Frost-induced changes in spectral characteristics of of grain sorghum. (A03-pinter163003-Oral)

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Abstract:

Visible and near-infrared spectral properties of grain sorghum (Sorghum bicolor) were observed using wideband and hyperspectral radiometers in Arizona. Field measurements that were taken before and after the late-planted, 1998 crop was damaged by frost, displayed temporal dynamics that were correlated with visual scores of leaf injury and were different from those observed under more typical senescence conditions the following year. Field data were also compared with changes in spectra measured on detached leaves following their exposure to -5 C for 1h. These laboratory observations, which were made from 350 to 2500 nm using an integrating sphere, showed decreases in reflectance and increases in transmittance shortly after thawing. Derivative spectra show the red edge narrowing and shifting about 14 nm towards shorter wavelengths. As the damaged leaves dehydrated over a several hour period, there was a gradual rise in reflectance and a decline in transmittance. Implications are discussed for using widely accepted vegetation indices (e.g. NDVI) and specific hyperspectral features such as the red edge in remote sensing approaches for determining the extent of frost damage to a crop.

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