

옥수수 수분스트레스 지표인 엽온의 변화에 기상변화가 미치는 영향

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Interpretation of Canopy Temperature as Crop Water Stress Indicator for Corn with Meteorological Changes

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Timely and accurate determination of temporal and spatial crop water status is essential for proper scheduling of irrigations. Field study was conducted on differentially irrigated corn (30%, 50% and 80% Maximum Allowable Depletion, MAD) to investigate the potential use of remotely sensed canopy temperature which was derived from soil moisture level and meteorological variables. The experiments were conducted at the Conservation and Production Research Laboratory (CPRL) in Bushland, TX, USA. Grain corn (*Zea mays* L.) was grown for high yield using practices common for the northern Texas Panhandle, Texas. Canopy temperature was measured by wireless infrared thermometers (IRTs) and two IRTs were mounted on stationary masts approximately 2.7 m above the ground. TDR reading was made every 10 cm up to 1 m and stored every 30 min. Meteorological variables were obtained from a weather station located near the center pivot collecting air temperature, relative humidity, wind speed and solar radiation. Dramatic change of soil moisture level was observed at a soil depth of 10 cm due to frequent irrigation events at the early state of corn growth. The coefficients of variation over depths ranged from 5 to 21 (30% MAD), 13 to 26 (50% MAD) and 7 to 25 (80% MAD), respectively. The response of canopy temperature with a change of soil moisture levels showed the negative correlation with slight time-delay ($R=0.67\sim0.82$). The correlation coefficients between canopy temperature and meteorological variables were 0.88 (air temperature), 0.68 (solar radiation), -0.61 (relative humidity) and 0.19 (wind speed).

Keywords: Crop water status, Canopy temperature, Meteorological variable, Soil moisture level

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