

The Effect of Air Injection in Irrigation Water on Sugar Beet Yield

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Abstract : In recent years, a lot of research has been done for the sustainable use of scarce resources in the world. Especially, effective and sustainable use of water resources has been researched for many years. Sub-surface drip irrigation (SDI) is one of the most effective irrigation methods in which efficient and sustainable use of irrigation water can be achieved. When the literature is taken into consideration, it is often emphasized that, besides its numerous advantages, it also allows the application of irrigation water to the plant root zone along with air. It is stated in different studies that the air applied to the plant root zone with irrigation water has a positive effect on the root zone. Plants need sufficient oxygen for root respiration as well as for the metabolic functions of the roots. Decreased root respiration due to low oxygen content reduces transpiration, disrupts the flow of ions, and increases the ingress of salt reaching toxic levels, seriously affecting plant growth. Lack of oxygen (Hypoxia) can affect the survival of plants. The lack of oxygen in the soil is related to the exchange of gases in the soil with the gases in the atmosphere. Soil aeration is an important physical parameter of a soil. It is highly dynamic and is closely related to the amount of water in the soil and its bulk weight. Subsurface drip irrigation; It has higher water use efficiency compared to irrigation methods such as furrow irrigation and sprinkler irrigation. However, in heavy clay soils, subsurface drip irrigation creates continuous wetting fronts that predispose the rhizosphere region to hypoxia or anoxia. With subsurface drip irrigation, the oxygen is limited for root microbial respiration and root development, with the continuous spreading of water to a certain region of the root zone. In this study, the change in sugar beet yield caused by air application in the SDI system will be explained.

Keywords : sugar beet, subsurface drip irrigation, air application, irrigation efficiency

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