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EVALUATION OF AN ELECTRONIC IRRIGATION SYSTEM WITH INTERNET CONNECTION IN STRAWBERRY CULTIVATION

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Abstract

Efficient usage of water resources is critical for several problems related with environment. Therefore, the irrigation systems enabling precise application of water are important for environmental protection. Besides, determining water need of plants correctly and applying the relevant amount of irrigation water precisely are important issues in water management due to their relations with sustainability of the sources, crop yield maximization and water-related diseases. In this work, an automated electronic irrigation system addressing these issues was developed and tested on strawberry cultivation under the Spanish-type high tunnel. The water level in an evaporation pan was measured through a sensor to calculate the irrigation amount. Rubygem and Fortuna varieties were cultivated under four irrigation regimes (IR125, IR100, IR75, IR50). To evaluate the morpho-physiological responses to irrigation levels; leaf area, crown number, leaf number, plant width, midday leaf water potential, net photosynthesis, and stomatal conductance (Sc) were measured. The Fortuna cultivar had significantly higher Sc, causing 14% higher photosynthesis than Rubygem. Hence, the Fortuna yield was approximately greater 100 g/plant than Rubygem. The maximum yield was 1046.1 g/plant for IR100 which was reduced up to 435.8 g/plant for IR50. It is concluded that this situation is directly related with lower values for Sc, leaf water potential and photosynthesis. As a result, the amount of irrigation water was found pivotal to reach desired yield and fruit quality in strawberry cultivation.

Keywords: fruit quality, pan evaporation, plant physiology, stress condition, yield

Received: September, 2020; Revised final: February, 2021; Accepted: March, 2021

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