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Mulch Matters: Choosing the Right Type!

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SUMMARY

Selecting the right mulch is essential for optimizing plant growth, conserving soil moisture and improving overall soil health. The choice of mulch whether organic or inorganic should align with specific environmental conditions, crop requirements and long-term sustainability goals. Organic mulches, such as straw, wood chips and compost, enhance soil fertility and microbial activity, while inorganic mulches, like plastic films, provide effective weed control and moisture retention. By using the appropriate mulch, farmers and gardeners can reduce water evaporation, suppress weeds, regulate soil temperature and enhance plant productivity. Ultimately, proper mulching practices contribute to improved crop yields, soil conservation and sustainable agricultural management, making it a valuable strategy for both small-scale and commercial growers.

INTRODUCTION

Mulching is a protective layer of organic or inorganic materials placed on top of the soil. In the present situation of globalisation and health awareness demand of the virtuous horticultural crops have increased worldwide. The increasing demand by the landscape growers, enthusiasts for decorating their home landscapes to have aesthetically beautiful landscape sceneries in their home gardens have raised market competition for newer and better approaches to make their landscape pretty. So why mulch? Does it add any aesthetic beauty to the garden? The answer is yes.

Benefits of mulching

Mulches provide aesthetics, economic and environmental benefits to the urban landscapes. Mulching is especially useful in the establishment of trees in landscapes that receive minimal care, such as restoration sites. They also improve health of soil, create healthy plant populations and micro flora and fauna. They are bio diverse, provide stable landscapes and are more resistant to stress, require fewer applications of pesticides and fertilizers and are ultimately more sustainable than those without mulch cover. Mulching provides insulation from extreme heat and cold, helps to control soil temperature fluctuations and reducing stress on trees (El-Beltagi et al 2022). Mulches maintain the good level of moisture in the soil, where it can be absorbed by roots. This is especially beneficial during periods of drought. It also manages weed growth by avoiding germination of unwanted plants. It has been observed that the mulched planting pits with manure or sawdust improved oak (*Quercus* spp.) seedling survival compared to unmulched pits and surface plantings. You yourself can be the best judge for selecting the landscape mulch for your own garden.

Analyse the following parameters:

Selection of mulch? Is it too hot in the summers, then probably shouldn't choose rocks as they tend to increase the heat around plants, resulting in increased plant stress and greater vulnerability to insect and disease problems. Using rocks can also be dangerous since mowers, landscape equipment and children can throw them. Rock mulches are a good choice for dry bed streams to help slow water down and reduce soil erosion and the washing of organic mulches into turf grass areas. In areas where rock is used, select a color that matches other elements of the house or hardscape.

- Cost of the mulch?
- Is the mulch readily available?
- What is its benefit?
- Will it provide aesthetic beauty to the garden?
- Will it match with other elements?
- What's the shelf life of the mulch, does it need frequent replacements?
- What's the area to be covered with mulch? Can it be done by local garden mulch?

If the answers to these questions are fulfilled and you are satisfied, go for it and beautify and healthify your garden with a great landscape mulch of your choosing. Some of these tips might help.

Types of mulches

Basically, there are two types of mulches: organic and inorganic types.

Organic mulches are the living type which can get easily decomposed and need frequent replacements. They add organic matter to the garden through decomposition and improve soil health. Increases water holding capacity in sandy soils and improve drainage in clay soils. It also helps in recharge of ground water. They are many types of organic mulches such as straw, leaves, bark, pine needles, compost, saw dust, grass clippings, wood chips etc.

Inorganic mulches are the non-living type and do not decompose easily and only needed to be replenished when they are too damaged in the soil or moved off-site. Yes they do have high longevity but they do not add anything to the soil. They increase the reflective heat and soil temperatures especially during summers. Some of the examples are rock, pebbles, plastic and landscape fabric (geotextile).

Types of organic mulches

With respect to retention of water the mulches are divided into three categories. These consist of rapid decomposers such as grass clipping, leaves and local crop residues; moderate decomposers including hay and straw, coir pith and jute; and slowly decomposing timber residues including sawdust, and barks and chips from both hard and softwood plants. Cover crops are generally less effective than either organic or inorganic mulches as they must compete with other landscape plant materials for water.

An early investigation revealed that applying a relatively thin layer of straw, approximately 3.8 cm (1.5 inches) in thickness, could reduce evaporation by approximately 35% when compared to leaving the soil bare. Across most comparative studies examining various types of mulches, organic mulches consistently prove to be more efficient in conserving water than inorganic mulches, and both organic and inorganic mulches outperform synthetic mulches. In essence, any form of mulch is superior to leaving the soil exposed when it comes to water conservation. From a practical perspective, using an appropriate mulch can significantly reduce the need for irrigation in various landscaping scenarios. Traditional straw mulch sourced from rice (*Oryza sativa*) and other grains continues to be a popular choice and, in some cases, can even surpass the effectiveness of living mulches like legumes and grasses. Combining straw mulch with an erosion control net has been proven to reduce erosion by 95% when compared to untreated bare soil in forest plantations.

