

Mulching provides many benefits that increase overall tree health and resilience. It increases soil organic matter, helps maintain soil moisture, mitigates soil temperatures, and increases soil microbial activity which improves overall root zone health. Mulch may also help control weeds and reduce the spread of plant disease.

Depending on the material used, it may also provide nutrients.

Mulching Materials

Mulching materials commonly used in the Sierra Nevada foothills include wood chips, composted manure, compost, rice hulls, straw, leaves, mowed cover crops, or a combination. Fruit tree prunings may also be used, if they are free of insect pests and disease. For organic orchards, mulching materials must be free of pesticide residues.

Mulch Application

Apply a 4-6" layer of mulch to moist soil. Mulch applied to dry soil may impede water infiltration, and will require heavy irrigation to refill the soil profile with water.

Spread mulch under the tree canopy around each tree or along the tree row, leaving row middles clear. Keep mulch 4" away from tree trunks. This prevents moisture accumulation at the base of the tree, which can cause trunk rot. It also reduces cover for voles which can girdle trees. Check trees regularly and move accumulated mulch away from the trunks. Weeding or pruning activities or wildlife activity such as scratching by turkeys may cause mulch to accumulate around tree trunks.

Benefits of Mulch

1. Reduces water loss and tree water stress

Mulch helps retain soil moisture by reducing water loss due to evaporation. It also holds on to water in the soil as the mulch decomposes into humus, slowly releasing it

as the soil dries. 1% organic matter holds 16,000 gallons of water per acre-foot of soil.

2. Reduces soil temperature extremes.

Mulch provides insulation to the soil, keeping soil and roots cooler, reducing plant stress during periods of high heat.

Shallow absorbing roots and beneficial soil organisms can be damaged by extreme heat or cold. Mulch provides insulation from these conditions.

3. Increases soil organic matter and may provide nutrients

Mulch increases soil organic matter and enhances microbial activity by fostering populations of beneficial bacteria and fungi. Organic matter stores both water and plant nutrients. As mulch decomposes, it gradually releases nutrients into the soil, reducing the possibility of nutrients being leached away by rainfall or irrigation. The nutrient content of mulch, the rate at which it decomposes, and releases nutrients varies depending on the material used. Depending on the materials used, it may supply nitrogen, phosphorus, and/or sulfur. This may reduce the amount of fertilizer needed.

4. Improves soil structure

The microbial populations which feed on the mulch produce substances that aggregate soil particles, improving soil structure and reducing erosion. This creates more and larger pore spaces in the soil which improves water retention and infiltration.

5. Reduces soil erosion

Mulch protects the soil surface from the impact of heavy rain and overhead irrigation. This is important on slopes and fragile soils. Mulch provides a healthy root environment which helps maintain soil integrity and reduces erosion.

By reducing erosion, mulch can help improve the water quality. The mulch and resulting humus retains sediments that may carry nutrients or pesticides. This is increasingly important as agricultural water quality regulations become more stringent.

6. Weed management

A 4-6" layer of mulch can inhibit weed seed germination of some species by excluding the light necessary for germination. Weed seedlings exhaust their stored resources before they are able to reach sunlight.

Be sure to use mulch materials that are free of weed seeds. Manures should be composted to reduce viable weed seeds. Take care to prevent weed seeds from being introduced to mulched areas (e.g. from weedy orchard margins, irrigation water, etc.), since weeds may also benefit from mulch.

7. Pest management

Mulch may provide habitat for some organisms such as ground beetles and predatory nematodes that may reduce soil-dwelling pests. Weeds can serve as alternate hosts to pest insects and disease organisms, so using mulch to reduce weeds may help reduce these pests. However, mulch may impede sanitation practices such as removal of leaves and dropped fruit. It may provide habitat or an overwintering site for some pests. Mulch has may also increase rodent activity (voles, moles, and gophers).

Considerations for Mulch Use

- Cost and availability of material
- Labor cost for application
- How often you need to reapply: it depends on the material and its rate of decomposition in your microclimate with your irrigation system.
- Your irrigation system and its compatibility with mulch. If you use overhead irrigation, the mulch will absorb a significant quantity of water before it reaches the soil and ultimately tree roots. Microsprinklers are

more compatible with mulch, since water is applied directly to the soil.

- If you are using wood chips from municipal tree trimming companies, check to be sure they are free of debris such as plastic, glass, wire, etc.

References and Resources

Influence of Orchard Floor Management and Compost Application Timing on Nitrogen Partitioning in Apple Trees. 2010. Dan TerAvest, et al. HortScience 45(4):637–642.

Mulching Options for Northwest Organic and Conventional Orchards. 2008. David Granatstein. HortScience. 43(1): 45-50.

Orchard Floor Management Practices to Reduce Erosion and Protect Water Quality. 2008. Anthony Toby O'Geen, UCANR Pub #8202. <http://anrcatalog.ucanr.edu/pdf/8202.pdf>

Organic Mulching Materials for Weed Management. 2012. Mark Schonbeck. eXtension. <http://articles.extension.org/pages/65025/organic-mulching-materials-for-weed-management>

Pest Management Benefits of Compost Mulch in Apple Orchards. 2003. M.W. Brown, Thomas Tworkoski. Agriculture, Ecosystems & Environment. 103(3): 465-472.

Tree-based Mulches Influence Soil Properties and Plant Growth. Adam O. Maggard et al. HortTechnology. 2012. 22(3):353-361.

Development of this information is supported by:

- California Department of Food and Agriculture Specialty Crop Block Grant Program
- Western Extension Risk Management Education Program



**WESTERN
EXTENSION
RISK MANAGEMENT
EDUCATION**