

## MULCH CORNER

### TYPES OF MULCHES

*By John Ferguson*

This week we are going to start looking at the different types of mulches available in Houston and the Gulf Coast.

Our understanding of the importance of biology and organics in soil and plant health has changed and greatly increased in recent years hence a recently revised definition of the word mulch states: "Mulch is anything that will facilitate the improvement of the microorganisms in the soil."

Organic Mulches - Organic mulches offer the most benefits, often at lower cost, and improve the fertility and health of the soil. A three inch layer of organic mulch can lower soil temperature about 25-30°F which reduces plant stress and water requirements. Bare soil can easily reach 100-135°F in the summer which speeds evaporation and dries out the soil, which stresses the plant resulting in wilting, more insect and disease problems and in most plants and eventual death. The higher soil temperature reduces a plants roots ability to absorb moisture (even if it is there) and the higher soil temperature kills beneficial microbes that help feed, water and protect plants roots. In addition soil nitrogen (N) decreases as soil temperatures increase. For every 10°C increase in soil temperature, soil N will decrease 2-3 times. Studies in Austin and San Antonio Texas during the 1990's found that lawns mulched with 1/2 inch of compost each year, save \$50-\$200 per month on their water bill. Two studies from Ohio State University have confirmed that plants grown organically in organically enriched soil suffer far less disease and insect problems than those grown with synthetic chemicals. Hence good organic mulch helps build up the soil, naturally increasing a plants pest and disease resistance. USDA studies on several species have found that mulched plants were often 3 times as large and with 3 times the yield of unmulched plants after several years.

#### Bark Mulches

Historically the most common type of organic mulch in the Houston area is bark mulch. Fifty years ago we had millions of cubic yards of bark that had been piled up in East Texas for years slowly rotting (composting) as a waste product of the forest industry. These barks were a dark brown to almost black

and all the toxic chemicals had been broken down hence they had some value in gardening. These old composted mulches were used up many years ago. Today only fresh bark is available which has a whole different set of properties and is no longer beneficial to plants. is why unscrupulous companies add toxic chemicals (ashen mulches) or black dyes (colored) to their bark to make it look old.

Bark mulches are made from the protective outer layer of trees and are produced as a by-product of the lumber and paper industries. Since outer bark is designed as a protective layer for the tree it tends to be low in nutrients. Tree barks frequently contain the chemical suberin, a naturally occurring substance that waterproofs (helps bark shed water) and prevents the bark from being broken down by soil microorganisms. In addition to suberin, barks contain waxes that also help waterproof the tree. Hence, the suberin in the bark can slow or retard the growth of some plant species. It also repels rain preventing it from being absorbed into the soil. Additionally, barks contain very little energy-releasing compounds used by the soil microorganisms that are extremely important to soil and plant health.

Barks can be broken into two basic types, hardwoods and softwoods (conifers). In much of the country, hardwood bark is mostly from oak trees and softwood bark is from pine trees or other conifers. They are both a by-product of the lumber and paper industry. Since conifers tend to be a pioneer species (they grow on poor nutrient deficient soils) so they contain very little nutrients (less than hardwood bark). Barks have a very high C:N ratio that averages 450:1. Hence they require a lot of nitrogen to break down often starving nearby plants in the process.

Large pieces of bark are slower to breakdown and less likely to blow and wash away than finely ground pieces, but they are considered more difficult to work around. Barks and uncomposted sawdust from redwood, cedar, Douglas fir, larch, eucalyptus, and spruce trees, are considered toxic to many plants. Any bark that is high in tannic acids and phenols is potentially harmful unless thoroughly composted and leached.

Fine ground pine bark packs down and prevents oxygen from reaching the soil. It is difficult to wet, sheds rain after it dries out, and prevents moisture from reaching the plants roots. Often, when trees are dying from disease they are cut for pulp or lumber and the diseased bark ends up being sold to consumers.

Research at Cornell University has shown that conifer barks release toxic volatile compounds that are harmful to plants like tomatoes. Research at the University of Arkansas has found that Marigold growth was significantly reduced in beds mulched with pine bark [HortTechnology, July-September 1997]. Many tree biologists, anatomists, arborists, soil ecologists and other experts now recommend that bark based mulches be avoided. Dr. Alex Shigo at the University of Georgia, a leading tree expert



has several papers posted on the Internet about this subject. Research at the Ohio Agricultural Research and Development Center has also found that pine bark does not support many of the beneficial microorganisms that prevent disease.

The natural chemicals in pine bark tend to kill off many species of beneficial microbes that naturally attack and prey on fire ants and termites; hence problems with these insects are reported to be more common when pine bark is used. A report presented at the Texas Association of Apple Growers convention found that bark mulches actually steal nutrients away from plants when compared with mulches made from recycled tree trimmings and brush that release nutrients and feed the soil (i.e. Native mulches).

In recent years as fuel prices have increased more and more, in many areas of the country barks are being burned for fuel resulting in reduced availability for the nursery industry.