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기상 변화에 따른 사과나무의 수분스트레스와 토양수분함량과의 상관관계 분석

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Crop Water Stress in Apple Trees and Its Relationship with Soil Moisture Content with Meteorological Changes

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This study describes the crop water stress index (CWSI) related to the soil moisture content (SMC) under different irrigation schemes. The experiment was carried out at the experimental station, National Institute of Horticultural and Herbal Science during one growing season, in an apple orchard 5 years old, with cultivar 'cinnamon sweet'. Experimental plots with different irrigation treatments (75%, 50% and 0% daily ETs irrigated) were prepared and necessary data (continuous canopy temperature, air temperature, relative humidity, solar radiation, and wind speed) were collected to quantify the CWSIs throughout the study periods. Timely soil moisture contents at a soil depth of 40 cm was collected at a 30-min interval. The CWSI values ranged from 0.34 to 0.79 during the study periods and did not reach 1.0, which indicates 'stressed condition'. The study analysis showed a linear CWSI-SMC relationship that varied with irrigation levels, explaining that CWSI values increased with decreasing soil moisture content and decreased after irrigation. The relationship between CWSI and SMC is inverse and highly significant, but with a low coefficient of determination (R^2=0.30~0.41) caused by soil variability, wind gusts, intermittent cloudiness and agronomic factors. The findings of this study could contribute provide practical recommendation in irrigation scheduling (time and amount of irrigation) for apple trees.

Keywords: Crop water stress index (CWSI), Canopy temperature, Soil moisture content, Apple

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