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Effect of Mulching on Horticultural Crop Production under Rainfed Condition

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Abstract:

As the population of India is continuously rising we have to adopt some means of sustaining our agricultural growth and it can be done through conservation farming. The best way out is the adoptions of the age old practice of Mulching in our agricultural fields. Mulching has become an important practice in modern field production due to benefits such as increase in soil temperature, reduced weed pressure, moisture conservation, reduction of certain insect pests, higher crop yields, and more efficient use of soil nutrients. Plastics are the most widespread mulching materials, and especially black polyethylene is used almost everywhere due to its low price and proved positive results in production, also in the fields the use of biodegradable films is increasing because they can be left safely in the field after harvesting, but they are not very durable and are much more expensive than plastics. This article reviews the published research on mulches. Different mulching materials have been used for different agricultural and horticultural species in different climatic environments, and results vary according to the chosen approach, growing practices, conditions and species, so generalizations are hard to make.

Keywords: Mulching, Conservation, Weeds, Rainfed.

Introduction

In the present situation of globalization and health awareness demand of the various horticultural crops has increased worldwide. The increasing demand for the fruits and vegetables and market competition has forced the farmers to produce more and high-quality fruits and vegetables for sustaining in the international market. Mulching is an agricultural and horticultural technique in which the use of organic is involved. This technique is very useful in protecting the roots of the plants from heat, cold. Mulch is used to cover soil surface

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around the plants to create congenial condition for the growth. This may include temperature moderation, reduce salinity and weed control. and quality of the crop. However, it is preferred in fruit orchard, flower and vegetable production, nurseries and forest where frequent cultivation is not required for raising the crops. Black plastic mulch is most commonly used in agriculture.

Types of Mulches

- **Organic mulches**: Organic mulches are derived from plant and animal materials such as straw, hay, peanut hulls, leaf mold, compost, sawdust, wood chips, shavings and animal manures. To achieve optimum advantage from the organic mulch, the mulch should be applied immediately after germination of crop or transplanting of vegetable seedling @ 5 t ha-1. Organic mulch are efficient in reduction of nitrates leaching, improve soil physical properties, prevent erosion, supply organic matter, regulate temperature and water retention, improve nitrogen balance, take part in nutrient cycle as well as increase the biological activity.

Straw:

Straw from rice, wheat, barley and other crops is widely available after harvesting. Straw mulch is light in weight and easy to apply and use. Nowadays, Paddy straw is used for mulching on fields, it provide better conditions for crop cultivation.

Bark mulches:

Bark Mulches are prepared from the by-products of pine, hardwood logs or cypress. Bark mulches decompose slowly therefore will have not to be replenished from time to time as other mulches.

Sawdust:

Sawdust is by-product of wood processing. Sawdust is low in nitrogen, so it can robs nitrogen from the soil as it decomposes like wood chips.

- **Inorganic mulches:** Inorganic mulch includes plastic mulch and accounts for the greatest volume of mulch used in commercial crop production. The plastic materials used as mulch are poly vinyl chloride or polyethylene films. Owing to its greater permeability to long wave radiation it can increase temperature around the plants during night in winter.

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Plastic Mulching for Crop Production: Synthetic mulching is an agricultural technique that involves placing synthetic materials on soil around plants to provide a more favourable environment for growth and production.

Effect of mulching on soil

- **Conserve soil moisture:** The conservation of soil moisture through mulching due to modification of favourable micro-climatic conditions in soil. When soil surface is covered with organic mulch it helps to prevent weed growth, reduce evaporation and increase infiltration of rain water during growing season. In addition plastic mulch helps in shedding excessive water away from the crop root zone during periods of excessive rain fall.
- **Reduced infiltration rate:** The presence of crop residue mulch at the soil-atmosphere interface has a direct influence on infiltration of rainwater and evaporation. Mulch cover reduces surface runoff and holds rainwater at the soil surface thereby giving it more time to infiltrate into the soil.
- **Maintain soil temperature:** Mulching reduces soil temperature in summer, raises it in winter and prevents the extremes of temperatures. In general, the effect of mulching on the temperature regime of the soil varies according to the capacity of the mulching material to reflect and transmit solar energy.
- **Reduced fertilizer leaching:** As excessive rainfall is shed drained the root zone, fertilizer loss due to leaching is reduced. This is particularly true in sandy soils. This allows the grower to place more pre plant fertilizer in the row prior to planting the crop. Mulching with coconut fronds increased leaf N, P and K content in chilli.
- **Add organic matter:** Organic mulches return organic matter and plant nutrients to the soil and improve the physical, chemical and biological properties of the soil after decomposition, which in turn increases crop yield.

Effect of Organic Mulching on Vegetative Growth: The application of organic mulch increases the crop growth such as earliness flowering, fruit set and harvesting period also it increased the no. flowers and fruits in tomato crop over control. Maximum plant height and a maximum number of leaves are observed in plots mulched with 4-inch wheat straw. A maximum number of fruits per plant is observed in mulching with grass.

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Conclusion:

The mulching with organic materials increases the soil nutrients, maintains the optimum soil temperature, restrict the rate evaporation from the soil surface, restrict weed growth and prevent soil erosion. It improves the all properties of soil like physical, chemical and biological. The organic mulches are decomposing easily and increase the organic content like carbon etc., in the soil which helps to maintain the soil loose. These organic matters are beneficial for the growth of earthworms and soil microorganisms it is also food of these beneficial microorganisms.

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