

Detecting Salt Stress in Tomato Plants using Remote Sensing Technology

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Abstract. The effects of salt stress on tomato plants (*Solanum lycopersicum*) were investigated by using spectral reflectance measurements and digital color-infrared imagery under artificial (quartz halogen) lighting conditions in the laboratory. Spectral measurements of eight plants subjected to four salt concentrations (0.0 m, 0.1 m, 0.25 m, and 0.50 m) indicated significant changes in reflectance in both the visible and near-infrared regions of the spectrum, with the greatest changes occurring among plants subjected to the highest salt concentrations. Spectral changes were also detectable in close-range digital imagery acquired from a vertical perspective using a color-infrared camera system, and were greatly enhanced by using images based on ratios of near-infrared to red reflectance. These results demonstrate a practical application of remote sensing technology in which a certain type of plant stress is detectable in both visible waveband regions and wavelengths that are not detectable to the human visual system.