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INORGANIC MULCHING - A TECHNIQUE TO IMPROVE CROP PRODUCTIVITY

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Abstract
With the increasing world population, the need for feeding the world population increases. Hence, the crop production has to be increased to produce more food. Many challenges are involved in this. One among is inadequate water supply .In order to protect the available water in soil the modern mulching technology is used. Mulching protects the soil moisture and makes it available during the entire crop growth. This article explains every single aspect about inorganic mulching.

Keywords : Inorganic mulches, plastic films, soil moisture , weed control

Introduction

Agriculture is the main occupation of the most rural population and is the important sector contributing to the Indian economy .Now-a-days, Indian agriculture faces many problems and issues. The key issue is the availability of water. The farmers use excess water to the crop resulting in absence of water. In recent days, the need of water for human domestic needs has increased tremendously resulting in the depletion of major water resources. This resulted in the low presence of water for agriculture. So, various ways and method were analysed to conserve water for agriculture. Mulching is one of those water conserving technologies that primely aims at preserving the soil moisture by reducing evaporation of water . A mulch is natural or artificially spread layer of plant residues or other material on the surface of the soil. It is mainly of two types organic and inorganic mulching .The prior one works on the use of organic residues like leaf, grass, compost, etc... While the latter insists upon the use of materials like plastic films, stones .This article briefly discusses about inorganic mulching, the materials used, advantages, disadvantages.

Inorganic Mulching

Inorganic mulching involves the use of inorganic substances that does not uses organic matter in it. Inorganic mulches are stones and gravels, polyethylene films, landscape materials and rubbers. Inorganic mulches are usually used to create interruption in germination of weeds. Inorganic mulches like stones, gravels and rocks do not involve in improving soil condition but biodegradable and photo-degradable plastic mulches are readily decomposable and improve the soil condition. Heat can be absorbed and reflected by rocks which are useful in dry and hot environmental condition.

Types of Inorganic Mulches

Various types of inorganic mulches are given in the below Fig.1 types of inorganic mulches.

