Effect of Incorporation of Wheat Residues to Soil on Physiological Traits and Canned Yield of Sweet Corn under Water Stress

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Abstract

A two-year field experiment (2015–2016) was conducted as a split plot design with four replications at School of Agriculture, Shiraz University, Iran to investigate the influence of water stress (supplying 50, 70, and 100% of water requirement) and wheat residue rates (0, 25, and 50%) incorporated with soil on physiological traits and canned yield of sweet corn (Zea mays L. V. Saccharata). Net photosynthesis rate was decreased under severe stress (supplying 50% of the water requirement) during vegetative, reproductive and ripening stages of sweet corn by 25.8, 15.8 and 5.5%, respectively, compared to normal irrigation (supplying 100% of the water requirement). Canned yield decreased significantly with supplying 50% of water requirement. The lowest values of canned yield (1.1 t ha⁻¹) and harvest index (23.55%) were obtained in severe stress and no-residue conditions, indicating approximately 71 and 11% reductions compared to normal irrigation and no-residue treatments, respectively. In all water stress levels, application of residues led to a yield improvement. In this regard, the highest effect was observed under mild water stress with incorporation of 50% wheat residues, as it led to two-fold increase in canned yield compared to the increase observed with no-residue treatment. The increased canned yield is attributed to the 30 and 43% increases in chlorophyll content and net photosynthesis rate, respectively. Overall, it seems that incorporation of wheat residue into soil reduces the effects of water stress through its effects on soil fertility and soil water availability. Therefore, this strategy is suitable for increasing water use efficiency, reducing water stress damage and improving canned yield of sweet corn in areas facing water scarcity.

Keywords: Chlorophyll content, Photosynthesis, Water stress

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