposing of the yard trash.

**Grass Clippings** The best use for grass clippings is to leave them on the lawn. Grass clippings will decompose rapidly, adding nutrients back into the soil. A two-inch layer of grass clippings provides weed control if they are not full of weed seeds. It is best to build up the layer gradually using dry grass, not fresh clippings, to prevent the formation of a solid mat. Be careful not to use clippings from lawns that have been treated with herbicides.

**Hay and Straw** Never use hay for mulch since it contains too many weed seeds. Straw decomposes rapidly, so you will have to replenish it to keep the weeds down. Straw is not very ornamental and is best for a vegetable garden or over newly sown lawns. Straw will improve the soil as it decays.

**Leaf Mold** Leaf mold has a tendency to form a crust, preventing water from penetrating into the soil. It is better to use leaf mold as a soil amendment than as a mulch.

**Leaves** A 2- to 3- inch layer of leaves provides good weed control. It is best to shred the leaves coarsely, using a shredder or your lawn mower. Whole leaves have a tendency to blow away, while finely shredded leaves do not allow water to penetrate. Oak and beech leaves help to acidify the soil for acid-loving plants. Leaves are usually easy to get, attractive as a mulch, and they will improve the soil once they decompose. After the leaves decompose, dig them into the soil and add a new layer of mulch on top.

**Pine Bark** A 2- to 3- inch layer of pine bark is good for weed control. Pine bark makes an attractive, usually dark-colored mulch. It can be purchased in various particle sizes, from shredded to large-sized particles, called nuggets. Large pine bark nuggets float in water and may not stay in place during a heavy rain. They may also attract termites and other insects.

**Pine Needles** A 2- inch layer of pine needles makes an excellent mulch for acid-loving trees and shrubs. This mulch is very attractive and allows water to penetrate easily.

**Shredded Hardwood Mulch** This mulch is good at suppressing weeds. It does not wash away easily. It decomposes relatively slowly, and it is very attractive.

**Wood Chips** This material contains bark and pieces of wood of various sizes and makes an attractive mulch. A 2- to 3- inch layer of wood chips provides good weed control. Small wood chips decompose very rapidly using nitrogen from the soil, which needs to be replaced by nitrogen fertilizer. Wood chips may attract termites and other insects.

**Pecan Shells** Pecan shells make a long-lasting, attractive, dark brown mulch that is effective in retaining moisture in the soil. Availability is limited to areas where pecans are processed.

**Ground Cover** Many perennial ground cover plants, such as ivy, periwinkle, pachysandra, mondo grass and liriopse, will cover the soil and act as a mulch. For more information on groundcovers, refer to HGIC 1100, *Groundcovers*.

#### **Inorganic Mulch Materials:**

**Gravel, Pebbles and Crushed Stone** These materials are permanent and are best used for permanent plantings such as foundation plants. A 1- inch layer of small rocks will provide good weed control. Do not use them around acid-loving plants since the rocks may add alkaline elements and minerals to the soil. These materials reflect solar radiation and can create a very hot landscape environment during the summer months.

**Black Plastic** Black polyethylene film is very effective in preventing weed growth. It also holds water in the soil. Therefore, plastic is not recommended for poorly-drained areas as it may cause the soil to remain too wet, which could result in root disease problems. You may have to cut holes in the plastic if water does not go through it. There is black plastic available that has small holes in it to help with drainage. If exposed to sunlight, black plastic is broken down fast, losing its effectiveness as a mulch. However, if you bury black plastic in the soil, it will last for many years. Covering the black plastic with a layer of wood chips or pine needles will reduce heat absorption and mask its artificial appearance.

**Clear Plastic** Clear plastic will not suppress weed growth because light penetrates the film and raises the soil temperature, which may result in an increased growth of weeds in early spring.

#### **Landscape Cloth or Woven Ground Cloth**

Materials woven of fabric, plastic or paper are available in various lengths and widths. The materials are treated to resist decomposition. Unlike plastic films, woven materials allow water and air to move through them. They are very effective in controlling most weeds, although some

grasses may grow up through the holes in the fabric. Landscape cloth needs to be fastened down so it will not be pushed up by perennial weeds. Better moisture, temperature and weed control will be obtained by adding several inches of another mulching material on top of the landscape cloth.

***Aluminum-coated plastic and foil*** One layer of either one of these materials provides excellent weed control. These materials decompose very slowly, but they are very expensive and quite unattractive mulches.

***Ground Rubber Tires*** Mulches made of ground rubber tires do not decompose and therefore, never need to be replaced. The use of ground rubber tires is relatively new and its effectiveness as a mulch is still being evaluated.

## **WHERE TO USE MULCH**

Mulching is a very important practice for establishing new plantings, because it helps to conserve moisture in the root ball of the new plant until the roots have grown out into the surrounding soil. The growth rate and health of trees and shrubs increases when there is no competition for water and nutrients from weeds. Mulch also helps to prevent tree trunk injury by mowers and trimmers. Newly planted trees require a circle of mulch 3 to 4 feet in diameter. Maintain this for five years. Mulch entire beds of shrubs, trees, annuals, herbaceous perennials and ground covers.

Mulch can also be used to cover trails, driveways, and play and natural areas.

Light-weight mulch such as dried grass clippings and pine straw can be used temporarily to cover low-growing tender plants to protect them from frost injury.

## **WHEN AND HOW OFTEN TO MULCH**

The best time to mulch new plantings is right after you plant them. Around established plants mulch is best applied in early spring. This is when plants are beginning to grow and before weed seeds start to germinate.

