

Mulching: Recent Advances in Mulching and It's Benefits on Agriculture

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The India's population is increasing continuously due to which there is need to adopt some technologies to sustain our agricultural growth and it can be possible through the means of conservation farming. The best conservation farming need to adopt from the old age practices in agricultural fields is mulching.

Mulching in other term means 'covering the soil'. Mulching is the practice of covering the ground and soil for making the favourable conditions for the growth and development of the plant as well as for the efficient crop production.

Mulching has many beneficial effects due to which it becomes more significant practice in modern field production like reducing the crop weed competition, soil temperature, conservation of moisture, certain insect pests' reduction, increase in crop yield and using the soil nutrients efficiently. It also has many interesting effects relevant with soil ecosystem, crop growth and climate. Much insulating the soil and making buffer from cold and hot temperatures that are also an important activity to create protected and beautiful landscapes.

Benefits of using mulching in Agriculture:

Crop growth parameters:

Studies show that early growth emergence induced by plastic mulch therefore, it increases the biomass production of crop at early stages of growth. Early seedling emergence lead by the plastic mulch and also earlier spike differentiation due to which more spikelets and more grains per spike in wheat developed in wheat.

Weed control and reducing the crop weed competition:

The major aim of mulching is to hinder the fall of light to the weeds to suppress the growth of the weeds. Any kind of mulch covers the soil and creates the physical pressure on the weeds. Mulching can control the weed population in nursery and field both. Germination

of small seeded weed species reduced as the mulching acts as the barrier in the passing of the light to the weed.

Soil temperature:

Generally, temperature of the soil high under the plastic film and it depends upon the plastic colour. The black plastic film mulched plots have low temperature of the soil in comparison to the clear plastic film mulched plots, as it absorbs the more solar energy which is lost in the atmosphere through radiation and forced convection. Mulching by plastic increases the soil surface by influencing the heat balance and thus increases the temperature of the soil and it also impacting the crop emergence positively.

Soil health improved by mulching:

Mulching protects the surface of the soil from erosion which is caused by the high-speed wind and surface runoff. It checks the flow rate of rainwater and therefore, restricts the water and soil runoff. Surface runoff of rainwater don not come in direct contact with the ground and runoff of rainwater slows down and therefore, increases the infiltration rate of water which increases the more availability of the moisture for plant use.

Types of mulches**Organic Mulch:**

The soil characteristics are improved by organic mulches. It improves the soil physical, chemical and biological properties. Slowly, these mulches are decomposed and adding the organic content in the soil which helps to keep the soil loose.

Straw:

The common mulching materials are the straw of wheat and paddy, used for fruit and vegetable production. It makes the soil fertile after decomposition by adding organic matter. Straw has a long life if we compare with other mulches like grasses, leaves and leaf mould.



Saw dust:

Saw dust which is obtained from the finishing operation of wood can be used as a mulch but it is very poor in nutritive value and it decomposes slowly also. It should not be used in acidic soil as saw dust is acidic in nature.

Compost:

One of the best mulching material is compost. It increases the population of microbes by improving the soil structure of the soil and provides nutrients. It is the excellent material for improving the health of the soil.

Limitations of organic mulching:

- Mulches keep the soil very moist due to which oxygen is restricted in the root zone on poorly drained soils.
- If mulching is done close or in contact with the stem, , trapped moisture the environment which is favourable for the development of diseases and pests.
- Many organic mulches provide the favourable location for breeding of snails, slugs, mice, etc. that may attack the plants.
- Some types of mulches like hay and straw possess the seeds that may become weeds.

Others: Grass Clipping, Dry leaves, Newspaper, Bark clippings.

Inorganic Mulch**Gravel, Pebbles and Crushed stones:**

Perennial crops are mulched by these materials. 3-4 cm layer of small rock provides the good weed control. But they create a very hot soil environment during summer time as they reflect the solar radiation.



Plastic mulch:

Black and transparent both films are used for mulching. As plastic chemistry advances, it results the development of different films having optical properties that are ideal for a specific crop in a specific location. Before using the plastic mulch, there is need to known the optimum above and below ground environment of a particular crop.

**Black plastic film:**

It conserves the moisture, control weed and reduces the outgoing radiation.

Reflective silver film:

It usually maintains the temperature of the root zone cooler.

Transparent film:

It increases the temperature of the soil and generally used for solarization.

Selections of mulching

The selection of the appropriate mulching material depends upon the ecological locations, perforations, colors, and thickness of available material, types of materials, cost-effectiveness, and feasibility of the crop.

Suitability of mulching

Mulching can be done in fields around the young plant and as well as before and after crop plantation. It is specifically used in high-value vegetable crops, and for growing crops in dry areas, during dry season cropping and in places where the soil is easily eroded by heavy rains.

Conclusion

Mulch provide many benefits in crop production such as creates the favourable condition for the growth of the plant by temperature moderation, protects the root of plants from heat and cold, salinity reduction, control in weed population ultimately increases the yield and quality of the crop. The water utilization within soil root zone is a critical phenomenon to increase the water within root zone efficiently and save the resource of water by mulching. Therefore, in these modern days farmers should adopt this technique to conserve moisture, control weeds and to improve the health of the soil.

