



### 基于宽范围动态植被指数的棉花冠层覆盖度监测

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### Monitoring of the Cotton Vegetation Fraction Based on Wide Dynamic Range Vegetation Index

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摘要

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摘要 旨在利用宽范围动态植被指数对棉花冠层覆盖度进行监测, 解决传统的利用归一化差值植被指数对冠层覆盖度较高时监测不准确(饱和)的问题。采用高光谱仪获取棉花不同时期不同覆盖度的冠层光谱反射率, 通过对构成归一化差值植被指数的近红外波段反射率引入系数 $\alpha$ 来提高修正后的植被指数随棉花覆盖度变化的动态范围。当利用权重系数 $0.1 \leq \alpha \leq 0.2$ 对近红外波段反射率调整之后, 新形成的宽范围动态植被指数用于监测不同覆盖度棉花时未出现“饱和”现象。利用宽范围动态植被指数建立的棉花覆盖度监测模型的决定系数 $r^2 > 0.948$ , 对棉花冠层覆盖度进行监测, 可以解决传统的归一化差值植被指数对冠层覆盖度较高时监测不准确(饱和)的问题, 提高了植被指数对棉花冠层覆盖度监测的精度。

关键词: 棉花 覆盖度 高光谱 宽范围动态植被指数 监测

Abstract: In this paper the wide dynamic range vegetation index (WDRVI) was proposed to estimate the vegetation fraction (VF) of cotton canopy, to take the place of normalized difference vegetation index (NDVI) when the canopy vegetation fraction is relatively large. The reflectance spectra of canopy were measured using a field radiometric spectrometer in different vegetation fractions in the different growth stages of cotton. A coefficient  $\alpha$  was introduced in the near-infrared band reflectance, it could improve the precision of NDVI through adjusting the dynamic range of near infrared bands in the different growth stages of cotton. The coefficient  $\alpha$  with a value between 0.1 and 0.2, enables the adjustment of the NDVI as the wide dynamic range vegetation index, and the WDRVI can avoid the "saturation" problem of NDVI when it is used to retrieve the cotton canopy information in various vegetation fractions. The WDRVI based model for the retrieval of cotton vegetation fraction information can achieve  $r^2 > 0.948$ . Thus, the proposed WDRVI can be used to retrieve the cotton canopy information better than the conventional NDVI when the cotton biomass is relatively big, and produces higher accuracy of the estimation of the cotton canopy vegetation fraction.

Keywords: cotton vegetation fraction hyperspectral radiomete wide dynamic range vegetation index monitoring

Received 2011-01-05;

Fund:

国家自然科学基金(30860139)、国家科技支撑计划(2007BAH12B02)、“863”计划(2006AA10A302)

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引用本文:

陈江鲁, 王克如, 李少昆, 肖春华, 陈兵, 王方永, 金秀良, 吕银亮, 刁万英, 王琼, 王楷, 何晟国. 基于宽范围动态植被指数的棉花冠层覆盖度监测[J] 棉花学报, 2011, V23(3): 265-271

CHEN Jiang-Lu, WANG Ke-Ru, LI Shao-Kun, XIAO Chun-Hua, CHEN Bing, WANG Fang-Yong, JIN Xiu-Liang, Lü Yin-Liang, DIAO Wan-Ying, WANG Qiong, WANG Kai, HE Sheng-Guo. Monitoring of the Cotton Vegetation Fraction Based on Wide Dynamic Range Vegetation Index[J] Cotton Science, 2011, V23(3): 265-271

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