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## Mulching Practices for South Florida

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### Introduction

Mulching is the practice of spreading material around the base of a plant(s) to act as a protective covering.

There are two main reasons for mulching the soil around plants:

- **Mulch conserves soil moisture, and reduces the need for irrigation.**
- **Mulch aids in the suppression of weeds, reducing the time spent in manually pulling weeds or the need for toxic herbicides.**

Additional benefits can be derived from regularly mulching plants, particularly if organic materials are used:

- ★ As the mulch breaks down, it improves both soil nutrient content and physical structure by increasing the amount of organic material present. This is particularly relevant in Miami-Dade County, where most soils are thin and low in organic content.
- ★ Mulch can moderate fluctuations in soil temperature and protect the root zone from excessive heat or cold.
- ★ As organic mulches decompose, they tend to lower the soil pH, a beneficial attribute, given the prevalence of high pH soils in Miami-Dade County.
- ★ Mulch is a “natural” means of suppressing the build-up of damaging populations of pathogenic soil nematodes.
- ★ The presence of mulch can lessen the risk of soil-borne pathogens being splashed on to plant surfaces.

★ Mulch reduces leaching of fertilizer out of the soil; as it breaks down, it raises soil organic content.

★ Mulch can create a weed and grass free zone around landscape plants, thereby reducing damage to tree trunks during lawn maintenance.

★ Mulch can improve the aesthetic appeal of landscape.

### Types of Mulching Materials Available

There are three broad categories of materials used as mulches:

1. **Organic.** Many different materials are used as organic mulches, but they all have in common the fact that they decompose over time once in contact with soil. The wood and bark of various trees is used as nuggets, chipped or shredded. In some instances yard generated material is used such as leaves, grass clippings or municipal mulch from collected garden trimmings. Some products are only available locally (e.g. pine straw, bagasse, peanut hulls and pecan shells) or are of limited usefulness (newspaper).

In Miami-Dade County, the most commonly available organic mulches are:

- ◆ **Pine bark.** This is widely available either as nuggets or shredded and has the advantage of being derived as a by-product from a commercially planted tree. The nuggets break down slowly, and are superior at preventing weed growth. The shredded bark is not as effective in preventing weed growth, but is less likely to float away if the site is inundated with rain.

- ◆ **Other forest-based mulching products.** These are widely available in Miami-Dade including eucalyptus (a fast growing renewable tree) and *Melaleuca* (a good use for an invasive tree). A recent study from the University of Florida found *Melaleuca* to require replacement less often than other mulches.
- ◆ **Cypress bark.** This material has a high water-holding capacity and therefore needs to be well soaked after being spread. Once thoroughly wet, cypress bark forms an excellent moisture barrier. Although this it is a most attractive mulch, it is a non-renewable resource and for this reason other alternatives are being promoted.

Wood chips are less expensive than bark, but can cause a definite if temporary depletion of available nitrogen once they begin breaking down in the soil. One remedy is to apply extra fertilizer when using wood chips as mulch. Using wood chips that are at least 1 -1½” in size will aid in slowing down this nitrogen loss. Shredded wood can cause an even more pronounced depletion of nitrogen, and is also more apt to compact, shed water and limit soil aeration as it ages. For these reasons this mulch should be regularly raked and replaced. Sawdust is not recommended for use as mulch since the problems with compaction and nutrient depletion of the soil are too pronounced.

Most of the popular colored mulches are processed from scrap wood, and will therefore require extra applications of nitrogen fertilizer. The iron oxide-based stain used to color wood mulch is non-toxic; the iron is released as the mulch decomposes enriching the soil. Concern has been raised over the possible incorporation of scrap pressure-treated lumber into color mulches. There is a risk of arsenic leaching from the product<sup>1</sup>; thus it is advised to not use such materials near food crops.

There are some mulches made from borate-impregnated wood chips, that are claimed to help suppress termites. While the available evidence suggests that wood-based mulches do not form an important food source for termites, they should not be used immediately adjacent to the wall of a dwelling. The moisture retained under the mulch could create conditions permitting termites access to breaks in the house foundations.

2. **Synthetic Mulches.** These are manufactured products and most utilize plastic, either woven (often termed “geotextiles”) or non-woven. Less common in South Florida are mulches made from recycled rubber or plastic. The non-woven products are made from polythene sheets of various thicknesses and colors, and are widely used for vegetable production. Clear polythene mulch is used in Florida to solarize soil before planting to reduce the total population of soil pathogens (especially nematodes) and weeds.

Needle-punched fabrics are the least expensive of the geotextiles, but have open fibers through which weeds can grow. Woven fabrics are stronger, but weeds are still able to grow through the fibers. Thermally spun-bonded fabrics are the most effective at preventing weed penetration, some types even being able to resist purple nutsedge.



Plastic landscape bark and rubber nuggets, manufactured to appear “natural”, are long lasting and use recycled materials, but contribute nothing to the soil and are relatively expensive. Rubber nuggets are impact absorbing and therefore useful in areas frequented by children.

