کارگاه‌های آموزشی مرکز اطلاعات علمی

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The Effects of Different Types of Mulch on Water use Efficiency of SC 704 Corn Growth Indexes

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Introduction: Water scarcity is the most important limiting factor in the production of crops in arid and semi-arid regions. Thus, actions for increasing the efficiency and productivity of farm water is inevitable. A large proportion of the water, used in irrigation, evaporates, so an effective solution for conserving water is to control the evaporation on arable lands. Nowadays using mulch or plastic mulch is common and it makes efficient use of water in furrow irrigation possible by conserving and storing soil moisture. Mulch does not let dry air contact topsoil and it also prevents topsoil from solar irradiance and reduces evaporation and maintain soil moisture. Recent research in order to economize on water use and irrigation efficiency and water use efficiency has led. Thus, regarding the problem of water scarcity, the objective of this research is to investigate the effects of evaporation suppressing monolayers on the efficiency of water consumption and growth indices of seed corn single cross SC 704 in an arid and semi-arid region.

Materials and Methods: This research was conducted in Shahrekord University during 2015. The experimental design was randomized complete block design with 6 treatments and 3 replications. The treatments include control treatment (uncovering) and transparent plastic wrap, black plastic, cotton gunny and white and blue pp woven fabric. Planting and growing operations were conducted due to agronomic principles. Changes in soil moisture within the root-zone during the season were measured by using thetaprobe and all operations by measuring the amount of irrigation water used in all experimental plots of each treatment were applied separately using flow measurement and the amount and time of each irrigation was determined and applied based on MAD=50 by supplying required water.

Results and Discussion: The measurement results showed that variance analysis of relative water content (RWC) and water efficiency under the impact of different coverings had a significance difference with p-value of 0.01. Also the amount of the dry matter and harvest index of corn showed significance with p-value of 0.05. Results showed that mulch at all stages of measuring the impact of increasing the leaf relative water content it could originate from growing trend of air temperature during the period. Under these treatments the plants are expected to experience more desirable conditions regarding maintaining and distributing of soil moisture in comparison with other treatments and the indicator. The highest amount of dry matter calculated is for the blue pp woven fabric treatment that shows the ideal growth conditions and appropriate performance of the plant under the impact of this covering and the lowest amount is for the cotton gunny treatment. Leaf area index (LAI) is one of the important growth indices. In flowering (anthesis) stage, the maximum amount of LAI is 5.08 for the blue pp woven fabric treatment. The minimum amount of LAI is 2.5 for the cotton gunny treatment and it is because of There macroporous coating that weed growth has been hindering plant growth. On the basis of the hundred seed weight, the heaviest weight is 18.18 for the white plastic treatment and the lowest weight is 13.46 for the indicator treatment. The highest amount of harvesting index (HI) is 53.97 for the transparent plastic treatment and the lowest amount is 41.12 for the black plastic treatment.The corresponding amount is an increase of 32 percent compared to control treatment. The reason of reduction of HI is the reduction of seed performance than biological performance in water scarcity. One of the indices for evaluating irrigation management is water efficiency. The highest amount of water efficiency is 2.6 and 2.7 kg/m^{3}for the blue pp woven fabric and white pp woven fabric covering and it reduces water wastage in form of evaporation and causes water conservation. And it protects the top soil from solar irradiance.

Conclusion: This research was conducted at Shahrekord University to investigate the effects of various coverings on water efficiency and corn seed performance. Using covering causes temperature growth in the soil under the covering and it also causes further and fast plant growth. It reduces evaporation from topsoil. As a result, it causes soil moisture to be invariable and because of lack of light under the coverings, photosynthesis is

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impossible, thus, weeds could not grow. Blue pp woven fabric of mulch to mulch increased 42% dry matter was cotton sack. Mulches effect of the corn harvest index showed a clear plastic mulch to increase 32 percent harvest index compared to the control. Mulches blue pp woven fabric, white pp woven fabric, cotton gunny, black plastic and transparent plastic, respectively, increases of 92, 85, 28, 14 and 78 percent of water use efficiency were compared to control.Therefore, plants under the impact of blue pp woven fabric and white pp woven fabric coverings access more water and nutrients than the indicator treatment, so water efficiency increases. Using coverings has conserved moisture more in the top layers of soil by reducing evaporation form topsoil.

Keywords: Evaporation**,** Leaf Area Index, Mulch**,** Relative Water Content of leaves, Water Use Productivity

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