

应用多光谱图像技术进行锦橙叶片氮含量监测

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Monitoring nitrogen contents of Jincheng leaves using multi-spectrum digital image analysis technique

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摘要

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摘要 以蓬安100号锦橙为试材, 运用多光谱图像技术建立快速监测叶片氮含量的方法。利用多光谱相机MS3100采集蓬安100号锦橙叶片图像, 运用Adobe Photoshop软件提取叶片图像的颜色特征参数, 对其进行数学变换和归一化处理后的颜色特征参数与叶片氮含量值进行相关分析, 并建立二者回归模型。结果表明: 6个颜色特征参数G-B、G/(R+B)、(G-B)/(G+B)、G/(R+G+B)、g-b值与叶片氮含量的相关较好, 综合评价得出G-B、(G-B)/(G+B)、g-b值所建立的蓬安100号锦橙叶片氮含量监测模型较好, 其相关系数均为0.84, 决定系数为0.70, 预测误差为3.7%。研究表明, 利用计算机视觉技术进行锦橙叶片氮含量监测是可行的。

关键词: 多光谱 图像技术 锦橙叶片 氮含量 监测

Abstract: The color characteristic parameters of the images of Peng'an 100 Jincheng's leaves captured with multi-spectral camera MS3100 were acquired by the Adobe Photoshop software. Then the relationships between the color characteristic parameters processed by the mathematic transformation and normalization and the nitrogen contents of the Jincheng 100 leaves were analyzed, and the regression model were established. The results show that the color characteristic parameters, G-B, G/(R+B), (G-B)/(G+B), G/(R+G+B) and g-b have significant non-linear correlation with the nitrogen contents, and the monitoring models of Peng'an 100 Jincheng leaf nitrogen contents based on image color parameters, G-B, (G-B)/(G+B) and G-B are better. The correlation coefficients, the determinant coefficients and the errors of prediction are same for the parameters, and 0.84, 0.70 and 3.70%, respectively. Therefore, it is feasibility to monitor nitrogen content of Jincheng leaves by using computer vision technology.

Keywords: multi-spectra image technique Jincheng leaf nitrogen content monitoring

Received 2011-07-18; published 2011-12-26

Fund:

重庆市自然科学基金项目; 中央高校基本科研业务费专项资金项目; 科技部科技人员服务企业专项项目; 农业部“948”项目

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引用本文:

易时来 邓烈 何绍兰 郑永强 姚珍珍 韦献果 李松伟 简水仙.应用多光谱图像技术进行锦橙叶片氮含量监测[J] 植物营养与肥料学报, 2012,V18(1): 176-181

YI Shi-lai DENG Lie HE Shao-lan ZHENG Yong-qiang YAO Zhen-zhen WEI Xian-guo LI Song-wei JIAN Shui-xian.Monitoring nitrogen contents of Jincheng leaves using multi-spectrum digital image analysis technique[J] Acta Metallurgica Sinica, 2012,V18(1): 176-181

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