



EXTENSION
College of Agriculture,
Biotechnology & Natural Resources

Special Publication 06-10

Mulches for Nevada Landscapes

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Introduction

After plants and the necessary irrigation system have been installed in a landscape, it is important to maintain it. Water conservation is critical, as is weed control. Preventing compaction and erosion on slopes are important especially where soils have poor structure. It also benefits certain types of gardens to moderate soil temperatures, keeping them from swinging between extremes of heat and cold. In Nevada, all of these concerns must be addressed if gardens are to remain healthy. The limited supply of water in the desert means that landscapes must be water efficient. Weeds are opportunists and will exploit nutrient sources, diverting water resources from desirable plants. Because of their poor structure, desert soils become eroded easily. Temperatures across Nevada can be extreme: -50° F is the record for cold (San Jacinto, 1937) and 125° F (Laughlin, 1994) is the highest temperature recorded. Such conditions can stress landscape and garden plants, interfering with their normal growth and survival.

Types of Mulch

Mulching is the practice of placing some kind of material on the bare soil between plants.



Shredded wood or bark can be a useful organic mulch. Photo: Angela O'Callaghan

The “best” mulch will vary with the type of plant and landscape. Mulches may be decorative, applied for aesthetic reasons, such as to tie a landscape together, to make bare soil more attractive, or to set off plantings. Mulches are characterized as permanent, which are left in place and do not readily break down, or temporary, useful for a specific length of time, and that are either removed or left to decay. The more useful descriptions are “organic,” “inorganic” and “living.”

Organic mulches are those that were recently alive, or are derived from living things.

Materials such as wood chips, sawdust, shredded or chunked bark, pine needles, straw, hay, even compost, dried leaves or shredded newspaper fall into this category. Organic mulches permit the soil to take up and hold water. These types of mulches will be acted upon by soil organisms, causing them to decompose over time. This action ultimately enriches the soil with nutrients and improves the overall soil structure. Since they do break down, they must be renewed regularly.

Inorganic mulches are not derived from animals or plants. Materials such as rock, landscape cloth, shredded rubber, and plastic sheeting are considered inorganic. Several of these are categorized as permanent, although plastic is not. It is easily torn, and is frequently removed after a specific length of time. For these and other reasons, plastic mulches are rarely recommended for landscape use.



Plastic mulches are applied in shade to block light and moisture from an area.



Low growing prostrate rosemary can serve as a living mulch in a Southern Nevada landscape.

Photo: Angela O'Callaghan

Living mulches are plants installed between other plants of interest. These are

frequently grasses or legumes, although dense, low growing ground covers also serve this purpose. Like any other plants in the landscape, they require irrigation and fertility management.

Functions of Mulches

All mulches have a **weed-blocking** role, whether they are organic, inorganic or living. By preventing light from reaching the germinating weed seeds, they prevent unwanted plants from appearing. Weeds may emerge, however, from openings in the mulch where the desired plants are growing.

Organic and inorganic mulches **limit evaporation** of limited water from the soil. Living mulches pull up water and ultimately lose some of it to the atmosphere.

Mulches are frequently used to **control soil temperatures**. A layer of chipped wood, bark, compost, straw or hay on the surface will provide dense shade to the soil, which keeps temperatures lower. This also retards soil warming in the spring. White plastic can also reflect light, keeping soils cooler. Clear plastic mulches, on the other hand, are occasionally used to raise soil temperatures, since they can act much as greenhouses do. Because they absorb heat, rock mulches raise the temperature of both the soil and the surrounding air.

Which kind of mulch to use

Bark, chipped wood, and peat moss mulches are frequently used as mulch because they present an attractive addition to a landscape, while materials such as straw or corn cobs are used more for vegetable gardens.

Depending on the variety of plants that are used, organic or inorganic mulch may be appropriate. One way to determine what type to use is by referring back to the environment where the plant first evolved. This is often the

kind of ecological niche where the plant grows best.

Deserts are harsh environments where plant life is distributed sparsely. There are very few grasses present, and leaves tend to be small, reduced or even non-existent. Since these areas have so little plant material, organic mulches would not play a large role in the landscape. Plants from such areas would probably not benefit much from organic mulches, particularly as they can keep soil temperatures lower.



While it may look barren, desert crust is teeming with microscopic life. Photo: Angela O'Callaghan

Soil surfaces in the desert often have a surface layer of rocks, known as “desert pavement.”. There is also a desert “biological crust” composed of large numbers of soil microorganisms. This crust is also called cryptobiotic or microbiotic.