How often mulch needs to be replenished depends on the mulching material. Grass clippings and leaves decompose very fast and need to be

replenished frequently. Inorganic mulches such as gravel and pebbles rarely need replenishing. As the plants grow and fill in the bed areas, less and less mulch is needed.

## **HOW TO APPLY MULCH**

Before applying any type of mulch to an area, it is best to weed the area. Spread a layer of mulching materials over the entire plant bed. Keep mulch 2 to 3 inches away from the stems of woody plants. This will prevent decay caused by wet mulch and rodent damage during the winter. Keep mulch 6 to 12 inches away from the walls of buildings.

Subterranean termites nest in the soil and feed on materials that contain cellulose. Termite treatments are applied to the soil around buildings, so keeping mulch away from walls will prevent termites from using it as a bridge to cross treated soil.

Newly planted trees require a circle of mulch 3 to 4 feet in diameter. Maintain this for at least three years. Do not pile mulch against the trunk. For established trees in lawns create a circle of mulch about 2 feet in diameter for each inch of trunk diameter. Increase the size of the mulched area as the tree grows. Try to apply the mulch at least 6 to 12 inches beyond the drip-line of the tree. Because the root system can extend two to three times the crown spread of the tree, mulch as large an area as possible.

## **HOW DEEP TO APPLY MULCH**

The amount of mulch to apply depends on the texture and density of the mulch material. Many wood and bark mulches are composed of fine particles and should not be more than 2 to 3 inches deep. Excessive amounts of these fine-textured mulches can suffocate plant roots, resulting in yellowing of the leaves and poor growth.

Coarse-textured mulches such as pine bark nuggets allow good air movement through them and can be as deep as 4 inches.

Mulches composed of grass clippings or shredded leaves should never be deeper than 2 inches, because these materials tend to mat together, restricting the water and air supply to plant roots.

## HOW TO CALCULATE THE AMOUNT OF MULCH NEEDED

To determine how many cubic feet of mulch is needed, you need to calculate the surface area and the desired depth of coverage. There are 27 cubic feet in a cubic yard. One cubic yard will cover a 324-square-foot area with an inch of mulch. Figure out the square footage of your bed, that is the width times the length for square or rectangular shaped beds. The square footage of a circular bed is the distance from the middle of the circle to the outside, multiplied by itself and then multiplied by 3.14 (which is pi). Multiply your square footage by the depth desired (in inches) and divide by 324 square feet. This will tell you how many cubic yards you will need.

## PROBLEMS

**Mulch Toxicity:** Though mulch benefits plants, “sour” mulch can quickly damage plant tissue and lower the soil pH causing injury or death. Bedding and low-growing woody plants are most easily damaged. Symptoms include yellowing of the leaf margins, scorching or dropping of leaves and occasionally entire plant death. Although it may be several days before symptoms appear, spreading sour mulch can damage plants immediately. Sour or “acid” mulch is caused by poor handling or storing of mulch resulting in anaerobic (without air) conditions. Mulch piles need to “breathe” to prevent anaerobic conditions from occurring. In the absence of air, microbes in the mulch (mostly bacteria) produce toxic substances such as methanol, acetic acid, ammonia gas, and hydrogen sulfide gas.

Sour mulch smells like vinegar, ammonia, sulfur or silage. Good mulch smells like freshly cut wood or has the earthy smell of a good garden soil. Another way to determine if mulch is sour is to test its pH. Toxic mulch will have a pH of 1.8 to 2.5.

To prevent mulch from turning sour or to cure sour mulch, you need to turn your pile once or twice a

month, more frequently if the pile is very wet. Do not let the pile get larger than 4 feet thick in any dimension if you are not turning the pile regularly. A good aeration will eliminate the toxic compounds in 24 hours, but to be safe allow three days.

**The Artillery Fungus:** Occasionally, microorganisms in mulches can become a nuisance. The shotgun or artillery fungus (*Sphaerobolus*) may cause serious problems. While it decays the mulch, it also produces fruiting structures that resemble tiny cream or orange-brown cups that hold a spore mass resembling a tiny black egg (1/10 inch in diameter). This fungus shoots these spore masses high into the air. They stick to any surface and resemble small tar spots on leaves of plants, on cars or on the siding of homes. They are very difficult to remove. To avoid damage to cars and houses do not use mulches that contain cellulose (wood). Use pure bark mulches, especially pine, or if the mulch is already in place, cover the hardwood mulch with pine needles.

**Slime Molds:** Slime molds are another type of nuisance fungus. They first appear as bright yellow or orange slimy masses that may be several inches to a foot or more in diameter. They are harmless but unsightly. Some fungi in mulches produce toad stools (mushrooms), and some of these are toxic to humans. It is a good idea to destroy them when small children have access to the mulched area.

---

Prepared by Marjan Kluepfel, HGIC Information Specialist, and Bob Polomski, Extension Consumer Horticulturist, Clemson University.

---

This information is supplied with the understanding that no discrimination is intended and no endorsement by the Clemson University Cooperative Extension Service is implied. All recommendations are for South Carolina conditions and may not apply to other areas. Use pesticides only according to the directions on the label. All recommendations for pesticide use are for South Carolina only and were legal at the time of publication, but the status of registration and use patterns are subject to change by action of state and federal regulatory agencies. Follow all directions, precautions and restrictions that are listed. (New 4/99).