Arguments for and against the use of **synthetic mulches** are presented below:

**ADVANTAGES**

- ❑ Last long when protected from direct sun.
- ❑ Act as a barrier between soil and decorative mulch, thus reducing frequency of replacement. Especially useful to prevent inorganic mulches such as gravel from mixing with soil.
- ❑ Some types contain nodules of a slow release herbicide, further aiding in weed suppression.

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<sup>1</sup> For further information, request a copy of *Using Treated Lumber in the Home Landscape* from the Miami-Dade County Cooperative Extension Service office.

**DISADVANTAGES**

- ❑ Cannot be used alone - must be over-laid with some other mulch to protect from UV degradation.
- ❑ Prevents beneficial mixing of soil with decomposing organic mulches. Weeds can then grow on top of fabric with the roots enmeshed in those with an open weave.
- ❑ Many landscape fabrics are easily penetrated by weeds such as nutsedge, a major problem in South Florida landscapes.
- ❑ Geotextiles must be correctly installed, and subsequent amendments to the soil underneath are difficult.

**3. Inorganic.** A variety of mineral based products are available such as marble chips, river rock, pea gravel and lava rock. Breakdown of these materials is negligible, and they contribute little to improving soil fertility. Marble chips can cause problems with reflected heat and glare, and are better in low light situations. Other rock-based mulches such as pea gravel and cracked granite may retain too much heat. Lava rock, since it is porous and traps air is supposed to insulate the soil below from overheating. If inorganic mulch is used it should be underlaid with a geotextile to prevent mixing with the underlying soil.



**Installation & Maintenance of Organic Mulch**

**How much to use?** Mulch should be evenly spread around the base of the plant to a thickness of 3-4", but not touching the trunk. Spread too thick, mulch can reduce aeration of the soil, particularly if it is prone to compaction.

To calculate how much mulch to use, measure the area to be covered in square feet (width x length, or  $\delta r^2$  if a circular plot<sup>2</sup>). Multiply this number by the depth required in inches and then multiply by 0.003. This gives the amount of mulch required in cubic yards (x 27 to convert to cubic feet). For example, to cover an area of 150 ft<sup>2</sup> would take 1.35 yd<sup>3</sup>. (36.45 ft<sup>3</sup>) requiring about twelve 3 ft<sup>3</sup> bags of mulch.



**After the mulch is applied.** Under South Florida conditions, fresh mulch should be added every 8 -12 months, with shredded products being added more frequently than nuggets. Carefully rake shredded mulch at least every two months to prevent compaction. Since plants roots will grow up into the decomposing mulch, it is important to add fresh mulch in a timely manner, otherwise the roots are at risk of drying out.

To reduce the rate at which organic mulch needs to be replaced an underlying sheet of one of the geotextiles can be installed. Under such conditions the mulch will now be of limited value in improving the organic content of the soil. If a fabric is used, select a thermally spun-bonded product that will resist penetration by weeds. One drawback to the use of these fabrics is that as the organic mulch breaks down, it provides an excellent medium in which weeds can germinate and turf grass runners can take root. If grass or weed roots are then able to penetrate the weave of the landscape fabric they can be impossible to remove without destroying the fabric.

**Storage of mulch.** The use of improperly stored mulch (wet with poor air circulation) encourages the production of anaerobic fermentation by-products (e.g. methanol and hydrogen sulfide) which can cause severe plant injury. Open piles of stored mulch should be turned regularly and bagged mulch stored off the ground, covered, and used as quickly as possible.

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<sup>2</sup>  $\delta = 3.14$  and  $r^2$  is the radius multiplied by itself

For convenience, the main attributes of the mulches discussed above are compared in Table 1 below.

**Table 1.** A comparison of the main characteristics of landscape mulches.

Criteria	Type of mulch		
	<i>Organic</i>	<i>Synthetic</i>	<i>Inorganic</i>
<i>Preventing Soil Moisture Loss</i>	Excellent if maintained at a depth of 3-4"	Poor except for non-woven polyethylene sheet used in vegetable production.	Slight
<i>Weed Suppression</i>	Excellent if maintained at a depth of 3-4".	Ranges from poor to very good	Very good if underlaid with spun-bonded geo-textile
<i>Soil Structure</i>	Improves as mulch is incorporated into soil	Prevents overlay of organic mulch from mixing with soil.	No effect. May cause compaction if material is heavy.
<i>pH / Soil Nutrients</i>	Over time slight increase in soil nutrients and decrease in soil pH depending on mulch used.	No direct effect	Negligible
<i>Durability</i>	Low - must be replaced every 6-18 months.	Several years depending on type, if protected from UV radiation (sunlight).	Excellent
<i>Cost</i>	Lowest initial outlay but recurring cost of replacement.	Best types are expensive and should be professionally installed.	Moderate to expensive but rarely needs replacement.