

Effect of Mulching on Commercial Fruit Production in Fruits: A Review Article

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Abstract

Mulching is a water and soil conservation practice in agriculture. Large amount of water is lost through a human carelessness, as one example is using huge amount of water, excess water application. Mulching is a soil and water conserving practice which helps in weed management with the help of soil solarisation process in which a mulching material is spread around the plant. It has various advantages as it will help in retaining soil moisture, enhancing structure of soil and prevents plants from weed growth. Mulching proves to be beneficial for reducing soil erosion, maintaining soil structure and increasing the soil temperature. It increases soil fertility status and decreases incidence of pest and disease.

Keywords: Mulching, Fruits, Conservation, Moisture, weed control

Introduction

The word mulch has been probably derived from the German word “molsch” meaning very soft to decay, which refers to the use of straw and plant leaves spreading on the ground as used as mulch. The mulch material commonly used in the orchards is paddy straw, saw dust, hay, plastic mulch and rubber mulch. Mulching decreases the deterioration of land by protecting the soil loss, soil deterioration, runoff, helps in checking water evaporation and decreasing weed growth. So it will help in facilitating more withholding capacity of water and helps in regulating fluctuation of high temperature, improving the biological and physico-chemical attribute of soil, so it increases the yield, quality and growth of crops by adding nutrients to the soil. In addition to increasing nutrients to soil it has been found that mulching enhances the yield by 50-60 per cent as compared to no mulching under rainfed situations. Borthakur and Bhattacharya [1] stated that regular utilization of organic mulching helps in enhancing the flora of land soil and helps in better soil aeration. Diurnal soil temperature is moderated by the organic mulches. [2]. The application of polythene mulch

is beneficial in rising temperature of soil, conservation of water, controlling of weeds [4]. Most commonly used mulch is black plastic mulch used worldwide [5]

Types of Mulching

Mulching are classified into two types organic and Inorganic mulching

Organic Mulches

Organic mulches include the living product as the tree bark, grass, wood chips, hay those products which decayed. The organic mulches improve the soil quality and help to contain high nutrients. This type of mulching help to increase the nutrient capacity in soil and to improve quality. The leguminous plants are living mulches which are planted around the main crop and these crops are environmentally friendly then other inorganic mulches [7].

Inorganic Mulches

These types of mulches are non-organic products incorporated to the soil surface such as recycled rubber, rock, stone, fabric and plastics. The inorganic mulches does not break easily and they are taken out after each growing season when reused in field or garden. The inorganic mulch that is commonly incorporated is Plasticulture [8].

Mulch Materials and Its Importance in Fruit Production

A. Organic Mulching Material

- ✚ **Composts:** Compost helps in reduction of growing of plant diseases and help to control weed problems. It is prepared by recycling the organic material and it helps in decomposition of plant. High water efficiency is found in compost mulch by basil. [8]
- ✚ **Dry leaves:** Dry leaves are good for plants in winter as they keep the plant warm and dry during dormant period but the dry leaves may be easily blown away by the light wind. To protect them from being blown away it will require anchoring with chipped bark, stones and covering with sheet or net.
- ✚ **Dust mulching:** It is the method of regularly and deeply cultivation of the land around the plant or crop to develop a good pulverized layer of soil. The importance of dust mulching is elimination of weeds round about the crop in soil, but not in depletion in vaporization /evaporation on the surface of soil.
- ✚ **Living Mulch:** These types of mulches are easily emerging and soil covering, short in height and less nutrition, less water capacity. Mostly the legume crops or cereals

especially rye are used. The living mulch besides managing the weeds also helps in insect pest disease resulting in use of less pesticide.

- ✚ **Sod mulch:** In the sod mulch the vegetation is cut frequently in the field and cutted material is put into to remain on ground.
- ✚ **Straw:** Straw had low effect on soil before decomposition but it makes soil more fertile after decomposition. Straw mulch has a long life in comparison to other organic mulches.

