

园艺一简报

应用数码图像技术对梨树叶片营养诊断的初探

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摘要:

本文使用数码相机获取黄金梨叶片图像并进行色彩分析,研究了利用数码图像技术进行黄金梨元素营养诊断的可行性,结果表明:黄金梨叶片的图像数字化指标绿光深度绝对值G与叶片全氮成显著性正相关;常规测试指标与钾的相关系数介于-0.703~0.923之间,R、G、B与镁含量呈显著或极显著负相关性;R、G与SPAD读数呈显著正相关。NRI与钾、锌分别成显著性负相关和极显著负相关;NGI和铁呈显著性正相关;NBI与钾、铁的相关系数分别为0.819**、-0.753*。数字图像分析技术在果业的可持续发展中将具有良好的应用发展前景。

关键词: 营养诊断

Preliminary Study of Whangkeumbae Leaf Nutrients Status Diagnosis by Using Digital Image Processing Technique

Abstract:

The most widely used methods to assess Whangkeumbae leaf nutrients status diagnosis and fertilization recommendation needs a lot of the laboratory for analysis. Due to their labor requirements or high costs these methods can hardly be applied. This study examined an alternative method to research the possibility of measuring leaf nutrients status diagnosis by using a digital camera to record the visible light reflected from Whangkeumbae. The results showed that greenness intensity had positive correlation with the total N concentration; the correlation coefficient values were from -0.703 to 0.923 for K; redness intensity, greenness intensity and blueness intensity had significant or very significant negative relationships with magnesium contents. Redness intensity and greenness intensity had a significant positive correlation with SPAD reading. Normalized redness intensity showed prominently and very prominently inverse relationships with K and Zn; normalized greenness intensity did prominently positive mutuality; the correlation coefficient were 0.819**and -0.753* between normalized blueness intensity and K and Fe, respectively. The new method will have bright future in the sustainable development of pome industry.

Keywords: leaf nutrients status diagnosis

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参考文献:

[1]祝锦霞, 邓劲松, 石媛媛, 陈祝炉, 韩凝, 王珂.基于水稻扫描叶片图像特征的氮素营养诊断研究[J].光谱学与光谱分析, 2009, 8(29):2171-2175.
[2] Jia Lang-lang, Chen Xin-ping, Zhang Fu-suo, Buerkert A, Romheld V. Use of Digital to Assess Nitrogen Status of Winter Wheat in the Northern China Plain[J]. Journal of Plant Nutrition, 2004, 27

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(3): 441-450.

- [3] Adamsen F J, Pinter P J, Barbes E M, Lamorte R L, Wall G W, Leavitt S W, Kimball B A. Measuring Wheat Senescence with a Digital Camera[J]. Crop Sci, 1999, 39: 719-724.
- [4] Adamsen F J, Coffelt T A, Nelson J M, Barnes E M, Rice R C. Method for Using Images from a Color Digital Camera to Estimate Flower Number[J]. Crop Sci, 2000, 40: 704 - 709.
- [5] 王秀峰.应用数字图像技术进行黄瓜和番茄氮素营养诊断的研究. 硕士论文, 吉林农业大学, 2005, 72-77.
- [6] 王晓静, 张炎, 李磐, 侯秀玲, 冯固.地面数字图像技术在棉花氮素营养诊断中的初步研究[J].棉花学报, 2007, 19(2): 106-113.
- [7] Lukina E V, Stonr M L, Raun W R. Stimating vegetation coverage in wheat using digital images[J]. J.Plant Nutr. 1999,22: 341-350.
- [8] 贾良良, 范明生, 张福锁, 陈新平, 吕世华, 孙彦铭.应用数码相机进行水稻氮素营养诊断[J].光谱学与光谱分析, 2009, 29(8): 2176-2179.
- [9] 裘正军, 宋海燕, 何勇, 方慧.应用SPAD和光谱技术研究油菜生长期间的氮素变化规律[J].农业工程学报, 2007, 23(7): 150-154.
- [10] Wolfe D W, Henderon D W, Hsiao T C, Alvino A. Interactive water and nitrogen effects on senescences of maize. II .Photosynthetic decline and longevity of individual leaves[J].Agron.J.,1988, 80: 865-870.
- [11] Al-abbas A H, Barr R, Hall J D, Crane F L , Baumgardner M F. Spectra of normal and nutrient-deficient maize leaves[J].Agron.J.1974, 66: 16-20.
- [12] Blackmer T M, Schepers J S, Varvel G E. Light reflectance compared with other nitrogen stress measurements in corn leaves[J].Agron.J.1994, 86: 934-938.
- [13] 李井会, 朱丽丽, 宋述尧.数字图像技术在马铃薯氮素营养诊断中的应用[J].中国马铃薯, 2006, 20(5): 257-260.
- [14] Scharf P C, Lory J A. Calibrating corn color from aerial photographs to predict sidedress nitrogen need[J]. Agron.J., 2002, 94: 397-404.

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2. 肖焱波, 贾良良, 陈新平, 张福锁.应用数字图像分析技术进行冬小麦拔节期氮营养诊断[J]. 中国农学通报, 2008,24(08): 448-453
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4. 焦雯珺, 闵庆文, 林 焜, 朱清科, 张建军.植物氮素营养诊断的进展与展望[J]. 中国农学通报, 2006,22(12): 351-351
5. 黄冰艳 高伟 苗利娟 严玫 张新友 董保红.谷氨酰胺合成酶基因研究进展及其在植物氮代谢调控中的应用[J].中国农学通报, 2010,26(23): 53-57
6. 赵满兴 周建斌.西北旱地冬小麦氮素营养诊断生理指标初探[J]. 中国农学通报, 2010,26(20): 222-226