

Mulching: Materials, Applications, and Performance

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Mulches vs. Soil Amendments

Mulch refers to a material placed on the soil surface. **Soil Amendment** refers to any material mixed into a soil.

Benefits of Mulches

Depending on materials used, mulches can:

- Reduces evaporation from soil surface, cutting water use by 25 to 50 percent
- Increase gas exchange with soil
- Organic mulches can promote soil microorganism activity, which in turn, improves soil tilth and helps lessen soil compaction
- Stabilizes soil moisture
- Prevents soil compaction
- Controls weeds, which compete for soil moisture and nutrients
- Moderates soil temperature extremes
- Controls erosion
- Protect shallow-rooted plants from freeze damage and frost-heave
- Gives a finished look, improving aesthetic quality

Mulch Materials

Organic

- Wood Chips
- Bark
- Straw/Hay
- Pine Needles/Leaves
- Grass Clippings
- Seed Hulls
- Cardboard/Newspaper

Inorganic (Inert)

- Rock
- Pavers
- Brick Chips
- Weed Barrier Fabric
- Plastic

Mulch Considerations

- Price
- Formal vs. Informal Appearance
- Weed Seeds
- Heat Transfer
- Weed Seeds
- Wind
- Nitrogen Deficiency (organic only)
- Flammability
- Others

Mulch Flammability Study

Three field sites were chosen: Flagstaff, Prescott, and Tucson. Eight Mulch Treatments were installed: gravel, turf, bark nuggets, ground bark, chipped woody waste, bagged compost, pine needles, and straw. Three replications of each treatment were installed at each site. Two tests were run: Fall 2005 and Summer 2006. Three ignition sources were used: lit charcoal briquette, lit cigarette, propane torch for 15 seconds.

The following graphs show some of the findings of this study.

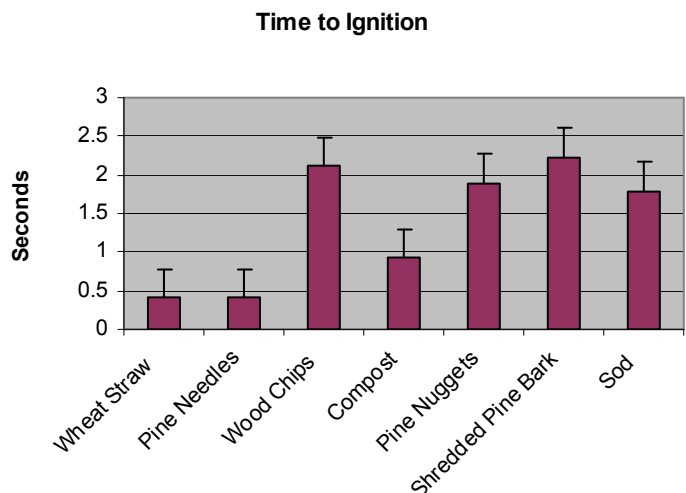


Figure 1. The time needed for flames to occur on various mulch types using charcoal and propane torch (cigarettes did not ignite mulches). Error bars show one standard deviation.

Pooled Flame Lengths

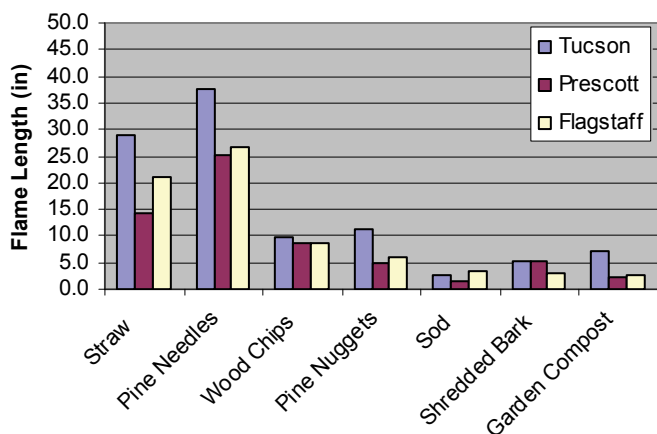


Figure 2. Pooled flame lengths in inches generated by mulches during the Fall 2005 and Spring 2006 trials.

Mulch Flammability Study Findings

- Inorganic mulches such as decomposed granite, gravel or rocks offer superior fire-proofing and should be used when mulch is needed that directly abuts flammable structural members.
- Green, closely mowed sod will provide excellent fire-proofing in the landscape.
- Dense, finely ground/screened materials such as the garden compost and the shredded bark proved to have excellent fire-proofing characteristics.
- Wood chips and bark nuggets were the less desirable in their fire-proofing characteristics. We recommend that these materials be used outside Zone 1 (0 to 15 ft from structure).
- Straw and pine needles were the least desirable in their fire-proofing characteristics and we recommend that these materials be used well outside Zone 1 of the property.

References Used

- Lloyd, J.E., D. A. Herms, B. R. Stinner, and H. A. J. Hoitink. 1999. Effects of Organic Mulches and Fertilization on Soil Microbial Activity, Nutrient Availability, and River Birch Growth. From: Ornamental Plants -- Annual Reports and Research Reviews 1999. Special Circular 173-00. (http://ohioline.osu.edu/sc173/sc173_12.html).
- Orzolek, M.D. and L. Otjen. 2003. Is There a Difference in Red Mulch? Center for Plasticulture. Penn State University. (<http://plasticulture.cas.psu.edu/RedMulch.htm>)
- Whiting, D., R. Tolan, B. Mecham, and M. Bauer. 2005. Mulching with Wood/Bark Chips, Grass Clippings, and Rock. Colorado State Cooperative Extension Publication 7.760. (<http://www.ext.colostate.edu/PUBS/GARDEN/07760.html>).

Recommendations for Successful Mulch Performance

- Control perennial weeds prior to mulching
- Match material to desired effect and your personality
- Landscape fabrics offer better water infiltration and gas exchange, but weeds can root through fabric
- Herbicides can increase effectiveness: its your choice
- In areas where pine needles naturally occur, depths of less than 1 inch are acceptable to the Prescott Fire Department
- Plastic mulches have special applications in crop production, but are not desirable in ornamental landscapes
- Avoid direct contact of organic mulches with tree and shrub trunks