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基于光谱参数的棉花叶面积指数监测和敏感性分析

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Monitoring of the Leaf Area Index of Cotton Based on Spectral Parameters and the Sensitivity Study

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摘要 研究棉花冠层光谱参数对不同叶面积指数的响应，建立棉花叶面积指数光谱参数最佳估测模型，并对所选光谱参数进行敏感性分析。利用高光谱仪测定不同时期不同叶面积指数条件下的棉花冠层光谱反射率。结果表明，694 nm和1099 nm分别为可见光和近红外波段区域内与叶面积指数相关性最好的波段，并用于改进前人所建立的光谱参数；宽范围动态植被指数和比值植被指数与叶面积指数的拟合效果最好，估测模型的决定系数（*r*2）分别为0.8375和0.8324；此外，比值植被指数对棉花叶面积指数变化的敏感性大于宽范围动态植被指数。

关键词： 光谱参数 叶面积指数 估测模型 敏感性

Abstract： Leaf area index (LAI) is one of the key structural parameter for cotton canopy. The objectives of this study were to determine the relationships between spectral parameters and LAI so that the optimum regression models for estimating LAI were developed in cotton, and to analysis the sensitivity of these spectral parameters. The reflectance spectra of canopy were measured using a field radiometric spectrometer in different canopy LAI in the different growth stages of cotton. The results showed that the maximum sensitivity of reflectance to variation in leaf area index, 694 nm and 1099 nm, were found in visible and near-infrared spectrum, respectively. Hence, previous established spectral parameters were modified using reflectance of these two wavebands. Furthermore, the models to retrieve LAI using wide dynamic range vegetation index(WDRVI) and ratio vegetation index(RVI) were most feasible with the maximum determination coefficients (*r*2) (0.8375 and 0.8324, respectively). Additional, RVI showed higher sensitivity to LAI than WDRVI consistently.

Keywords： spectrum parameters leaf area index estimation model sensitivity

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