

## The Hyperspectra and their Red Edge Characteristics of Cotton( I )

TANG Yan-lin<sup>1,3</sup>, WANG Xiu-zhen<sup>2</sup>, HUANG Jing-feng<sup>1</sup>, KONG Wei-shu<sup>3</sup>, WANG Ren-chao<sup>1</sup>  
(1. *Institute of Agriculture Remote Sensing & Information System Application, Zhejiang University, Hangzhou, 310029, China*; 2. *Institute of Meteorology, Zhejiang Province, Hangzhou, 310029, China*; 3. *School of Sciences, Guizhou University, Guiyang 550025, China*)

**Abstract:** The hyperspectral reflectances of the canopy, the first and the third unfold leaves from the top of two cotton varieties were measured in field and indoor at different stages. The concentrations of chlorophyll and carotenoid of leaves corresponding to the spectra were determined by biochemical method. The correlation between the pigment concentrations, leaf area index, above ground biomass and leaf mass and the spectral variables  $\rho_{800}/\rho_{550}$ 、 $\rho_{680}/\rho_{570}$ 、 $\rho_{673}/\rho_{640}$ 、 $\rho_{680}/\rho_{550}$ 、PSSR<sub>a</sub>、PSND<sub>a</sub> and R<sub>Ch</sub> of corn were

analyzed. The hyperspectral reflectance were gradually getting smaller in the visible region and bigger in the near infrared region along with growth. The reflectance of back surface was slightly bigger than that of up surface, and the transmittance smaller than the reflectance for cotton leaves. The leaf area index, fresh leaf weight and dry leaf weight were significantly correlated to the spectral variables  $\rho_{800}/\rho_{550}$ 、 $\rho_{800}/\rho_{680}$  and  $\rho_{680}/\rho_{570}$  of the canopy spectra. The concentrations of chlorophyll-a, chlorophyll-b, total chlorophyll and carotenoid of leaves were also significantly correlated to the spectral variables  $\rho_{680}/\rho_{570}$ 、 $\rho_{673}/\rho_{640}$ 、 $\rho_{680}/\rho_{550}$ 、PSSR<sub>a</sub>、PSND<sub>a</sub> and R<sub>Ch</sub>. This indicated that these spectral variables could be used to estimate the concentrations chlorophyll and carotenoid of leaves for cotton.

**Key words:** cotton; hyperspectral reflectance; spectral variables; red edge parameter; agronomic parameter; regression analysis