



# Mulching Garden Soils

## EXTENSION

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Mulching Oklahoma garden soils may be one of the most valuable cultural practices of gardening.

The use of organic materials for mulches can provide many beneficial effects. These include the control of annual weeds, the elimination of the need for cultivation and the resulting damage to plant roots, the reduction of moisture evaporation, the increase of water absorption and retention, the decrease in runoff and soil erosion, and the regulation of soil temperature. Other benefits are cleaner, more easily harvested crops, the reduction of fruit rot and easier movement through the garden during very wet periods.

Surface mulches will provide conditions for plant roots to develop throughout the soil to absorb water, nutrients and oxygen. Luxuriant stem, leaf, flower and fruit growth follows the development of vigorous, extensive root growth.

Most Oklahoma soils are high in mineral content but low in organic matter. The use of organic mulches in the home garden and their incorporation into the soil at the close of each gardening season provide an opportunity to increase soil organic matter content, improve the physical condition of the soil and add some nutrients.

### Mulching Materials

Many materials are available for mulching. The selection of a particular material depends upon the cost, availability, the season of the year and the crop to be mulched.

Since one of the more important factors in successful home gardening is the maintenance of an adequate level of organic matter in the soil, this fact sheet will consider primarily those materials that produce this result.

Suitable organic mulch materials should decompose within a season and should not contain undesirable quantities of viable seeds and harmful disease organisms or other pests.

The material should be easily applied and remain in place. It should not pack down and should be effective for at least one season. Finally, the mulch should be incorporated with the soil for further decomposition. It is a good practice to incorporate or compost garden refuse at the close of the gardening season. This eliminates protective quarters for insects to use in winter months.

### Application of the Mulch

#### Growing Season Mulches

A mulch is frequently applied soon after the emergence of the crop seedlings or following transplanting.

A delay in application of the mulch may be desirable if the soil has not warmed sufficiently during the spring season.

In the event of excessive soil moisture, crop plant roots may develop in the mulch layer where aeration is more favorable for root growth at that time.

The depth of a mulch layer will be influenced by the texture of the mulch material since a primary objective is to prevent or greatly reduce the germination and growth of annual weeds and grasses.

The amount used might vary from 1 inch for sawdust, peat moss, cotton seed hulls, ground corncobs, compost or similar density materials to 4 to 8 inches for straw, hay, corn stalks or other coarse materials.

Another factor in determining the amount and type of mulch material used is the need to provide protection to foliage, flowers and fruits from soil-borne disease organisms that could splash upon the plant. Also, mulch can prevent the development of fruit rots or leaf diseases.

Many of the more permanent plants of the yard and garden may also be mulched to maintain a continuous soil cover under and around the plants. This might include trees and shrubs as well as hardy perennial flower, fruit and vegetable plants.

Some plants that benefit from summer mulching include: tomato, pepper, eggplant, okra, green beans, cucumbers, cantaloupe, squash, broccoli, cabbage, cauliflower, brussel sprouts, sweet corn, asparagus, rhubarb, strawberries, blackberries, dewberries, boysenberries, blueberries and tree fruits. Also, chrysanthemums, columbine, roses, azaleas, asters, lilies, daylilies, perennial phlox, peonies and many kinds of annual flowers benefit.

Generally, the semi-arid plants and most wild flowers, when grown in higher rainfall regions, should not be mulched.

Sweet potatoes do not benefit from summer mulching except in very sandy soils and in dry seasons.

#### Winter Season Mulches

The principal reasons for winter mulching are to provide more uniform soil moisture and to protect the plant from severe temperatures during cold weather.

Winter mulches generally are applied around and over the tops of low growing plants after the plants are in a dormant or inactive stage of growth. This usually occurs in very late December.

The amount of mulch applied is influenced by the severity of winter cold, the amount of drying winds and winter rainfall. Often, one will apply a cover but not totally screen out plants under the mulch. Loose mulch materials are more suitable (straw, pine needles, loose hay).

As growth begins to develop in the spring, the young leaves will have a very light green color due to the reduction of sunlight under the mulch. Remove enough of the mulch to allow for normal plant growth. With chrysanthemums, this might require removal of at least three-quarters of the mulch, while with strawberries removal of half of the mulch might be adequate.

Often the cause of death in non-mulched plants is the result of low temperature combined with excessive drying of the soil.

## How to Use Sawdust As a Mulch

Where sawdust is available, it is commonly used as a summer mulch. The material, preferably partially decomposed, may be applied to a depth of 1 to 1½ inches. This would require about 5 bushels (6.25 cu. ft.) of sawdust for a 10 ft. x 10 ft. plot. This amount of sawdust would, if dry, weigh approximately 50 pounds.

