

Background



Mulching is a very common technique used in vegetable production. It consists of laying a material between the soil and the crop to protect the plants. Alternative Mulching techniques include natural materials (straw) or synthetic material (plastic films, nonwovens). Plastic mulches are offered in a range of formats specifically to maximise crop yields. Compared to natural options, synthetic mulch has the advantage of being free from seeds and pathogens while offering a greater thermal effect.

Mulch main purposes are:

- Increasing soil temperature
- Stabilizing and protecting the soil structure
- Preventing weeds growth
- Limiting the evaporation and loss of water
- Harvesting clean vegetables

This application sheet focuses on black mulch

How does black mulch work?

Mulch works by increasing the soil temperature, mainly during spring, which improved the environment around the plant roots. It increases seedling growth speed (melon), allows earlier sowing (Sweet corn), and increases young plant “taking again” (tomato, pepper) [2] .

Black mulch absorbs high levels of the solar radiation and transforms it into heat. The heat is dissipated by conduction and splits between atmosphere and soil, which can increase the temperature of both soil and air in the vicinity of plants. Daytime soil temperature remains similar with black mulch and bare soil, however night temperature is always higher than with mulch because it retards the heat escape by between 0.5°C to 4°C.

Stabilizing and protecting the soil structure

Heavy rain, irrigation and aggressive external factors (drying wind, hail) can result in soil crusting and compaction, which cause poor circulation of water and oxygen to the root structure.

Mulched soils remain porous, loose and friable with good aeration. All this contributes to a healthier root system (both surface and deep roots) leading to more efficient use of nutrients. In a well-aerated soil, the biological activity of the soil microorganisms is increased. [3]

Preventing weeds growth

Weed growth requires light to drive photosynthesis. Black pigments used in mulch significantly reduce light transmission to very low levels, restricting photosynthesis under the sheet and hence weed growth

Evaporation Control and Water management [3]

Mulch reduces the evaporation of water from the soil through a cumulated effect of reduced thermal and wind evaporation. Reduced weed development lowers the competitive consumption of water. The porous nature of nonwoven mulch means rain water and surface irrigation reach the soil. In addition, because the crop is not in contact with the soil, growers have then clean crop, which improves the marketable yield and reduced the use of cleaning water

Cultivation Guidance

The field to be mulched should be ploughed, fertilized and prepared as normal

Early mulch application has the advantage of warming the soil prior to planting. Black mulch can be laid manually or mechanically. Because heat is dissipated by conduction, mulch has to be laid in the closest contact possible with the soil. To plant the crop, mulch can be perforated manually or mechanically. It exists also pre-perforated black mulch with different hole density, depending on the crop. For short term crops, mulch is removed after harvest and can be reused. For long terms crop or even perennials, UV stabilization allows at least several season of use.



Advantages of Nonwoven Mulch compared with PE film

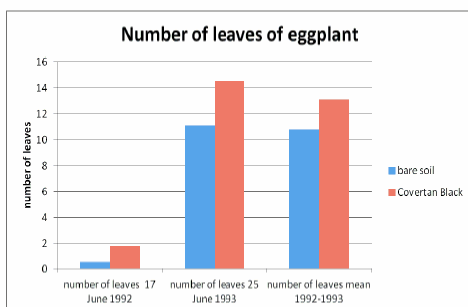
Covertan Black has all the advantages of a plastic mulch, plus an air and water porosity.

- Water and nutrients pass through the Covertan Black readily, maintaining the root humidity. As a consequence, the need and the cost of irrigation are reduced and the re-growth of the plant is very quick. Water porosity allows to put the localized irrigation system on the fleece, which enables to control it in case of clogging, etc
- From a phytosanitary point of view, there is less risk of leaf rot as water doesn't build up. Moreover air porosity creates a good aeration of the plant neck. The growers have then healthier harvest.
- Its breathability avoids root asphyxiation by regulating soil humidity, especially in soils that don't dry out well.

Agronomic test evaluation [1]

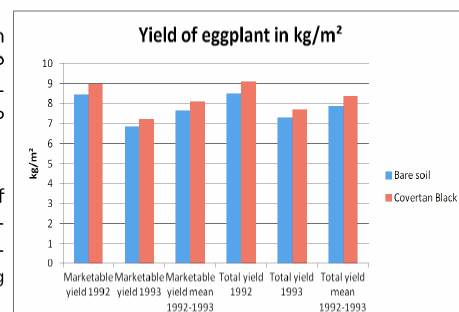
Bibliographie

Crop, area and application type:	Eggplant, eastern Europe, under plastic tunnel
Test Duration (2 years 1992 and 1993):	Planting under cover in May , harvest mid July to late September
Measurements:	Temperature in the soil (10 cm deep), number of leaves, yield



The number of leaves suggests the production of biomass which is greater with black PP mulch than with bare soil. The greatest marketable yield was obtained with the black PP mulch.

The effect of mulching on the modification of thermal condition in the root zone was measured. Higher temperatures were recorded under black PP fabric, the differences reaching 1.1°C at 8 am. At 2 pm difference was lower.



- [1] Siwek P., Libik A., 1994. Effect of mulching soil in a plastic tunnel on selected elements of microclimate and the growth and yields of eggplant.
- [2] Brun R., 1992. Le paillage plastique. Les plastiques en agriculture. CPA-Revue Horticole, Paris. 393-407.
- [3] Anonyme. Mulching. 90-98

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