

Abstract

Recent evidences confirm that during the next few decades, many agroclimatic indices of Iran would be affected by global climate change. This study was conducted to investigate of the climate change impact on growth, yield and water productivity of sugar beet and the response sugar beet to water stress. The experiment was conducted at Aleshtar in Lorestan province during growing seasons of 2014 and 2015, using a randomized complete block design. Irrigation treatments were consisted of full irrigation (T1) as control, removing last irrigation (T2), applying irrigation water at 10% greater than control (T3), applying irrigation water at 10 (T4), 20 (T5) and 30% less than control (T6). In this study the LARS-WG model was used to simulate the weather data of Khoramabad station under A1B, A2 and B1 scenarios in the time periods of 2011-2030 and 2046-2065. The effects of climate change on growth, yield and water productivity of sugar beet was simulated by the AquaCrop model. AquaCrop model was calibrated and validated by the data collected in the field before being used. The results obtained in this study showed that the temperature is increasing and the rain is decreasing. Also, the results showed that in all treatments the growing period of sugar beet would significantly decrease in the future. Compare evapotranspiration simulation results showed that the evapotranspiration would significantly decrease in the future and actually is reduce the water requirement of sugar beet. Also, future climate change will significantly increase the yield and biomass of sugar beet in Khoramabad region. It was observed that the amount of water productivity increased in both future periods relative to the base period significantly, the increase in the period of (2011-2030) for A2 and B1 scenarios were 5.15 and 10.29 percent and in the period of (2046-2065) for A1B, A2 and B1 scenarios were 7.35, 14.70 and 20.58 percent, respectively. Evaluate different planting dates of sugar beet showed that, by selecting planting date of 9 April, the largest increase of biomass, yield and water productivity were simulated for periods 2011-2030, 2046-2065. These results will be useful for future irrigation planning in Khoramabad region. Generally it can be concluded reduce water consumption and increase yield leads to improved water use efficiency in Khoramabad region in the future climatic conditions.

Keyword: AquaCrop Model, Climate Change, Irrigation Management, Sugar Beet, Water Crisis.



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