

## 利用航空成像光谱数据研究土壤供氮量及变量施肥对冬小麦长势影响

### Assessment of the influence of soil nitrogen supplies and variable fertilization on winter wheat growth condition using airborne hyperspectral image

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英文关键词: PHI(Pushbroom Hyperspectral Imager); airborne-remote sensing; soil basic nitrogen; variable fertilization; soil total nitrogen

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中文摘要:

以推扫式成像光谱仪PHI(Pushbroom Hyperspectral Imager)获取的冬小麦拔节期、灌浆初期及乳熟期的航空影像数据为基础,提取反映冬小麦长势的光谱特征值,结合地面调查数据,分析了研究区冬小麦的长势情况;对不同时期光谱特征值与土壤基础供氮量、土壤总供氮量以及变量施肥量进行统计分析,分析结果显示:土壤基础供氮量、土壤总供氮量的空间分布差异对冬小麦长势有明显的影响,其中,土壤基础供氮量是影响冬小麦长势的重要因素,它对冬小麦的长势影响贯穿冬小麦的整个生育期;此外,该文还通过变量施肥前后作物

英文摘要:

Pushbroom Hyperspectral Imager(PHI) is a hyperspectral imaging sensor with 80 wavebands from 411.9 nm to 832.8 nm which was developed by Shanghai Institute of Technical Physics of Chinese Academy of Sciences. From April to May in 2002, three airborne images were acquired at different winter wheat growth stages in Beijing precision agriculture demonstration base. The flight height was 1000 m and the spatial resolution of image reaches 1 m when the hyperspectral images were rectified and spectrally calibrated. In this paper, some spectrum characteristic parameters which are sensitive to winter wheat growth condition were obtained from images, combined with data of soil basic nitrogen content, soil total nitrogen supplies, nitrogen of variable fertilization, analysis between spectrum characteristic parameters and soil data show that soil basic nitrogen is a pivotal factor to wheat growth. And its influence lasts during the whole winter wheat growth stage. Furthermore, analysis based on the change of wheat spectrum information between two growth stages of winter wheat shows that variable fertilization can improve the growth of wheat. It can also eliminate some growth differences caused by spatial difference of soil basic nitrogen.

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