Before application, mix 1 pound of actual nitrogen per 5 bushels of sawdust to aid in further decomposition (1 pound actual nitrogen would be 3 pounds of ammonium nitrate or 5 pounds of ammonium sulfate).

If no nitrogen were mixed with the sawdust, some of the nitrogen in the soil would be used for sawdust decomposition after mulching. The result would be nitrogen starvation of the mulched crop. Such plants would have yellowish-green foliage and limited growth.

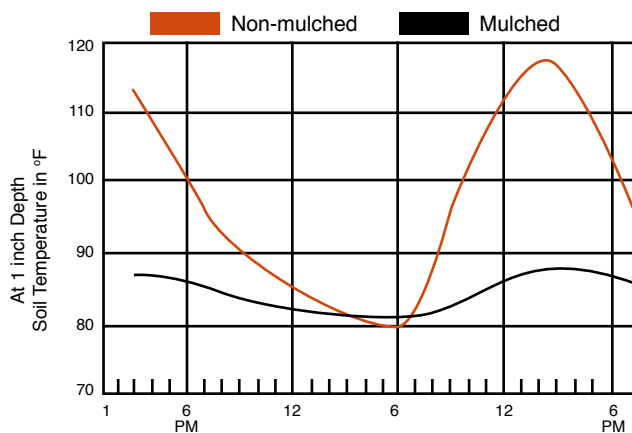
Strawberry runner plants may readily root down through such a layer of sawdust, while it provides excellent control of most annual weeds. This amount of mulch would perhaps be equal to adding between 6 to 10 inches of additional irrigation water on non-mulched strawberry plants.

Using organic materials as mulches may cause an increase in certain garden pests. The mulch provides an excellent environment for sowbugs (or pillbugs) to grow. Some treatment to reduce this pest may be needed. Recommendations for this are provided in fact sheet EPP-7313 "Home Garden Insect Control."

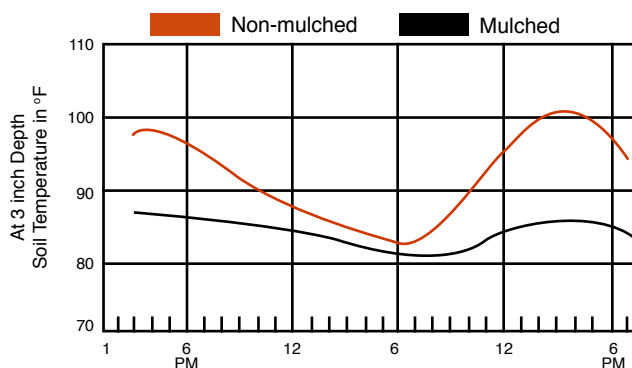
## Polyethylene Film and Other Sheet Forms of Mulching

The use of air-tight sheets of plastic are less desirable as mulching materials because of the lack of air movement into the soil surface during periods of soil drying. However, this may be offset by specific advantages of the practice. When attempting to garden in an area infested with perennial weeds, the use of chemicals to control them may make gardening in that area undesirable for several months.

An alternative weed control program is cultivation of the area and application of the needed fertilizers. Then cover the surface with black polyethylene and set plants or plant seeds in the soil through slits in the film. The result of this system will be the destruction of the perennial weeds if the covering remains over the soil throughout the



**Figure 1.** Mid-summer temperature differences between non-mulched and mulched plots measured 1 inch deep in the soil.



**Figure 2.** Mid-summer temperature differences between non-mulched and mulched plots measured 3 inches deep in the soil.

growing season. There may be small amounts of grass or weed growth through the slit openings and these plants may require physical removal at the close of the gardening season.

The commercial vegetable industry has had degradable plastic film available to reduce their dependency of cleanup and disposal. Such films are available for home gardens. Photodegradable films disintegrate under the exposure of ultraviolet light in a time-released manner that usually lasts through one growing season. However, remnants of the plastic can remain after a growing season. Soil and foliage that may cover the plastic also blocks the ultraviolet light, thus preventing complete breakdown.

The use of aluminum foils or laminates may provide similar effects. Also, certain kinds of insects (leaf hopper, spider mites and aphids) may be repelled, depending on the intensity of reflected light to the under side of the plant foliage.

Table 1 provides information on mulch materials and some of their characteristics.

