NC STATE UNIVERSITY

College of Agriculture & Life Sciences
Department of Horticultural Science

Horticulture Information Leaflet 8608
Revised 9/00 -- Author Reviewed 9/00

MULCHING TREES AND SHRUBS

Erv Evans, Extension Associate

Mulching trees and shrubs is a good method to reduce landscape maintenance and keep plants healthy. Mulch helps conserve moisture -- 10 to 25 percent reduction in soil moisture loss from evaporation. Mulches help keep the soil well aerated by reducing soil compaction that results when raindrops hit the soil. They also reduce water runoff and soil erosion. Mulches prevent soil and possible fungi from splashing on the foliage -- thus reducing the likelihood of soil-borne diseases. They help maintain a more uniform soil temperature (warmer in the winter and cooler in the summer) and promote the growth of soil microorganisms and earth worms.

Mulches eliminate mowing around trees and shrubs and provide a physical barrier that prevents damage from lawn mowers and weed trimmers. A 2- to 4-inch layer (after settling) is adequate to prevent most weed seeds from germinating. Mulch should be applied to a weed-free soil surface. Simply covering perennial weeds such as bermudagrass or nutsedge will not prevent their growth.

The mulched area should include as much of the root zone as possible. For beds mulch the entire area. For individual plants, such as trees, the mulched area should extend at least 3 to 6 feet out from the base of the plant. It is advisable to pull the mulch 1 to 2 inches from the base of plants to prevent bark decay.

Mulch depth depends on the type of material used and the drainage and moisture holding capacity of the soil. Sandy soils dry out quickly and often benefit from a slightly deeper mulch layer (3 to 4 inches). A site that stays moist may not benefit from mulching at all.

Mulch can be applied any time of the year. However, the best time to mulch is late spring after the soil has warmed. Early spring application will delay soil warming and possibly plant growth. It is not necessary to remove the mulch when you fertilize. Apply the fertilizer over the mulch --- nutrients will move with water to the roots below.

There are a number of materials that can be used for mulching, each has advantages and disadvantages.

Organic Mulch Materials

Many organic materials can be used as mulch. The material should be weed-free, non-matting, easy to apply, and readily available. Fine particle organic mulch will form a more complete soil cover than a coarse, loose material. Coarse mulch material will need to be applied thicker in order to achieve the desired benefits.

Organic mulches decompose with time, releasing small amounts of nutrients and organic matter to the soil. The layer of mulch should be renewed as needed to maintain a 2- to 4-inch depth. On

previously mulched areas apply a 1-inch layer of new material. Pine straw will need to be reapplied each year while pine bark may not need to be replenished for several years.

Some of the best organic materials include pine bark nuggets, pine straw, and compost. Pine straw is aesthetically pleasing and will remain in place better than most other materials. Pine bark nuggets are longer lasting, but can be washed with a heavy rain. Note that pine bark mulch is primarily used as a soil conditioner and that pine bark nuggets are used as mulch. Bark used as mulch should contain less than 10 percent wood fiber.

Yard waste, such as grass clippings, leaves, and small twigs can be used as mulch in moderation. The back side of the shrub border or natural area is an ideal place to dispose of small pruning clippings. Ideally, these materials should be shredded or composted before applying; however, small amounts can be applied to an existing mulch.

Other organic materials that are sometimes used as mulch include wheat straw, shredded newspaper, peanut hulls, wood chips, sawdust, and partially decomposed leaves. Most of these materials are less expensive than pine straw or pine bark but have some major limitations. Any fresh, light-colored, unweathered organic mulch will tie up nitrogen during the early stages of decomposition.

Properly composted wood chips can be used as a long lasting mulch that weathers to a silver-gray color. Unfortunately, most wood chip material is sold as a fresh material rather than as a composted or aged material. The chips decompose slowly, but as they decompose, microorganisms use nutrients from the soil that might otherwise be available for plant growth.

