Comparing Canopy Temperature of Soybean Irrigated by Surface and Subsurface Drip Irrigation Method under Mediterranean Conditions

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1. Introduction – Water resources are decreasing in arid and semi-arid regions of the world due to unfavourable factors such as rapid population growth, global warming, changing climate, increasing urbanization, and industrialization. On the other hand, irrigation water demand and the importance of water continue to accrete every year. Irrigation water demand will continue to increase leading to a shortage of water resources. Agriculture consumes about 70% of water worldwide, so that agricultural irrigation should be used in the most efficient way. Subsurface drip irrigation method is potentially efficient use of water because it provides water directly to the root zone and as the soil surface is not wetted, decrease evapotranspiration loss. The aim of this study was to compare the effects of surface drip (DI) and subsurface drip irrigation (SDI) methods on canopy temperature measured with infrared thermometers and to evaluate deficit irrigation effects in soybean grown at the Batı Akdeniz Agricultural Research Institute (BAARI), Antalya, Turkey in 2017.

2. Experimental - The study was formed in randomized complete block design to include two methods and three different irrigation treatments in three replications. Irrigation treatments were based on replenishing the 0.9-m deep root zone to field capacity when 30% of the soil water holding capacity consumed in the control treatment. The other treatments received irrigation water as much as 60 and 80% given to the control treatment. The canopy temperatures were measured by an infrared thermometer between 12.00 and 15.00 hours before and after irrigation.

3. Results and Discussion - The results show that the subsurface drip irrigation method seems to perform better than the surface drip irrigation because canopy temperatures were lower as much as 2.5 0C throughout the season for the treatments irrigated by subsurface drip irrigation. When all treatments were compared, the highest canopy temperature was obtained from the surface drip irrigation method irrigated as much as of 60% of the control treatment, while lowest canopy temperatures were obtained from 80% and control treatment of the subsurface drip irrigation treatments.

4. Conclusions - It was concluded that subsurface drip irrigation reduces the water stress and can save more than available water under Mediterranean conditions.