



Mulching in Fruit Crops

*Sonia, Sahil and Vikas Kumar Sharma

Department of Horticulture, CCS Haryana Agriculture University, Hisar (Haryana)

*Corresponding Author's email: bhankharsonia00@gmail.com

Mulching is an important horticultural practice widely used in fruit crop cultivation to improve soil conditions, conserve moisture and enhance plant growth. In simple terms, mulching refers to covering the soil surface around plants with organic or inorganic materials to protect the soil and improve the micro environment around the root zone. Fruit crops generally remain in the field for many years, and therefore maintaining soil health, moisture balance and weed control becomes crucial for sustainable productivity. Mulching helps in reducing soil evaporation, moderating soil temperature, suppressing weeds, improving soil fertility (in case of organic mulch) and protecting soil structure. In recent years, mulching has gained significant importance due to increasing water scarcity, soil degradation and the need for climate resilient horticulture practices. It is particularly beneficial in newly established orchards where young plants are highly sensitive to moisture stress and temperature fluctuations.

Keywords: Mulching, Soil moisture conservation, Weed Management, Climate-Resilient Horticulture.

Types of Mulches Used in Fruit Crops

Mulches used in fruit cultivation can be broadly classified into organic mulches and inorganic (synthetic) mulches.

Organic Mulches

Organic mulches are derived from plant or animal materials and gradually decompose in the soil. These mulches improve soil fertility and microbial activity.

Common organic mulches include:

- 1. Straw or hay mulch:** Wheat straw, rice straw, or hay is commonly used in fruit orchards. It is inexpensive and readily available in many farming areas.
- 2. Dry leaves:** Fallen leaves from trees can be used as mulch around fruit plants.
- 3. Crop residues:** Residues of crops such as maize stalks, sugarcane trash and paddy straw can be used effectively.
- 4. Wood chips and sawdust:** These are commonly used in orchards and landscaping.
- 5. Compost or farmyard manure (FYM):** Compost acts both as mulch and a nutrient source.
- 6. Grass clippings:** Freshly cut grass can also serve as mulch.

Advantages of Organic Mulches

- Improve soil organic matter and fertility
- Increase microbial activity
- Enhance soil structure
- Improve water infiltration
- Reduce soil erosion
- Suppress weed growth
- Provide nutrients during decomposition

Disadvantages of Organic Mulches

- Require large quantities of material
- May harbor pests, insects, or rodents
- Decompose quickly and require frequent replacement
- Sometimes may cause nitrogen immobilization during decomposition
- Can be labor intensive to apply

Inorganic Mulches

Inorganic mulches are synthetic materials that do not decompose easily. These are widely used in commercial fruit production systems.

Common inorganic mulches include:

Black polyethylene mulch

- Silver black plastic mulch
- Transparent plastic mulch
- Gravel or stones
- Rubber sheets
- Geotextile fabrics

Among these, plastic mulching films are the most widely used in modern horticulture.

Advantages of Inorganic Mulches

Excellent weed suppression

- Reduce soil moisture loss
- Increase soil temperature in winter
- Improve early plant growth
- Provide long term coverage
- Reduce soil compaction
- Improve water use efficiency

Silver or reflective mulches can also repel insect pests by reflecting sunlight.

Disadvantages of Inorganic Mulches

Higher initial cost

- Do not add nutrients to soil
- Disposal of plastic mulch may cause environmental pollution
- Can increase soil temperature excessively during summer
- Require careful installation and management

Living Mulches (Cover Crops)

Living mulches refer to growing cover crops in the interspaces of orchards to protect soil and improve fertility.

Common living mulches include:

Dhaincha (*Sesbania* spp.), Cowpea, Clover and Leguminous cover crops

These crops can later be incorporated into the soil as green manure.

Advantages

Improve soil fertility

- Fix atmospheric nitrogen
- Reduce soil erosion
- Improve soil structure
- Enhance biodiversity

Disadvantages

May compete with fruit plants for water and nutrients

- Require management and periodic mowing
- Can harbor pests or diseases

Benefits of Mulching in Fruit Crops

Mulching provides several agronomic and environmental benefits in fruit orchards.

Moisture Conservation

Mulch significantly reduces soil evaporation. Studies have shown that mulching can reduce evaporation losses by 30-50%, thereby improving water use efficiency.

Temperature Regulation

Mulch helps in maintaining favorable soil temperature conditions. It keeps soil cooler during summer and warmer during winter, protecting plant roots from temperature extremes.

Weed Suppression

Mulching acts as a barrier to sunlight and prevents weed seed germination. This reduces weed competition for nutrients, water and light.

Improved Soil Fertility

Organic mulches decompose gradually and release nutrients into the soil. They also increase soil organic carbon and microbial activity.

Reduced Soil Erosion

Mulching protects the soil surface from the direct impact of rain and irrigation water, thereby reducing soil erosion and runoff.

Improved Fruit Yield and Quality

Mulching often results in higher fruit yield, improved fruit size, better color and improved quality attributes due to improved soil conditions.

Better Soil Structure

Mulches help in improving soil aggregation and porosity, resulting in better aeration and root growth.

Application of Mulch in Fruit Orchards

Mulching is usually applied around the basin of fruit trees. The following guidelines are generally followed:

Apply mulch in a circular ring around the plant base.

- Maintain 5-10 cm thickness for organic mulches.
- Keep a small gap near the tree trunk to avoid rotting.
- Apply mulch during early summer or after irrigation.
- In young orchards, mulching can be applied over the entire basin area.

Fruit Crops Where Mulching is Commonly Used

Mulching is widely used in several fruit crops such as:

Mango, Guava, Citrus, Pomegranate, Apple, Strawberry, Banana, Papaya and Grapes

In crops like strawberry and vegetable based fruit crops, plastic mulching is particularly common.

Limitations of Mulching

Despite many advantages, mulching also has some limitations:

- Initial cost may be high in case of plastic mulch.
- Improper mulching may lead to rodent infestation.
- Plastic mulch disposal can cause environmental concerns.
- Thick mulch layers may prevent rainwater infiltration.

Proper management practices are therefore necessary to maximize the benefits of mulching.

Conclusion

Mulching is a highly effective orchard management practice that contributes significantly to soil health, moisture conservation, weed control, and improved fruit production. Both organic and inorganic mulches have their own advantages and limitations and their selection depends on crop type, climatic conditions, availability of materials and economic considerations. In sustainable horticulture systems, particularly under water limited and climate stress conditions, mulching plays a crucial role in maintaining soil productivity and ensuring better growth and yield of fruit crops. The integration of mulching with other improved orchard management practices can greatly enhance the efficiency and sustainability of fruit production systems.