PRINCIPAL COMPONENTS OF COTTON, *GOSSYPIUM HIRSUTUM* L., LEAF REFLECTANCE SPECTRA

L. Tarpley and G. F. Sassenrath-Cole
USDA-ARS
Mississippi State, MS
Stoneville, MS

Abstract

Principal component analysis (PCA) was used to identify physiological and environmental contributions to leaf reflectance spectra. The reflectance spectra of cotton (<I>*Gossypium hirsutum*</I> L.) leaves that varied in genotype, age, light exposure and chemical treatment were pooled for analysis. Spectra from 350-1050 nm were obtained with a GER 1500 spectroradiometer. The variation in principal axes of the cotton leaf reflectance spectrum was attributed to light source quality, pigment concentration, diurnal variation in incident radiation, and leaf surface features. Multivariate approaches will aid in achieving the noninvasive, near real-time analysis of the physiological states of plants in some detail. PCA can separate environmental and physiological contributions to leaf reflectance spectra. This allows the possibility of analytically filtering out one or the other.