During the summer months or in hotter regions, research indicates that organic mulches can effectively reduce soil temperatures when compared to unprotected soil. Specifically, coarser mulches tend to moderate temperatures more effectively than finer-textured mulches. For instance, the soil beneath cobble mulch remains cooler than that under gravel, and the soil under leaf mulch is cooler than that under compost. Additionally, thicker applications of organic mulch provide better temperature regulation compared to thinner layers. However, it's worth observing that when using finely textured mulches in thick layers, it can hinder both water and gas exchange. When comparing different types of mulches, living and organic mulches prove to be superior in regulating temperatures as opposed to inorganic mulches. Among inorganic mulches, chunkier materials like gravel and lava rock are more effective in moderating soil temperature than solid inorganic surfaces like concrete. Synthetic mulches, including asphalt, fabrics, and plastics, are less effective at temperature moderation. In fact, they often lead to an increase in soil temperature, especially for black plastic mulches, which can either raise or lower soil temperatures depending on factors like light absorption and heat retention. On the other hand, clear plastic mulches consistently elevate soil temperatures due to their ability to transmit radiation, including infrared wavelengths, while retaining heat.

In case you want to prefer organic mulches, these can be your choices:

1. Grass clipping

- Most abundantly and easily available mulch materials.
- It provides nitrogen to the soil, if incorporated fresh.
- Use of dry grass as mulch material is much preferred.

2. Straw

Straw has long life in comparison to other mulches (grasses, leaves and leaf mould) e.g. paddy and wheat straw are used for flower production.

3. Compost

- It is the excellent material for improving the health of soil and adding nutrients to soil.
- It increases microbial population and improves soil structure.

4. Dry leaves

Leaves are good for protecting dormant plants during winter by keeping them warm and dry. They get easily decomposed therefore, re-mulching is required.

5. Saw dust

- Very poor in nutritive value, decompose slowly and acidic in nature.
- It is obtained during finishing operation of wood.

6. Newspaper

1 to 2 cm thick sheet of newspaper should be used and edges should be fastened with materials like pebbles, gravels. Not usually preferred.

7. Bark clippings

- Long lasting and allow proper aeration to the soil underneath but are not easily available. Hardwood bark clippings contain more nutrients than softwood.
- Some bark products may cause phytotoxicity. Pine is the most common, but cypress and redwood are popular. Areas with these mulches provide classy look, they are darker and glossier provide smooth texture to the area and have good contrast with foliage and hardscaping.

8. Pine Needles

Great mulch, especially for acid-loving plants. Slow to decompose, pine needles, last a long time. Avoid using near wood fences or walls due to potential fire hazard. For plants such as gardenia, azalea, rhododendron, begonia, caladium, blueberry, magnolia, etc. Fallen pine (*Pinus* spp.) needles resulting from beetle attack helped prevent soil erosion and logging debris was used to intercept water and reduce overland flow. Common urban contaminants such as lead and cadmium can be removed from the soil solution by mulched leaves of eucalyptus (*Eucalyptus* spp.), pine, poplar (*Populus* spp.) and arborvitae (*Thuja* spp.).

9. **Woodchips**

- Woodchips can come from branches, bark, or recycled wood pallets. Many colourful dyed woodchips are available including pine, cedar, black walnut and cypress.in the market. It should be applied 2-3 inches thick.
- Fresh woodchips may contain seeds of trees that can become a weed problem in landscape beds. Bagged woodchips typically do not have a problem with weed seeds since temperatures achieved within the bag during shipping and storage are high enough to kill any that were present.
- Although it is not believed that woodchips draw termites to a location, they may create access for an existing termite population if woodchips are placed against the foundation. A 6- to 12- inch un-mulched buffer from wood or siding will reduce the likelihood of termites invading the foundation.
- It makes a good walkway, provides neatness to the garden area, provide cushioning underfoot and a great backdrop for the striking foliage plants such as Hosta, *Leucophyllum* sp., caladium and dracaenas etc.
- Bacterial soft rot (*Erwinia carotovora*) was significantly greater in plants grown with a black polyethylene mulch than with bark or wood chips. Therefore, selecting an appropriate mulch is crucial as part.

- **Types of inorganic mulch materials**

In case of inorganic mulches:

1. Gravels, pebbles, crushed stones:

- Soil covered with pebbles prevent transfer of heat from atmosphere but reflect solar radiation and can create a very hot soil environment during summer.

- Used for perennial crops. Small rock layer of 3-4cm provides good weed control.

2. **Plastic mulch**

- There are of two types: **Photo-degradable plastic mulch**: This type of plastic mulch film gets destroyed by sun light in a shorter period. **Bio-degradable plastic mulc**h: This type of plastic mulch film is easily degraded in the soil over a period of time.
- The following types of plastic mulch films are used in horticultural crops: Black Plastic film: it helps in conserving moisture, controlling weed and reducing outgoing radiation. Reflective silver film: it generally maintains the root-zone temperature cooler. Transparent film: it increases the soil temperature and used for soil solarization.

3. Landscape fabrics

- These are black woven fabric mulches of polypropylene or polyester that contain small holes in the surface to allow air, water and nutrients to move from the soil.
- They are not aesthetically pleasing by themselves and are typically used with mulches placed on top.
- Landscape fabrics may inhibit the growth of some rhizomatous and stoloniferous plants. Any soil that is allowed to stay on top of the liner provides a place for weed seed to germinate.

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