B. Inorganic Mulching Materials

- ✚ **Plastic mulching:-** In plastic mulching sheets are spread over the seed bed as it will provides increase in warmth for germination and helps in growing of seedlings. The use of plastic mulch material will allow the sunlight to heat the soil, helps in growth stimulation and early yield .The opaque sheets as black polythene sheet help in minimizing weed growth ,as weeds received less light while germination while seeds receives full light. A technique namely soil solarization heat soil to high temperature using clear plastic mulch to kill the soil born pathogens. It has been found by many workers that instead of bare soil black plastic mulch recorded high yield in many crops.
- ✚ **Rock and gravel:-** In the winter or cooler regions the heat retained by rocks may increase the growing season. Crushed rock can be an ideal solution for paths, parking area, weed and other uses. Rock and gravel is use mostly in landscape gardening.
- ✚ **Rubber mulch:-** The rubber mulches are made from recycled tire rubber. Rubber mulching is made up of recycled tires It is advantageous for increasing soil moisture, decreasing weeds growth, and becomes a weed barrier, as weed seeds dehydrate in the mulch before reaching the soil. It is used in garden and landscaping and is a dust reducing.

Effect of Mulchingon Different Fruits

Mulching is an important practice to get a higher profit from orchards [9] and results in higher yield [10]. The mulching practice in fruit trees impart many numerous profitable effect, like as stabilization of temperature, reduced the loss of water by evaporation, save more soil moisture [11] soil fertility maintenance [12] weed growth suppression [13],

enhancement in yield and growth [14], diminishes wind or water erosion, and reduces the weed growth [15].

Gupta and Acharya [16] worked on the role of various types of mulch on fruit production of strawberry and they found that polyethylene with black colour increased fruit yield 56% as compared to the other mulch materials. Similarly in custard apple maximum fruit set was obtained with polythene mulch with black colour mulch followed by straw mulch.[17]. A high yield was observed under mulch with black polyethylene in comparison to control while studying the effect of polyethylene mulch on yield and other characters of field cucumber [18].

The role of black polythene mulching on growth, yield and quality of strawberry resulted in increased yield [19]. While studying the performance of strawberry plants it has been found black polyethylene produced early fruit set stage and maximum yield comparison to paddy straw and deenanath grass [20]. Prakash *et al.* [21] found that *Gliricidia maculate* mulching was successful on increasing height of tree, tree canopy and growth of shoot, fruit cracking and fruit yields with comparison to all distinct mulching material while studying the effect of mulching treatments unmulched, black polythene sheets, *Gliricidia maculate* green leaves and chhan grass on in situ soil moisture and economic yield of litchi. It has also been reported that maximum height of plant, number of leaves and flowers per plant in strawberry fruit crop was found in plants mulched with black polyethylene. black polyethylene mulch results in maximum number of fruits per plant, average weight and size (length and width) of fruit and fruit yield. However, the effect of black polyethylene mulch was statistically at par with paddy straw and sugarcane trash for most of the parameters [22]. Ahmad *et al.* [23] reported more fruit set (86.66%) in polyethylene mulch black as compared to other mulch as rice straw, wheat straw, sugarcane bagasse and no mulch, while analysing the response of reproductive and vegetative characters of chilli to both organic inorganic mulches. Joshi *et al.* (24) studied the role of mulching (black polythene mulch, no mulch), drip irrigation at 50, 75, and 100% scheduling on yield and quality of litchi, observed that application of mulching helps in reduction of fruit drop, fruit cracking and fluctuation in soil moisture. He also worked on the influence of integrated use of mulch (black polythene mulch, no mulch) and drip irrigation (50, 75, and 100%) estimated water requirement on soil microbial biomass carbon of a young litchi orchard and observed that mulch influenced the

microbial biomass during winter and irrigation influenced it in summer .This may be due to fact that both mulch and irrigation regulate soil temperature and reduces temperature fluctuations, thereby maintain optimum temperature and favourable conditions for proliferation of micro organisms. Sandhu and Bal (25) studied on the role of mulching on fruit cracking in lemon and found that moisture at 20% available depletion of soil moisture and mulching found to be the most successful treatment by causing minimum fruit cracking (7.21%) and keeps its superiority in the other year also by reducing lessens the percentage of fruit cracking effectively over all other treatments including control (irrigation at 10 -15 days interval).Plum variety santa rosa response to both inorganic and organic mulches in temperate areas observed maximum set of fruit (57.85%) in plants under black polyethylene followed by (56.80 %) in fruits under pine needles and the least reading of 50.24% was recorded in un-mulched fruits of santa rosa plum [26] .

Conclusion

Mulching is a excellent technique in horticulture which is advantageous to increasing the growth, quality and production of fruit crops. Mulching is a process which helps in producing good quality food. In future, farmers will make use of this innovative technique which help to conserve moisture, control weed growth and will help to improve soil health .This will help in a long way in the world a for achieving food security sustainably.

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