## Landscape Fabric (Geotextile, Weed Barrier)

Also available to the home gardener are commercial fabric weed barrier products. Weed barriers are manufac-

ured geotextile materials that provide a protective barrier primarily for weed control in the landscape. Fabric weed barriers are air and water permeable for a while. But eventually they become plugged up by soil particles and other debris, resulting in poor water and oxygen movement to plant roots. The result is plant roots creeping up to the soil surface as they desperately seek water, oxygen and nutrients, leading to plant stress. In most cases, gardeners use a decorative mulch on top of the fabric barrier to restrain

the water from run-off and add aesthetic appeal. However, organic mulches, such as bark mulch, on top of fabric barriers will also contribute to the plugging of the fabric as the mulch decomposes. On slopes, water tends to run along the fabric surface without readily penetrating the material; light mulches like bark can then wash away. Nutsedge and other similar weeds have been known to grow through the fabric barrier. Generally, it is best to avoid landscape fabrics in ornamental landscape beds.

**Table 1.** Some Mulch Materials and their Characteristics<sup>a</sup>

Materials	Does the mulch crust, pack or seal?	Will the mulch control weeds?	Will the mulch remain effective for a season?	Blaze (fire) Possibility	Available Nutrients Present	Remarks
Peat Moss	2	2	2	2	4	May be blown or moved by wind or rain.
Sawdust	2	2	2	2	5	Add nitrogen to aid in decomposition.
Cotton Seed Hulls	4	2	2	2	2	Usually remains where placed.
Straw	1	2	2	5	3	• Presprout seed by wetting bales.
Leaves <sup>b</sup>	3	3	2	3	3	May be blown by wind.
Cotton Burrs	2	2	2	2	2	Don't use burrs from chemically defoliated plants.
Lawn Clippings	5	3	4	5	2	Compost - don't use fresh as mulch.
Hay - Prairie	1	3	2	4	3	Usually better if chopped.
Hay - Legume	2	3	2	3	2	May become very hot during early decay.
Compost	1	2	2	1	1	Also used as a row cover in seed planting.
Wood Chips	1	3	1	2	5	Excellent permanent mulch.
Bark <sup>b</sup>	1	2	1	2	5	Excellent permanent mulch.
Wood Shavings <sup>b</sup>	1	2	1	5	5	• May be blown by wind.
Leaf Mold	1	2	2	2	3	Value varies with ingredients.
Gravel Pebbles	3	4	1	1	5	Frequently used over polyethylene.
Aluminum Foil	5	1	1	1	5	May aid in insect control.
Black Polyethylene	5	1	1	2	5	Will destroy perennial weeds.
Fabric Weed Barriers	5	1	1	4	5	Will not absorb water readily on slopes. Frequently becomes plugged, inhibiting water and air movement.
Pine Straw	4	2	2	1	4	Shred before incorporating into soil.
Shredded Newspaper	2	3	3	2	5	Wet to keep in place.
Photodegradable film	5	1	2	2	5	Soil covered portions will not decompose.

(a) 1 = excellent, 5 = poor

(b) Black walnut sawdust, bark and leaves is very toxic to some kinds of plants.

• Add 1 pound actual nitrogen per 50 pounds of dry organic matter to provide for decomposition.

## **Yard Waste - A Valuable Resource**

Yard waste such as lawn clippings, leaves and pine needles is an inexpensive and valuable resource for your vegetable garden and landscape. Try recycling yard waste instead of sending it to the landfill. Yard waste can be transported to your compost pile and used later for mulch and/or soil conditioning. Many herbicide labels limit grass sprayed with an herbicide to be used as a mulch.

Leaves, twigs and other larger pieces should be shredded to aid in speed of decomposition. A lawn mower or mulching attachment can also be used to shred the leaves during the fall season. Yard waste can be directly utilized as mulch also, but if not fully decomposed, may compete with nutrients for the plants. Supplemental nutrients may be needed in this case.

## **Other Gardening Publications**

### **OSU Extension Fact Sheets**

- BAE-1511 - Trickle Irrigation for Lawns, Gardens and Small Orchards
- HLA-6004 - Oklahoma Garden Planning Guide
- HLA-6007 - Improving Garden Soil Fertility
- HLA-6009 - Fall Gardening
- HLA-6012 - Growing Tomatoes in the Home Garden
- HLA-6013 - Summer Care of the Home Vegetable Garden
- HLA-6032 - Vegetable Varieties for the Home Garden
- EPP-7313 - Home Vegetable Garden Insect Pest Control
- EPP-7625 - Common Diseases of Tomatoes Part I. Diseases Caused by Fungi
- EPP-7626 - Common Diseases of Tomatoes Part II. Diseases Caused by Bacteria, Viruses, and Nematodes.
- EPP-7627 - Common Diseases of Tomatoes Part III. Diseases Not Caused by Pathogens.
- EPP-7640 - Solar Heating (Solarization) of Soil in Garden Plots for Control of Soil-Borne Plant Diseases

This fact sheet is based on original material prepared by R. L. Campbell.

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