THE OPTIMAL CHOICE OF THE CHARACTERISTIC WAVELENGTHS IN SPECTRAL IMAGING FOR CUCUMBER DOWNY MILDEW

黄瓜霜霉病光谱图像特征波长优化选取

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Keywords: cucumber Downy Mildew; spectral image; characteristic wavelength; sensitive waveband

ABSTRACT

Aiming at the spectral image acquisition of cucumber downy mildew, the study proposed the optimal selection method of spectral imaging characteristic wavelengths combining the mean-variance analysis and analysis of variance. In this study, the variation degree and range of reflection spectrum was quantitatively measured for both healthy leaves and disease spots in cucumber plants. The analysis showed that the three sensitive wavebands (493 nm - 533 nm, 561 nm - 653 nm, and 689 nm - 698 nm) could properly reflect the inter class difference in spectral reflectance between the dorsal part of lesion and healthy leaves. When the selected combination of spectrum was used as the reference for disease spectral imaging acquisition, it showed that the choice of sensitive wavebands can better reflect the difference in the characteristics between lesion and healthy leaves. It has laid the foundation for obtaining the effective spectral images of disease and simplifying the algorithm for image identification.

摘要

针对黄瓜霜霉病的光谱图像获取，提出了基于均值方差法和方差差异分析相结合的光谱图像特征波长优化选取方法，定量衡量了黄瓜作物健康叶片和病斑的反射光谱差异程度及差异范围，提取了 493 nm - 533 nm、561 nm - 653 nm、689 nm - 698 nm 三个敏感波段，分析表明上述波段能较好反映病斑与健康叶片正面的类间光谱反射差异，并将选定的光谱组合作为病害光谱图像获取的参考依据，表明敏感波段的选择能较好地反映病斑与叶片间的特性差异，为获取病害有效光谱图像和简化图像识别算法奠定了基础。