

## 湖北省早、中、晚稻施氮增产效应及氮肥利用率研究

王伟妮<sup>1</sup>, 鲁剑巍<sup>1\*</sup>, 鲁明星<sup>2</sup>, 李小坤<sup>1</sup>, 李云春<sup>1</sup>, 李慧<sup>1</sup><sup>1</sup>华中农业大学资源与环境学院, 湖北武汉 430070; <sup>2</sup>湖北省土壤肥料工作站, 湖北武汉 430070

Effect of nitrogen fertilizer application and nitrogen use efficiency of early, mid and late rice in Hubei Province

WANG Wei ni<sup>1</sup>, LU Jian wei<sup>1\*</sup>, LU Ming xing<sup>2</sup>, LI Xiao kun<sup>1</sup>, LI Yun chun<sup>1</sup>, LI Hui<sup>1\*</sup><sup>1</sup> Resources and Environment College, Huazhong Agricultural University, Wuhan, Hubei 430070, China; <sup>2</sup> Soil and Fertilizer Station of Hubei Province, Wuhan, Hubei 430070, China

摘要

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**摘要** 2006-2009年, 通过在湖北省18个县(市、区)布置多点田间肥效试验, 研究了当前生产条件下施用氮肥对水稻产量的影响, 分析了氮肥的利用率现状, 并探讨了早、中、晚稻施氮效果的差异。结果表明, 当前生产条件下, 施用氮肥可以显著提高水稻产量, 早、中、晚稻的平均增产量分别为1641、1717和1695 kg/hm<sup>2</sup>, 增产率分别为37.6%、27.5%和35.0%。早稻和中稻产量的提高主要是由于单位面积有效穗数和每穗粒数的增加, 而晚稻主要是由于单位面积有效穗数增加和千粒重提高所致。早、中、晚稻对氮肥的利用效率存在一定的差异, 农学利用率平均分别为10.7、10.0和10.4 kg/kg, 偏生产力分别为46.2、50.1和45.3 kg/kg, 吸收利用率分别为31.0%、33.2%和24.8%, 生理利用率分别为31.8、31.8和41.1 kg/kg。3种类型水稻的土壤氮素依存率平均值都在60%以上, 表明水稻吸收的氮素主要来自土壤, 其中晚稻对土壤氮素的依赖程度要大于早稻和中稻。

**关键词:** 早稻 中稻 晚稻 氮肥 产量 氮肥利用率

**Abstract:** Multipoint field experiments of rice were conducted to study the effect of nitrogen (N) fertilizer application on rice yield, to investigate the N use efficiency, and to compare early, mid and late rice in their response to N application in 18 counties of Hubei Province during 2006–2009. The results show that the average yields of the NPK (with nitrogen) treatment of early, mid and late rice are 1641, 1717 and 1695 kg/ha, respectively, which are higher than those of the PK (without nitrogen) treatment. It is concluded that the N application increases grain yield significantly, with the yield increase rates of 37.6% for early rice, 27.5% for mid rice and 35.0% for late rice. And the increase of the yield is resulted from the increase of panicles per unit area and grains per panicle in early and mid rice, and the increase of panicles per unit area and 1000-grain weight in late rice. At present production conditions, N agronomic efficiencies (NAE) of early, mid and late rice are 10.7, 10.0 and 10.4 kg/kg, partial factor productivities of applied N (PFPN) are 46.2, 50.1 and 45.3 kg/kg, N recovery efficiencies (NRE) are 31.0%, 33.2% and 24.8%, and N physiological efficiencies (NPE) are 31.8, 31.8 and 41.1 kg/kg in Hubei Province, respectively. The average soil N dependent rates (SNDR) of early, mid and late rice are all above 60.0%, which means that nitrogen absorbed by rice mostly comes from soil rather than fertilizer. And in three kind of rice, late rice has the highest SNDR.

**Keywords:** early rice mid rice late rice nitrogen fertilizer grain yield nitrogen use efficiency

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Corresponding Authors: 鲁剑巍 Email: [lujianwei@mail.hzau.edu.cn](mailto:lujianwei@mail.hzau.edu.cn);

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