Non-shredded leaves and grass clippings can form a thick mat that makes water penetration nearly impossible. If sawdust is used it should be well aged, otherwise it will be difficult for water to move into the soil. Uncomposted sawdust is low in nitrogen and will rob nitrogen from the soil as it decomposes.

Organic material that has been stockpiled in a large pile often goes through anaerobic (low oxygen, high moisture) decomposition and becomes very acidic -- pH of about 3.0. (Properly composed organic material will have a pH between 6.0 and 7.2.) Anaerobic decomposition is often a problem with leaves or large piles of wood chips. Such materials are toxic to plants due to the byproducts of anaerobic decomposition: methane, alcohol. The mulch will have a smell of vinegar, ammonia, or sulfur. Marginal leaf chlorosis, leaf scorch, defoliation, and/or plant death may occur. Damage usually occurs within 24 hours after application.

Amount of Organic Material to Cover 100 Square Feet of Area.

Inches of Organic Material	**Material Needed to Cover 100 Square Feet**
6	2 cubic yards
4	35 cubic feet
3	1 cubic yard
2	18 cubic feet
1	9 cubic feet
1/2	4 cubic feet

Inorganic Mulch Materials

Geotextiles and landscape fabrics are available for use as mulch. These materials prevent the growth of most weeds (sedges and some grasses will grow through them) and will allow normal water and oxygen exchange. The material should be applied on bare soil before or immediately after planting. Fasten the material to the soil to prevent weeds from pushing them up. The material is cut to fit around shrubs by making an "x" and laying the flaps back. Avoid getting soil on top of the material. Some of the best results have been obtained when using a combination of landscape fabric covered with an organic material. As the mulch decomposes it can produce a layer of "soil" in which weeds can grow. Using a coarse-textured mulch material, such as pine bark nuggets, will delay the development of this layer.

Rocks, gravel - Some homeowners use inorganic mulch materials such as gravel, pebbles, lava rock, or crushed rock. They may seem like a good choice as mulch since they will not decompose. They do not require annual replacement but pose some potential drawbacks. Be certain the material is compatible with the overall landscape design. They are well suited for a rock garden, herb garden, or Japanese design but

may not be appropriate for a perennial flowerbed or a foundation planting.

In addition to the extra time it takes to apply these materials, some consideration should be given to problems associated with replanting shrubs or removal of these mulch materials. Light colored materials will reflect sunlight and cause the temperature around the plants to be warmer. Rock mulch absorbs heat during the day and releases the heat at night thus increasing water loss. Avoid using rock mulch around plants that might not grow well under these conditions.

A border of some type should be applied to keep the material in place; otherwise you may end-up with rocks in the lawn or on the driveway and sidewalk. When leaves and other debris fall into rock mulches, they are difficult to remove.

Black plastic is not recommended as a mulch material for landscape plants. While plastic will help control most weeds and conserve water, it does not allow water, nutrients, and air to move freely to the soil below. Plants often develop a very shallow root system that is more subject to damage during severe drought or cold weather.

Potential Problems from Mulch

Some gardeners feel that if mulch is good the more they use the better; however, the mulch layer can become too deep. Excessive application of mulch can result in a situation in which roots are growing in the mulch and not in the soil. Over-mulched plants are easily damaged when herbicides and fertilizers are applied and during periods of drought stress. Mulching an area that is poorly drained can aggravate the condition.

An organic mulch creates a breeding grounds for insects and some fungi -- most are harmless to trees and shrubs but may seem troublesome to gardeners. Their role is to break down the organic matter, which releases nutrients. Slugs are the most likely harmful pest. An application of wood ashes or diatomaceous earth at the base of the plant should provide some slug control. An alternative is to use slug baits or pellets.

In some cases, mice and voles may tunnel under mulch and cause damage by chewing the plant bark. Pull the mulch back 6 inches from the stems. A circle of crushed stone about 6 inches wide or a cylinder of $^1/_4$-inch hardware cloth around the trunk may also be helpful.