Development of the desert crust takes hundreds of years, hence it is not replicated in gardens or other planned landscapes. Water conserving desert landscapes often rely on rock mulch. For optimum weed control, it is advisable to place a layer of landscape fabric (not sheet plastic) on the soil surface before installing rocks.

Plants that did not evolve in the desert generally have higher water and fertility requirements than desert natives. Most garden vegetables, many flowering annuals and other ornamental plants, as well as a large number of fruit trees, arose in areas where precipitation and humidity levels are comparatively high. In those areas, foliage and other plant parts fall from

vigorously growing plants, creating an environment with higher amounts of soil organic matter, and thus, higher soil fertility. Temperatures in those areas are not necessarily always high or low, but usually have a narrower range than is found in the desert.

Growing such plants in the desert southwest demands careful attention, particularly as gardens must remain water efficient. Non-native plants are rarely acclimated to extreme temperature ranges, nor to infertile, alkaline, poorly drained or salty soils, such as those common in the desert. Survival of these non-desert plants requires sufficient supplemental water, good plant nutrition, and moderate soil



water requirements. Photo: Angela O'Callaghan

temperatures. They would not benefit much from inorganic mulches. Rather, organic mulch is more appropriate, because of the cooler soils that result from their use, as well as the gradual breakdown of the mulch slowly provides nourishment to the developing plants.

Applying mulch

Ideally, the appropriate mulch will be applied when the landscape is installed. Mulch can, however, be applied at any time, providing that other good gardening practices are followed.

These include the following practices:

- Healthy plants are placed in the soil at a correct depth and density;
- Soil has been amended to meet the plants' needs;
- Irrigation systems have been properly installed and operated;
- Soil is moist before the mulch is applied.



The coarser the organic material, the thicker it should be applied to keep light from the surface and to limit the amount of evaporation. Photo: Angela O'Callaghan

Organic mulches should be applied and maintained at an approximate thickness of three to four inches thick. Less than three inches will limit its weed control and temperature moderation benefits. The thickness of mulch should be checked periodically, since it breaks down or may blow off during periods of high winds. When using organic mulch around trees, take care not to permit it to come in contact with the trunks. Maintain a space of six inches between the mulch and the trunk. This will limit the opportunity for disease, insect or vertebrate pests to become established in the trees.

Inorganic mulches are not generally applied so thickly as organic ones, although complete coverage is important. A layer of landscape fabric under a two inch layer of rock is sufficient. Again, the key is to block light from reaching the soil to prevent weed seeds from germinating. Landscape fabric is rarely used alone, being kept covered for aesthetic and weed control reasons. A mulch of smaller rocks is

more effective at retaining soil water than are larger ones.



*Commercial and residential desert landscapes often include rock mulch.
Photo: Angela O'Callaghan*

For most gardens and landscapes, it is best to utilize only one type of mulch, either organic or inorganic. Mixing the two types will not give the best protection, and it would be very inconvenient to remove a temporary mulch if it has been placed beneath a permanent one.

When to apply mulch

As soon as possible after planting trees and shrubs, the appropriate mulch should be placed around the plantings. If necessary, it can be placed or replaced at any time, as long as the soil is ready to be covered, having been watered, weeded, and fertilized.

For vegetable gardens, mulch should be applied between and within rows, making sure not to block or cover developing plants. As with trees, mulch should not touch the bark of garden plants.

Depending on the type of mulch, it may decay, degrade or be blown away. It should be inspected periodically, and refreshed with new materials whenever necessary.

What happens at the end of the season?

Annual beds (flowers and vegetables) are generally mulched with temporary materials that may be either organic or inorganic. Annuals, which die at the end of the blooming season, are usually removed at that time. If they are not diseased or infested with insect pests, this might not be necessary. If an organic mulch has been used on the bed, then old plants and mulch can be worked into the soil to improve it. This may also be done at the end of the season with living mulches, working the plants into the soil where they become a “green manure”.

Inorganic mulches such as landscape fabric can be removed and stored until the next season, but if they have been placed under a permanent mulch such as rock, then it should be considered permanent.

Permanent mulch should be groomed if necessary, but this type of mulch is typically used in perennial plantings, hence there is no “end of season.”

