Agri Articles
(e-Magazine for Agricultural Articles)
Volume: 03, Issue: 04 (JULY-AUGUST, 2023)
Available online at http://www.agriarticles.com
©Agri Articles, ISSN: 2582-9882

Mulching

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Mulching is the process of applying natural or artificial layer of plant residue or other materials on the soil surface. In other words it may be defined as protective covering, as of bark chips, straw, or plastic sheeting, placed on the ground around plants to suppress weed growth, retain soil moisture, or prevent freezing of roots. A mulch is a layer of material applied to the surface of soil. It conserves soil moisture, improve fertility and health of the soil and reduce weed growth. However, mulches are used for various reasons but in agriculture, mainly used for water conservation and erosion control in dry areas. For arable soils, the most effective conservation practices for reducing water loss through surface evaporation are those that provide some degree of surface cover for the soil. A cover can be best provided by mulches or by tillage practices that leave plant residues on the soil surface. Mulch is any material placed on a soil surface for the purpose of reducing evaporation, retaining moisture, reducing soil erosion, suppressing weed growth and providing plant nutrients as the material decomposes Mulches act as barriers to movement of moisture out of the soil. They can be either organic (e.g. straw, wood chips, peat) or man-made (e.g. transparent or opaque plastic). Besides keeping the moisture in the soil, mulches can also enhance soil temperature; reduce the spread of soil borne diseases.

Usage

Many materials are used as mulches. They are applied to the soil surface, around trees, paths; flower beds etc. They are applied at various times of the year depending on the purpose. Towards the beginning of the growing season, mulches serve initially to warm the soil by helping it retain heat which is lost during the night. This allows early seeding and transplanting of certain crops, and encourages faster growth. As the season progresses, mulch stabilize the soil temperature and moisture, and prevent the growing of weeds from seeds. Mulch layers are normally 2 inches or deeper when applied. Overall the main usage is as follows:

- Retain soil moisture
- Regulate soil temperature
- suppress weed growth
- Aesthetics
- Reduce soil erosion
- Prevent freezing of roots

Materials used in mulches

Materials used as mulches vary according to the purpose. They are:-

- Organic residues: Grasses, leaves, hay, straw, shredded bark, sawdust, shells, woodchips, newspaper, cardboard, wool, animal manure, etc.

- Compost: Materials that are free of seeds are ideally used, to prevent weeds being introduced by the mulch.
- Old carpet (synthetic or natural)
- Rubbers
- Plastic mulch
- Rock and gravels

Types of mulches

Organic Mulches- Commonly available organic mulches are leaves, grass clippings, peat moss, wood chips, bark chips, straw, carpet etc. Organic mulches decay over time and are temporary. The way particular organic mulch decomposes and reacts to wetting by rain and dew affects its usefulness. Stubble and straw mulches are come in this category.

Soil mulch or dust mulch- If the soil surface is loosened, it acts as mulch for reducing evaporation. Inter cultivation creates soil or dust mulch in growing crops.

Colored mulch- such types of mulches are wavelength selective and are used to absorb some wavelength from solar radiation and maintain leaf temperature. Thus these helps in plant growth and development.

Plastic mulch- some plastic materials like polyethylene and polypropylene are used. Polyethylene is used mainly for weed reduction, while polypropylene is used mainly on perennials .This mulch is placed on top of the soil and can be done by machine or hand with pegs to keep the mulch tight against the soil. This mulch can prevent soil erosion, reduce wedding, conserve soil moisture, and increase temperature of the soil.

Biodegradable mulch– These are plant starches and sugars or polyester fibers which come from plants such as wheat and corn. These mulch films may be a bit more permeable allowing more water into the soil. This mulch can prevent soil erosion, reduce wedding, conserve soil moisture, and increase temperature of the soil.

Constraints of Organic Mulching

As beneficial as organic mulch is, too much mulch can be harmful. A thick layer of organic mulch can be effective in suppressing weeds and reducing maintenance, but it often causes additional problems.

- Some organisms can proliferate too much in the moist and protected conditions of the mulch layer. Slugs and snails can multiply very quickly under a mulch layer. Ants or termites, which may cause damage to the crops also may find ideal conditions for living. When crop residues are used for mulching, in some cases there is an increased risk of sustaining pests and diseases
- Damaging organisms such as stem borers may survive in the stalks of crops like cotton, corn or sugar cane. Plant material infected with viral or fungal diseases should not be used if there is a risk that the disease might spread to the next crop. Crop rotation is very important to overcome these problems.
- When carbon rich materials such as straw or stalks are used for mulching, nitrogen from the soil may be used by microorganisms for decomposing the material. Thus, nitrogen may be temporary not available for plant growth

Advantages

- Mulches keep the soil underneath moist longer than bare soil and prevent evaporation
- They keep the soil underneath moist longer than bare soil
- Controls soil erosion by cushioning the impact of raindrops and by slowing runoff
- Can prevent weed growth by shading them out
- Helps maintaining warm temperatures even at night
- Some mulch can improve soil fertility

Disadvantages

- Mulching is labour-intensive
- Inorganic mulches are costly
- Too much mulch can create rotting of the root zone or provoque pests, etc.
- Mulch material can introduce new pests and diseases into a field.
- When plastic mulch starts to break down into non-recyclable bits; it is hard to remove it again

Conclusion

Beneficial impact of organic mulches for crop production have been widely discussed by many researchers. Research has shown that mulch provides many advanteges to crop production such as protecting the roots of the plants from heat,cold and weeds, creating congenial condition for the plant growth by temperature moderation, reducing salinity and weed control and thereby improving the quantity and quality of the crop. Therefore in the days to come, farmers will make use of this innovative technique that helps them conserve moisture, avoid weeds and improve soil health tremendously while producing more. This will also go a long way in the world achieving food security sustainably and productivity.

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