

## 氮肥减施对稻-麦轮作体系作物氮素吸收、利用和土壤氮素平衡的影响

易琼<sup>1</sup>, 张秀芝<sup>1</sup>, 何萍<sup>1\*</sup>, 杨利<sup>2</sup>, 熊桂云<sup>2</sup><sup>1</sup> 农业部作物营养与施肥重点开放实验室, 中国农业科学院农业资源与农业区划研究所, 北京 100081; <sup>2</sup> 湖北省农业科学院植保土肥所, 湖北武汉 430064

## Effects of reducing N application on crop N uptake, utilization, and soil N balance in rice wheat rotation system

YI Qiong<sup>1</sup>, ZHANG Xiu zhi<sup>1</sup>, HE Ping<sup>1\*</sup>, YANG Li<sup>2</sup>, XIONG Gui yun<sup>2\*</sup><sup>1</sup> Ministry of Agriculture Key Laboratory of Crop Nutrition and Fertilization/Institute of Agricultural Resources and Regional Planning, Chinese Academy of Agricultural Sciences, Beijing 100081, China; <sup>2</sup> Institution of Plant Protection and Soil Fertilization, Hubei Academy of Agricultural Sciences, Wuhan 430064, China[摘要](#)[参考文献](#)[相关文章](#)Download: [PDF \(1123KB\)](#) [HTML 1KB](#) Export: [BibTeX](#) or [EndNote \(RIS\)](#) [Supporting Info](#)

**摘要** 田间试验研究了稻-麦轮作体系中减施氮肥对作物氮素吸收、利用和土壤氮素平衡的影响。结果表明,与当地习惯施肥(小麦: N 225 kg/hm<sup>2</sup>, 基肥与分蘖肥各半; 水稻: N 210 kg/hm<sup>2</sup>, 基肥和分蘖肥为3: 2)相比, 减氮20%~30%处理产量并没有降低, 而氮肥当季利用率、氮素农学利用率以及氮素偏因子生产力则有所增加; 而且, 氮肥分次追施, 能增加子粒产量, 并减少氮肥成本。虽然减氮20%~30%处理0—40 cm土层无机氮含量较习惯施肥处理降低, 但是并没有降低植株地上部对氮素的吸收。在小麦和水稻收获期, 减施氮肥处理 0—100 cm土壤无机氮残留量低于习惯施肥处理; 且稻-麦轮作系统中氮的表现损失主要发生在水稻季。初步认为, 在长江中下游平原稻-麦轮作体系氮素过量施用地区, 第一个轮作周期减施氮肥20%~30%不仅不影响产量, 而且可提高氮素利用率, 有利于保护环境。

**关键词:** 氮肥减施 稻-麦轮作 氮肥利用率 土壤无机氮

**Abstract:** The effects of reducing N application on plant N uptake, utilization, and soil N balance in rice wheat rotation system were studied using field experiments. The results show that compared with farmers practice for N fertilization, N 225 kg/ha for wheat with 1/2 basal and 1/2 topdressing at the tillering stage and N 210 kg/ha for rice with the ratio of 3: 2 for the basal and tillering applications, the grain yields are not decreased under the N application amounts with a reduction by 20%-30%, while the N recovery efficiency, N agronomic efficiency, and N partial factor productivity are increased. Moreover, topdressing N fertilization can increase the grain yields and reduce the cost of the fertilization. Although both soil mineral N content and accumulation are reduced, the N absorptions by crops are not reduced accordingly. There is less residual soil mineral N in 0-100 cm layer at the harvest stages of wheat and rice compared to that of the farmer's practice. In addition, the loss of apparent N in the rice wheat system is mainly occurred in the rice season. Therefore, it is preliminarily concluded that the reducing N application by 20%-30% is a feasible N management practice under the first rice wheat rotation system in the middle lower Yangtze plain with over N fertilization.

**Keywords:** reducing N application rice wheat rotation N use efficiency soil mineral N

Received 2009-12-10; published 2010-02-21

**Fund:**

国家重点基础研究发展计划课题(2007CB109306); 国家科技支撑计划课题(2006BAD02A14)资助。

**引用本文:**易琼<sup>1</sup>, 张秀芝<sup>1</sup>, 何萍<sup>1\*</sup>, 杨利<sup>2</sup>, 熊桂云<sup>2</sup>. 氮肥减施对稻-麦轮作体系作物氮素吸收、利用和土壤氮素平衡的影响[J] 植物营养与肥料学报, 2010, V16(5): 1069-1077YI Qiong<sup>1</sup>, ZHANG Xiu zhi<sup>1</sup>, HE Ping<sup>1\*</sup>, YANG Li<sup>2</sup>, XIONG Gui yun<sup>2</sup>. Effects of reducing N application on crop N uptake, utilization, and soil N balance in rice wheat rotation system[J] Acta Metallurgica Sinica, 2010, V16(5): 1069-1077**Service**

- [▶ 把本文推荐给朋友](#)
- [▶ 加入我的书架](#)
- [▶ 加入引用管理器](#)
- [▶ Email Alert](#)
- [▶ RSS](#)

[作者相关文章](#)