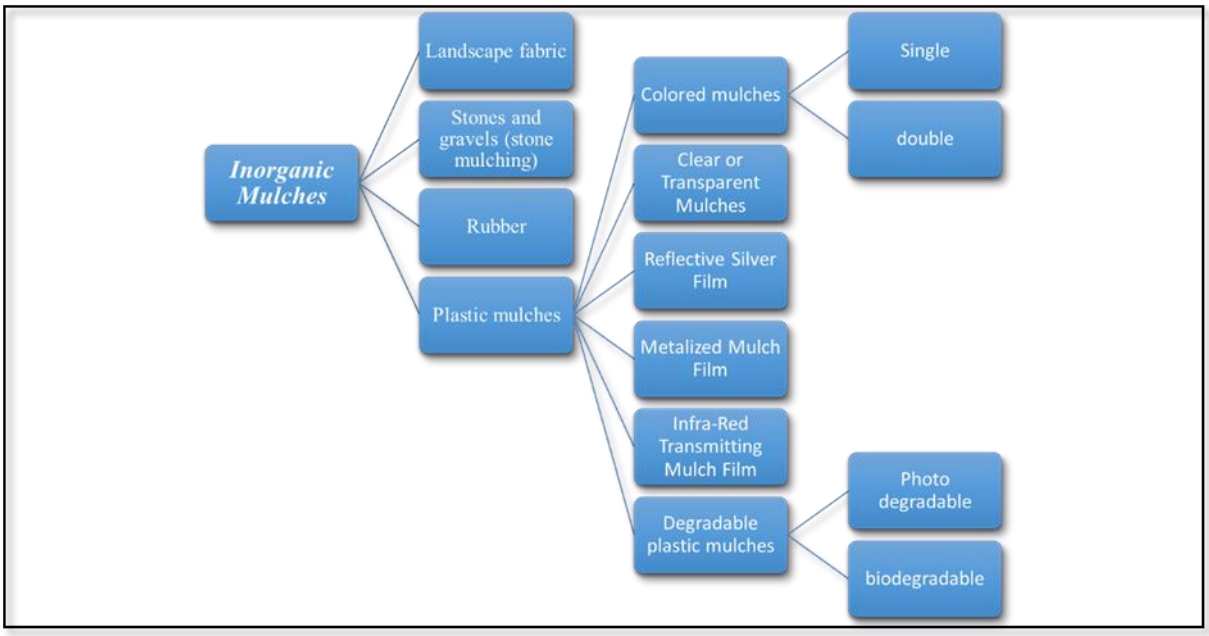

Fig.1 types of inorganic mulches.

I.) Landscape fabric

Landscape fabric is one of the better options for weed control as it allows only water and air to pass through it. Landscape fabric is created by polypropylene of high tensile strength. It controls the erosion of soil and protects the soil from wind and water erosion. It allows movement of rain water through it into the soil, which is impossible in plastic films. Landscape fabric is more popular than plastic films.

Fig.2 landscape fabric

II.) Stones and gravels

Stones and gravels are most commonly used in dryland to conserve water. They reduce the evaporation rate and improve the infiltration and percolation of water in the soil. But during hot season these stones absorbs the hot solar radiation creating high temperature. Hence, during hot season usage of these must be avoided.

Fig.3 Stone mulching

III.) Rubber

Rubber mulch is usually made from recycled rubber and tires . Due to its toxic combination it remains in the soil for long period and has high flammability. Hence , it is less prevalently used. Eventhough it has many disadvantages , it has advantages like no water and nutrient absorption , effective weed and pest control .

Fig.4 Rubber mulches

IV.) PLASTIC MULCHES

Plastic mulches are the most commonly used inorganic mulches that is involved in the conserving of water . Water and nutrients cannot pass through as it is impervious in nature . It should not kept for a long season as it deteriorates with exposture to sunlight . It is widely used in vegetable gardens . The various types of plastic mulches are discussed in the table given below.

Types of Plastic Mulches	Description
Colored mulches	i.) single colored : white cools the soil , red increases vegetable production , black helps in moisture conservation. ii.) double colored : Yellow/ Black for pests & insects , White/ Black or Silver/ Black cools off soil , Red/ Black Partially translucent to some solar rays , Blue/ Black Restricts reflections of radiation.
Clear or Transparent Mulches	solarize and increases the temperature of soil. solarize and increase the temperature of soil.
Reflective Silver Film	keeps cool the temperature of root zone.
Metalized Mulch Film	Delivers extra light to the plant and reflect a range of light which avoids the white flies and aphids
Infra-Red Transmitting Mulch Film	available in different colors from green to brown hues ; effective in controlling of weeds and increasing the temperature of soil.
Degradable plastic mulch	i.) Photo-degradable plastic mulch: Disintegrates on exposture to sunlight during the mulching period ii.) Bio-degradable plastic mulch: Mostly made from polyesters , plant sugars or starches ; gets easily decomposed.

Table .1 types of plastic mulches

Fig 5 biodegradable plastic films

Fig 6 colored plastic films

Advantages of inorganic mulching

- Reduction in the rate of evaporation
- Increase in moisture holding capacity
- Lowers leaching of nutrients
- Effective weed control
- Maintains soil structure
- Controls soil erosion

Disadvantages of inorganic mulching

- Some inorganic mulches like plastic films pollutes the soil
- Plastic films are toxic to animals
- Movement of agricultural machinery in field is difficult
- Increases soil temperature if added to large areas

Conclusion

Recent times , mulching becomes the most important and widely practiced technique to conserve the soil moisture and to increase crop productivity . The selection of mulching materials is highly based on the crop and the environment . Plastic films are one of the most popular mulching materials. Despite many advantages , it also has disadvantages like high cost of establishment , pollution to environment , difficulty in adaptability , etc…. It is concluded that despite disadvantages it helps to a considerable extent in conserving water.

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