



FactSheet

Extension

Ohio State University Extension Fact Sheet

Horticulture and Crop Science

2001 Fyffe Court, Columbus, OH 43210-1096

Mulching Landscape Plants

HYG-1083-96

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A mulch, by definition, is a layer of bark, sphagnum peat moss, muck peat, compost, pine needles, gravel, plastic, or any similar material uniformly spread on the surface of the soil under plants. Among the objectives of applying mulch or mulching are to:

1. prevent weed growth.
2. conserve moisture in the soil.*
3. cool soil surface and stabilize soil temperature.*
4. reduce heaving (plant roots forced upward out of soil) of small plants as a result of alternate freezing and thawing of the soil in autumn, winter and spring.*
5. add organic matter to soil, if mulch materials are organic in nature.
6. reduce soil erosion on slopes.
7. keep fruits, vegetables and flowers cleaner.
8. improve aesthetics of a landscape and add to property values.

* Research by the Weyerhaeuser Co. (1969) indicated that two inches of bark: 1) reduced moisture loss in summer by 21 percent, 2) reduced soil temperature in summer, in the upper four inches of soil, by 10 degrees F and, 3) delayed soil temperature in winter from reaching the freezing temperature by two days compared to unmulched soil.

Effects of Organic Mulches in Soil

Organic mulches, derived from plant material, will decompose in time and enrich and improve the soil. This results in increased aeration of silt or clay loam soils and added water-holding capacity of sandy loam soils. Mulching improves and stabilizes soil structure (arrangement of soil particles) by reducing the impact of rain, weight (people walking on the soil) and cultivation of soils, especially when wet. In short, compaction of the soil is reduced.

The pH (acidity or alkalinity) of soil can be changed depending on the mulch selected. For example, most composts will be slightly alkaline (pH greater than 7) and excellent for use in acidic soil regions, while continuous use of oak leaves, pine needles, pine bark and sphagnum peat moss will increase acidity. The breakdown products of leaves, including oak leaves, will be alkaline, but continuous use of oak, pine and sphagnum peat moss products will keep the soil surface acidic (pH less than 7).

Organic mulches contain both major and minor mineral elements essential for plant growth, but should not be considered substitutes for fertilizer. In fact, materials such as straw, wood chips and sawdust have high carbon to nitrogen ratios; and therefore, nitrogen must be added to the soil at the time of mulching. The high carbon to nitrogen ratio materials are easily decomposed by microorganisms. The microorganisms require nitrogen to multiply and survive. As a guide, 1 to 2 pounds of actual nitrogen per 1,000 square feet should be applied. For example, if using a 10% nitrogen fertilizer, such as a 10-6-4, applying 1 pound nitrogen to 1000 square feet would require 10 pounds of the fertilizer product. If additional nitrogen is not supplied, the nitrogen in the soil will be used by the microorganisms in the root zone of desired landscape plants, and nitrogen deficiency will likely occur.

Timing the Application of Mulches

Mulch is usually applied first in spring after the soil has warmed and begun to dry from winter rains and snow. Depending on soil texture (size of soil particles, e.g., clay [very small]; silt [medium]; and sand [large]), temperature and other weather conditions, this is usually mid to late spring. Mulching too early can delay drying of soil and subsequent root growth which is dependent upon sufficient aeration (oxygen content in soil) and reasonably warm temperature in the root zone. In seasons of more than ample rainfall and/or cool temperatures, mulching should be delayed until late May or June.

A second application is often needed in autumn. For established plants, timing of the mulch application may not be as important as it is on new plantings, especially shallow rooted shrubs and evergreens, herbaceous perennials, or strawberries. Heaving of small plants, especially those newly planted, occurs following alternate freezing and thawing of the soil. To reduce heaving, which breaks roots and leads to winter injury, apply mulch following the first indication of frost in the ground. Mulching slows the thawing cycle and thus heaving. For established plants, water thoroughly in late autumn if the soil is not already moist, then mulch.

Mulching Depth

The recommended mulching depth, depending on the material selected, is 2 to 2.5 inches. At this depth, most mulches will accommodate the primary objectives of weed control, soil moisture conservation and temperature modification.

Mulching depths less than two inches may not satisfy the principal objectives. However, mulch applied 3 to 6 inches or more, still recommended by some, can lead to serious problems for landscape plants. A mulch that is too thick may severely reduce or eliminate drying and lead to water-logged soil, particularly during wet seasons or in heavy clay loam soils. Extended periods of wet soils in spring are most damaging to a number of perennials, azalea, rhododendron, conifers in general, and taxus or yew in particular.

Excess mulch, particularly if applied right against the stem or trunk of landscape plants, also leads to constantly wet bark and conditions favorable for disease development.

Extra heavy mulch layers in autumn are often a haven for rodents to nest, which may lead to girdling (destruction of the food conducting vessel in the stem) of selected plants when wildlife

food sources are covered with snow. In autumn, pull the mulch back approximately six inches or more from the stem or trunk of all woody plants to avoid rodent feeding.

When reapplying mulch over an existing base, bring the total depth up to 2 to 2.5 inches. Avoid applying two inches of mulch with each application or soon a depth greater than three inches will accumulate. For example, when using cypress bark, which is slow to decompose, very little mulch will be needed in subsequent applications to maintain desired depths.

Some Recommended Mulch Materials

Mulching products most frequently available in garden centers are reviewed briefly below:

Inorganic or Fabricated Mulches

Aluminum foil. Use is limited primarily to vegetable plants where research findings have indicated a significant reduction in insect pests, such as aphids, and viruses carried by insects.

