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主动遥感光谱仪Greenseeker与SPAD对玉米氮素营养诊断的研究

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Study on diagnosing nitrogen nutrition status of corn using Greenseeker and SPAD Meter

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摘要 以手持式主动遥感光谱仪Greenseeker和叶绿素仪SPAD对玉米不同氮素水平下各个生育期的NDVI值及叶片SPAD值进行测试，研究不同氮素对玉米群体和个体营养状况的变化以及田间条件下简便、快速、非接触性的作物氮素营养状况诊断方法。结果表明，在一定的范围内随着氮肥用量的增加NDVI值也增加，氮肥施用量为N 300kg/hm^{2}时NDVI值达到最高，NDVI 与氮肥施用量符合线性加平台的关系；玉米不同生育期间NDVI 值变化明显，苗期NDVI值比较低，大喇叭口期NDVI 值达到最高，以后逐渐下降并在抽雄期后趋于稳定。SPAD值与NDVI 值的变化趋势相一致，SPAD值与叶绿素含量成正相关关系，大喇叭口期完全展叶的SPAD 与产量存在正相关关系。手持式主动遥感光谱仪Greenseeker和叶绿素仪SPAD结合能够对玉米的氮素营养状况作营养诊断。

关键词： 氮肥 玉米 NDVI值 SPAD值 营养诊断 氮肥 玉米 NDVI值 SPAD值 营养诊断

Abstract:

Portable active remote sensing spectrometer- Greenseeker and chlorophyll meter (SPAD 502) were used to determine NDVI and SPAD meter readings of corn at different growth stages under different nitrogen levels. This paper studied the impact of nitrogen on the nutritional status of single plant and corn population, and simple, fast and non－destructive nutritional diagnosis methods of crop nitrogen status in the field. The research results showed that NDVI increased with N rate, reaching a plateau at N 300 kg/hm^2. The relationship between NDVI and nitrogen rate could be described with a linear plus plateau model. Corn NDVI changed with different growth stages: NDVI was at a low level at the seeding stage and increased to the highest level at the pre-tasselling stage, then declined gradually and stabilized after tassel stage. The changes of NDVI and SPAD values showed similar trend. SPAD readings and chlorophyll contents were positively correlated, and SPAD readings at pre-tasselling stage were positively correlated with grain yield. This paper proved that portable active remote sensing spectrometer-Greenseeker and chlorophyll meter (SPAD meter) could be integrated to diagnose corn nitrogen nutritional status.

Keywords:

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