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Mulching in Organic Agriculture

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SUMMARY

Mulching is the process of covering the topsoil with plant material such as leaves, grass, twigs, crop residues, straw etc. A mulch cover enhances the activity of soil organisms such as earthworms. They help to create a soil structure with plenty of smaller and larger pores through which rainwater can easily infiltrate into the soil, thus reducing surface runoff. As the mulch material decomposes, it increases the content of organic matter in the soil. Soil organic matter helps to create a good soil with stable crumb structure. Thus, the soil particles will not be easily carried away by water. Therefore, mulching plays a crucial role in preventing soil erosion.

INTRODUCTION

Among the soil conservation practices that are used, mulching has been successfully applied to reduce soil and water losses in different contexts, such as agricultural lands, fire-affected areas, range lands and anthropic sites. In these contexts, soil erosion by water is a serious problem, especially in semi-arid and semi-humid areas of the world. Although the beneficial effects of mulching are known, further research is needed to quantify them, especially in areas where soil erosion by water represents a severe threat. Therefore, more research should be performed to help both farmers and land managers by providing them with evidence-based means for implementing more sustainable soil management practices in organic agriculture.

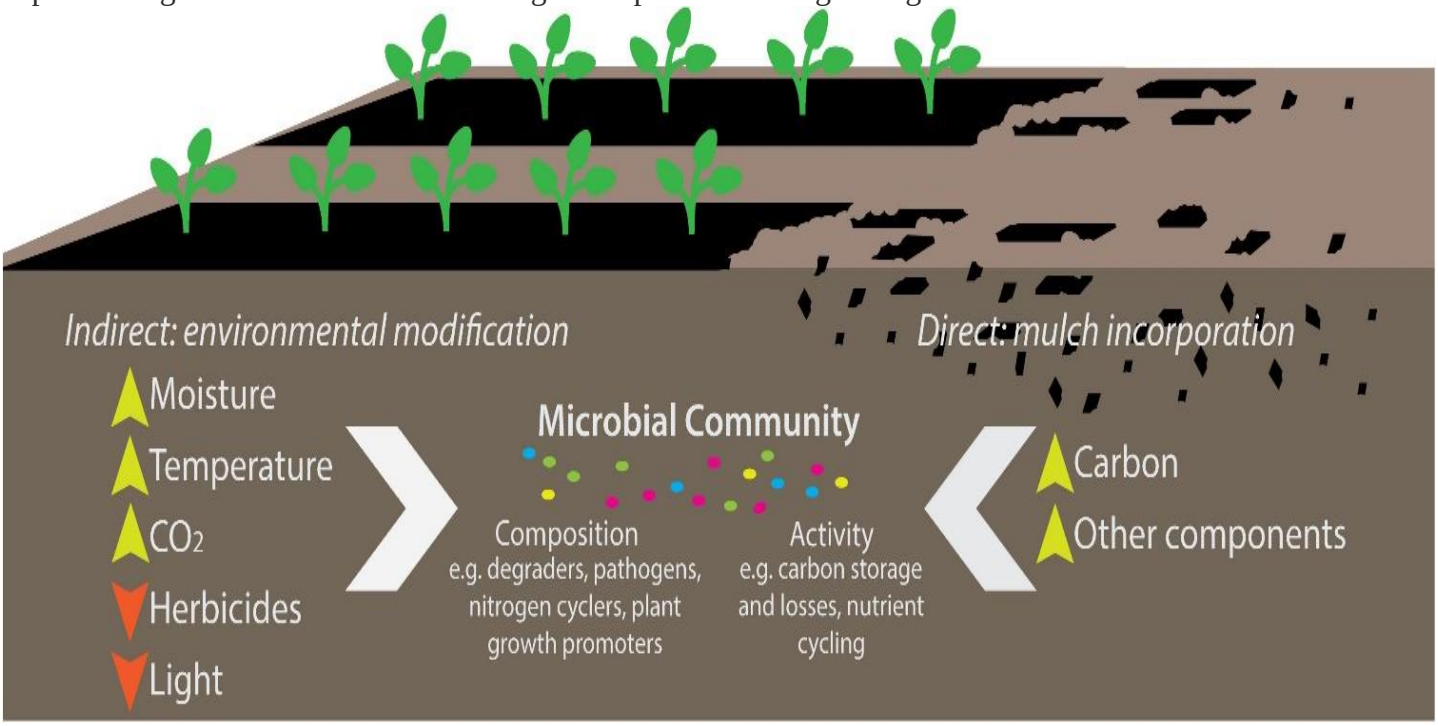

Figure no 1: Effect of Mulching

Why to Use Mulch?

- Protects the soil from wind and water erosion: soil particles cannot be washed or blown away.
- Improve the infiltration of rain and irrigation water by maintaining a good soil structure: no crust is formed, the pores are kept open
- Keeps the soil moist by reducing evaporation: plants need less irrigation or can use the available rain more efficiently in dry areas or seasons
- Feed and protect soil organisms: organic mulch material is an excellent food for soil organisms and

provides suitable conditions for their growth
- Suppress weed growth: with a sufficient mulch layer, weeds will find it difficult to grow through it
- Prevents the soil from heating up too much: mulch provides shade to the soil and the retained moisture keeps it cool
- Provides nutrients to the crops: while decomposing, organic mulch material continuously releases its nutrients, thus fertilizing the soil
- Increases the content of soil organic matter: part of the mulch material will be trans-formed to humus

Selection of Mulching Material