Black polyethylene. Still used in vegetable and vine crop production (cucumbers and melons), but no longer recommended for use in the landscape unless the soil is very well drained. Since air cannot penetrate polyethylene film, soils remain too wet and thus, black polyethylene film has been replaced with landscape fabrics.

Landscape fabrics. Landscape fabrics, also known as geotextiles or weed barriers, are relatively new to the marketplace. The two types of fabrics available are woven and non-woven polypropylene polymers (synthetic material). Polymers of non-woven fabrics are spun-bound or meshed, while polymers of woven fabrics are generally thicker in diameter and tightly woven. Most polypropylene polymers are readily oxidized (combined with oxygen and degrades) when exposed to ultraviolet light, and therefore, are limited in use to an undercover for a more decorative product such as shredded bark. Some fabrics, however, are surface coated with carbon black. Since these fabrics offer a degree of resistance to degradation from ultraviolet light, double mulching would not be necessary.

Examples and sources of landscape fabrics include:

1. DewittTM, black, woven, Dewitt Co., Sikeston, MO
2. DuonTM, gray, spun-bonded, Blunks Wholesale Supply Inc., Bridgeview, IL
3. TyparTM, gray, spun-bonded, Remay, Inc., Old Hickory, TN
4. VisqueenTM, black, woven, Visqueen Film Products, Richmond, VA
5. TEITM, white, woven, Dupont, Baltimore, MD
6. ExxonTM, white, spun-bonded, Landscape Supply Inc., Roanoke, VA

Recycled rubber tires. Shredded recycled rubber tire mulch is available in several colors. This mulch is used extensively in parks, schools, highways and industrial sites.

Stone, chips, pebbles, gravel. Available in many sizes and colors, these materials are utilized by landscape architects for color and texture changes, particularly in plantings in blacktop covered areas. All are fire resistant and have application near public entrances to buildings, along sidewalks and in shopping areas. They offer no value as breakdown products in the soil, which is true of all inorganic mulches.

Organic Mulch Products

Animal Manures. Historically, manure has been available from farms in bulk, but some are packaged for retail sales. Included in retail packaging are manure from cow, horse, sheep, poultry and zoological (zoo) animals. Manures are dried or dehydrated and sold for soil amending, mulching, or fertilizer purposes. Weed seed are sometimes introduced with manure.

Composts. This is an old term with new meanings as compost technology and new products become available. Although usually not packaged for retail use, grass clippings, leafmold and used mushroom composts are available.

Composted municipal sludge. This material is now available as a mulch with trade names such as Earthlife™, Comtil™ and TechnaGro™, among others. In the future we will see composts containing municipal garbage, paper pulp, yard wastes and many other by-products. The landfill legislation across the United States has given rise to composting technology that will continue to advance and bring new products.

Hulls, cobs, shells. This group of by-products, to a large degree from the food industry, includes such mulches as cottonseed, buckwheat, cocoa-bean, peanut or rice hulls, crushed corn cobs, spent hops, tobacco stems and similar products. All have been used extensively for mulch and are usually inexpensive. The disadvantage is that availability is typically limited to a local area.

Sphagnum peat moss/muck peat. These terms are often misunderstood. Sphagnum peat moss comes from mosses (sphagnum, hypnum, etc.) and contains long fibers which resist decomposition. It is available from Canada, Russia, Ireland and much of Europe.

Muck peat originates from well decomposed plant material that once thrived in swamps such as cattails, reeds, sedges and other water plants. While sphagnum peat moss is usually quite acidic, muck peat is usually neutral to slightly alkaline, is well decomposed and is dark brown or black with almost no fibers. Muck peat is available from sources in many U.S. states including Ohio, Michigan and Indiana. It is fine in texture, dries quickly and can be blown away by the wind when used as a mulch. It, too, is often locally available at a reasonable price but of somewhat limited value as a mulch.

Pine needles. The needles of pine trees as well as shredded cones make an excellent mulch particularly for evergreens and plants that thrive in acidic soils. Pine needle mulch, formerly available only in the southern states, is becoming available in other regions.

Straw. Straw and hay are used for winter protection of perennials, strawberries and small plants. If left as a permanent mulch, additional nitrogen (one pound of nitrogen per 1,000 square feet) is suggested, since this material decomposes readily. Weed seed can be introduced from straw, hay and grain crop residues. Salt hay, available along coastal states, is a very acceptable mulch.

Wood products. For simplicity, we will group all wood products into a) shredded, chip or chunk bark, b) wood chips or shavings and c) waste wood.

Shredded, chip, or chunk bark. This material is by far the most popular landscape mulch due to its appearance, serviceability and cost. Included are shredded hardwood and cypress bark, chipped and chunk pine, and fir and eucalyptus bark.

Wood chips or shavings. They have become available through utility companies and are usually not available in packaged form. Since they consist, along with sawdust, of more wood than bark, they decompose rapidly and should be supplemented with fertilizer at the rate of one pound of actual nitrogen per 1,000 square feet of mulched area.

Waste wood. Materials such as used pallets and other wood pieces that normally would have been taken to a landfill are now shredded and metal objects are removed. The resulting chips are

colored to match pine, hardwood, cypress or any other mulch product on the market. This material also decomposes faster than bark and requires the addition of nitrogen fertilizer.

¹This factsheet was originally produced by Elton M. Smith, Professor Emeritus, The Ohio State University for the Ohio Florists' Association who has granted permission for its use and distribution. Dr. Rose is the person currently responsible for the contents of this factsheet.

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