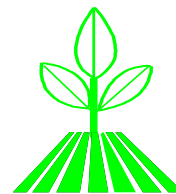




STATE OF ISRAEL
Ministry of Agriculture and Rural
Development
Extension Service
Mechanization & technology Dpt.



Effect of Rigid ground cover – TalYa - on water volume and production

Roni Amir - Greenhouse extension specialist

Ground cover around the plant, rigid plastic, developed in recent years at Tal-Ya Water Technologies Ltd (TDC*). Uniqueness by geometric shape, which is made up of channels and slopes, dew and water drains into the planting hole, contributing to the amount of water consumed by the plant.

TDC ground cover: rigid plastic mold with a unique geometric structure. Each mold has same size of approximately 0.5-1 m long and 0.5 m wide, with planting holes every 0.5 m. The molds are attached to each other, creating a continuous ground cover.

Measurements made in the last three years (2007 – 2009) can be shown that TDC ground cover can contribute to reduced water consumption by reducing evaporation and retaining soil moisture.

Ground cover has an additional advantage in water saving by suppressing growth of weeds that compete with plants for water and benefits of regulating soil temperature and also creating growing conditions at stress.

The develop of TDC cover start with black surface in winter 2006-7 and later with silver / gray until the last shiny silver 25% reflectivity. At that experiments were audit plot of bare soil and soil covered with flexible plastic.

Monitoring was carried out on the covering at different seasons and different crops and measured climatic conditions and soil temperatures - covered and exposed, at the areas of Emek Hefer and Lachish. The result show that the TDC cover allows obtaining of optimal growth conditions, compared to the other options and gives protection on the plants and also soil temperatures were found to be more moderate with lower amplitude' under TDC cover.



At winter, during the night, soil temperature under the TDC cover was 2-4⁰C higher than the bare soil temperature.

During cold, air temperature low then 0 ° C, soil temperature under the TDC cover reached 9 ° C, higher than the temperature of bare ground.

Under TDC cover Soil temperatures were found to be with lower amplitude

($\Delta T = 6$ ° C) than the bare soil temperature amplitude ($\Delta T = 10$ ° C) and this be an advantage in terms of the plant.

At day the soil temperature under TDC cover low by 1 – 2 ° C, depending on the radiation level.

These findings indicate that the TDC cover confines the air and humidity under him and also moderates the soil temperature fluctuations compared to bare ground. Regulating the temperature and humidity can save the plants in extreme weather conditions, ensuring the root system from drying out due to heat wave or cold.

On rainy days, the bare soil temperature and soil under the cover TDC was similar.

During the summer, vegetable crops, in the first stage of production, in May-June, when foliage was sparse, the advantage of TDC cover was significant and soil temperature was about 5OC lower than the temperature of the bare soil and flexible cover. Later, in August, when foliage was abundant, the differences were reduced. These differences were not expressed in the early harvest.

At night the soil temperature under the TDC cover was slightly higher than the temperature in the bare soil. The soil temperature under Tal-Ya ground cover was generally lower than the soil temperature under the PE ground cover, by 0.5OC. There was no dew.

Notwithstanding the differences found in soil temperature measurements, no effect on yield was found in this trial in the summer.

At the trial, which was planted in summer at Lachish, at open field raising tomato, pepper and eggplant at low trellising and medium - heavy soil , accompanied by follow-up of tensiometers, it was found that soil moisture, is better retained under TDC ground cover and the soil temperature moderated. In view of this, the application volume is about 50 percent lower, meaning a 50 percent saving in water.

Water consumption was 48% of the volume used in the plot with PE ground cover and the uncovered control plot.

Fertilizer was applied proportionally to the water volume. It can be seen that fertilizer consumption handled TDC cover plot was about 50% lower than in the plot under PE ground cover and in the uncovered plot.

Notwithstanding the differences found in soil temperature measurements, no effect on yield was found in this trial in the summer.

At the day the soil temperature under the ground cover was higher than the temperature in the uncovered soil. At night the soil temperature under ground cover was generally higher than the uncovered soil.

The TDC cover has today a color of shiny silver. This color found to be better during the development and trials, compared black cover by recession soil temperatures.

In the warm Israeli autumn and winter, climatic conditions are expected to allow formation of dew, most of the night. If dew is collected, water saving could be even higher.

It should be noted that Ground cover has an additional advantage in water saving by suppressing growth of weeds that compete with plants for water.

*Talya Dew Collector (TDC)