The kind of material used for mulching will greatly influence its effect. Material which easily decomposes will protect the soil only for a rather short time but will provide nutrients to the crops while decomposing. Hardy materials will decompose more slowly and therefore cover the soil for a longer time. If the decomposition of the mulch material should be accelerated, organic manures such as animal dung may be spread on top of the mulch, thus increasing the nitrogen content. Where soil erosion is a problem, slowly decomposing mulch material (low nitrogen content, high C/N) will provide a long-term protection compared to quickly decomposing material.

Sources of Mulching Material
- Weeds
- Cover crops
- Crop residues
- Grass
- Pruning material from trees
- Cuttings from hedges
- Wastes from agricultural processing or from forestry

Points Considered While Using Mulches

While mulching has a lot of advantages, it can also cause problems in specific situations. Thus, following points should be considered while mulch application:
- 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 risks.
- 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.
- The major constraint for mulching usually is the availability of organic material. Its production or collection usually involves labour and may compete with the production of crops.

Application of Mulch Material
- If possible, the mulch should be applied before or at the onset of the rainy season, as then the soil is most vulnerable.
- If the layer of mulch is not too thick, seeds or seedlings can be directly sown or planted in between the mulching material. On vegetable plots it is best to apply mulch only after the young plants have become somewhat hardier, as they may be harmed by the products of decomposition from fresh mulch material.
- If mulch is applied prior to sowing or planting, the mulch layer should not be too thick in order to allow seedlings penetrate it. Mulch can also be applied in established crops, best directly after digging the soil. It can be applied between the rows, directly around single plants (especially for tree crops) or evenly spread on the field.

Figure no 2: Problems related to mulching.

Fukuoka System of Mulching Field Crops

The Japanese organic pioneer Fukuoka developed a system of growing rice which is based on mulching. White clover is sown among the rice one month before harvesting. Shortly thereafter, a winter crop of rye is sown. After threshing the harvested rice, the rice straw is brought back to the field where it is used as a loose mulch layer. Both the rye and the white clover spring up through the mulch which remains until the rye is harvested. If the straw decomposes too slowly, chicken manure is sprinkled over the mulch. This cropping system does not require any tillage of the soil, but achieves satisfying yields.

CONLUSION

A mulch cover enhances the activity of various soil organisms and also provide with tremendous benefits to field. By adding organic matter to soil, it reduces the cost of purchasing external input. Every farmer weather practicing organic or not should use organic mulch in his field.

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