

Changes in Morphology, Yield and Yield Components of Sweet Corn (*Zea mays* L. var. *Sacarata*) as Affected by Water Deficit, Ultraviolet Radiation and Increasing Carbon Dioxide Treatments

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Abstract

Physiological study of crops under microclimatic changes is very important to improve their production in the future. This research was done in Tarbiat Modares University Research Greenhouse as factorial arrangement in randomized complete block design with three replications in one year (2015). The objective was to study the effects of carbon dioxide (500, 900, and 1300 ppm), UV-radiation (UV-A, B, and C with intensity of 18, 25 and 40 $\mu\text{W}\cdot\text{cm}^2$, respectively) and two irrigation water treatments (full irrigation and deficit irrigation i.e. 60 percent of field capacity) on yield and yield components of sweet corn. Plant height showed a direct relation with the amount of irrigation water and decreased about 10 percent under water deficit stress. The interaction of carbon dioxide and water deficit as well as the interaction of UV-radiation and carbon dioxide reduced the number of leaves below the corns, although this decrease was not significant. Water deficit reduced Specific Leaf Area and Leaf Area Index by, respectively, 11% and 19% relative to the control. In full irrigation, carbon dioxide concentration and number of seeds in each row had direct relation, but under water deficit condition, they had indirect relation. Ultraviolet radiations wave length reduction reduced yield. Water deficit reduced Specific Leaf Area and number of seed in corn row. UV-A and B wave length did not significantly affect yield, but UV-C radiation decreased it. In brief, increase in UV wave length under drought conditions led to decrease in leaf number, leaf area, and yield.

Keywords: Leaf Area Index, Photosynthetic pigments, Ultraviolet radiation, Water deficit

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