Difficulties in using mulch

As mentioned above, organic mulches can blow off the soil surface and breakdown over time. Early in this breakdown process, soil fertility can actually be slightly *lowered*. To maintain plant health, additional fertilizer (particularly nitrogen, at a rate of approximately ½ to 1 lb. per 1000 sq. ft.) is often required to compensate for this temporary lowering.

Occasionally, small animals will burrow into organic mulch and nest there.

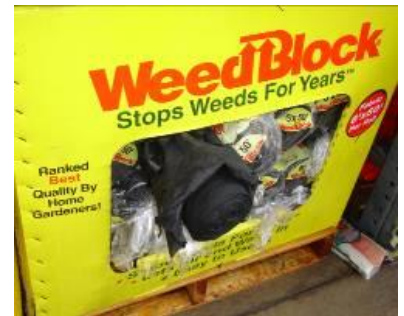


If the soil is too moist and mulch is kept excessively thick and wet, it contributes to promotion of disease causing organisms. Under these conditions, mulch can actually become toxic and foul smelling, and may even damage

plants. Insects such as termites and cockroaches may move into mulch and become problems. Hay is not considered the best mulch because there is a high probability of weed seeds being present in it.

Inorganic mulches do not improve soil conditions. While they may degrade, they do not provide nutrients, nor do they improve soil structure. Except for certain colored plastics used in vegetable production, plastic mulch is rarely recommended in Nevada. It is easily torn, which defeats its weed and moisture control purposes. Typically, it is removed and discarded at the end of the growing season. Once in a landfill, it does not break down unless it is photodegradable. Temperatures are usually not moderated under inorganic mulches, and may even become higher than desirable for growing many plants.

Landscape fabric (weed barrier) does not break down, and can be used repeatedly. It is usually not used alone, but under some other type of mulch. It is relatively expensive and can be cumbersome to use. Rock mulches are hot and heavy, and become unsightly when trash gets caught in them. When weeds do emerge between rocks, it may be difficult to remove them. Although they are generally classified as permanent, rocks do degrade over time, hence they need to be refreshed. A mulch of large stones may also provide a protected habitat for animals that could become pests.



Living mulches need to be maintained scrupulously. This can include mowing or pruning, irrigating and fertilizing. If they are allowed to grow too vigorously, they may interfere with other landscape plants, acting as if they were weeds. They must be kept in good condition, not only for aesthetic, weed and

temperature control reasons, but also to prevent them from harboring plant disease organisms and insect pests. Dead or dying living mulches can become a fire hazard.

Summary

When used correctly, mulches can conserve water, limit weed infestations, lessen soil erosion and moderate soil temperatures. It is necessary to use appropriate mulches in different types of landscapes. There are three general categories of mulch:

Organic mulches, such as wood, straw or compost, will ultimately break down into compost that often enriches the soil. They are rarely used with desert plantings, but can be very useful for other ornamentals and for edible gardens.

Inorganic mulches such as rock, often with a layer of landscape fabric beneath it, are the usual choice for desert plants.

Living mulch is a plant or group of plants grown between foundation plants in order to minimize weed infestation and moderate soil temperature.

In general, it is not a good idea to place temporary mulch, such as compost, on top of a permanent inorganic one such as rock.

References

Ngouajio, M., M.E. McGiffen, C. Hutchinson. 2001. Reducing weed population and soil temperature in desert vegetable production with cowpea mulch. SARE Western Region Project Report. <http://wsare.usu.edu>

Xiao-Yan Li, Pei-Jun Shi, Lian-You Liu, Shang-Yu Gao, Xiong-Shi Wang, Liu-San Cheng. 2005. Influence of pebble size and cover on rainfall interception by gravel mulch. J. Hydrology 312. 70-78.

Herrera, E. and G.W. Dickerson. Mulches for Gardens and Landscapes. New Mexico State University. Guide H-121

Examples of Mulches

(This list is not exhaustive)

Organic:

- Corn cobs and stalks
- Dried grass clippings
- Dried leaves
- Coffee grounds
- Compost
- Shredded bark
- Nut shells
- Peat moss
- Straw
- Chipped wood
- Sawdust
- Shredded Newspaper
- Pine needles (for acid loving plants)
- Coconut husk fiber (coir)

Inorganic

- Landscape cloth
- Roll plastic
- Gravel, rock
- Ground rubber
- Decomposed granite

Living

- Turfgrass
- Vetch
- Clover
- Bean plants
- Low growing shrubs
- Ground covers such as ice plant

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