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SONG Ying-bo.Predicting Model of Soybean Leaf Nitrogen Content by Leaf Reflectance Spectra under Different Nitrogen Supply Levels[J].Soybean Science,2010,29(04):641-644.[doi:10.11861/j.issn.1000-9841.2010.04.0641]

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不同施氮水平下大豆反射光谱预测叶片氮含量模型

《大豆科学》 [ISSN:1000-9841 /CN:23-1227/S] 卷: 第29卷 期数: 2010年04期 页码: 641-644 栏目: 出版日期: 2010-08-25

Title: Predicting Model of Soybean Leaf Nitrogen Content by Leaf Reflectance Spectra under Different Nitrogen Supply Levels

文章编号: 1000-9841 (2010) 04-0641-04

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关键词: 叶片氮含量 (KeySearch.aspx?type=Keyword&Sel=叶片氮含量); 叶片光谱反射率 (KeySearch.aspx?type=Keyword&Sel=叶片光谱反射率); 估测模型 (KeySearch.aspx?type=Keyword&Sel=估测模型)

Keywords: Leaf nitrogen concentration (KeySearch.aspx?type=Keyword&Sel=Leaf nitrogen concentration); Leaf spectrum reflectance (KeySearch.aspx?type=Keyword&Sel=Leaf spectrum reflectance); Estimation model (KeySearch.aspx?type=Keyword&Sel=Estimation model)

分类号: S565.1

DOI: 10.11861/j.issn.1000-9841.2010.04.0641 (http://dx.doi.org/10.11861/j.issn.1000-9841.2010.04.0641)

文献标志码: A

摘要: 通过分析不同施氮水平下大豆叶片氮含量与叶片光谱反射率之间的关系, 确立了大豆叶片氮含量的敏感波段及预测方程。结果表明: 在 530、550、890和930 nm 4个波段的光谱反射率与大豆叶片氮含量的相关性达显著或极显著水平。通过4种植被指数的比较, NDVI的 R^2 最大, RMSE最小。筛选得到回归方程: $Y = -323.214 \times \text{NDVI}^2 (890, 530) + 469.9307 \times \text{NDVI} (890, 530) - 165.021$, 该模型适用于不同生育期大豆叶片氮含量的预测。

Abstract: Through analyzing the relationships of nitrogen concentration in soybean leaf under different nitrogen supply levels with spectral reflectance, the sensitive wave bands and prediction functions of soybean leaf nitrogen concentration were worked out. The results showed that there existed higher significant correlations between spectra reflectance of four sensitive wave bands (530, 550, 890, and 930 nm) and the leaf nitrogen content of soybean. After compared with those four vegetation indices, R^2 of the NDVI was the best and RMSE was the smallest. The corresponding prediction model established by vegetation indices of NDVI was $Y = -323.214 \times \text{NDVI}^2 (890, 530) + 469.9307 \times \text{NDVI} (890, 530) - 165.021$, the model was suitable for estimation of leaf nitrogen concentration at different growth stages of soybean.

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备注/Memo 基金项目: 黑龙江省国际合作资助项目(WB08C07)。

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更新日期/Last Update: 2014-09-14

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