

## 长期施钾对红壤水稻土水稻产量及土壤钾素状况的影响

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## Effects of long-term K fertilization on rice yield and soil K status in reddish paddy soil

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**摘要** 研究了长期定位施肥试验中连续27年(1981~2007)施用钾肥对水稻产量和土壤钾素状况的影响。本试验选择了其中5个处理: CK(不施肥)、NP(施氮、磷肥)、NPK(施氮、磷、钾肥)、NP+RS(施氮、磷肥和稻草)和NPK+RS(施氮、磷、钾肥和稻草)。结果表明, 施钾能明显提高水稻产量, 施钾肥的NPK和NPK+RS处理27年的早稻平均产量分别比NP和NP+RS处理增加15.2%和10.9%; 晚稻增产17.2%和9.1%; 在27年54季水稻种植期间, 不同施肥处理早、晚稻产量的变化趋势不同。CK、NP处理的早、晚稻产量随着时间的推移呈负变化趋势, 而NPK、NP+RS和NPK+RS处理的早、晚稻产量呈正变化趋势。施钾的NPK和NPK+RS处理不同土层中土壤全钾、缓效钾和速效钾含量均高于NP和NP+RS处理的相同土层; 除NPK+RS处理外, 其它各处理表观钾平衡均为负值, 其中CK和NP处理钾的负平衡值最大。长期施用钾肥能提高水稻产量和维持土壤钾素肥力。

**关键词:** 长期施钾 红壤水稻土 水稻产量 土壤钾素状况 长期施钾 红壤水稻土 水稻产量 土壤钾素状况

## Abstract:

A 27 years of long-term experiment was conducted to evaluate the effects of K fertilizer application on rice yield and soil K status in reddish paddy soil. There were 5 treatments, namely, CK (without fertilization), NP (N, P fertilizers), NPK (N, P and K fertilizers), NP+RS (NP plus rice straw) and NPK+RS (NPK plus rice straw) in this study. The results show that the K fertilizer applications could obviously increase grain yields of early rice and late rice. The average yields of the early rice under the NPK and NPK+RS treatments are increased by 15.2% and 10.9%, respectively, and those of the late rice are increased by 17.2% and 9.1% compared with the NP and NP+RS treatments over 27 years. The 27-year yield change trends of both the early and late rice are different in various treatments. There are negative yield change trends with time in the CK and NP treatments, while there are the positive trends in the NPK, NP+RS and NPK+RS treatments. Contents of total K, slowly available K and available K in the different soil layers under the NPK and NPK+RS treatments are higher than those of corresponding soil layers under the NP and NP+RS treatments. Values of the apparent K balance in the soil-crop system are negative in all treatments except for the NPK+RS treatment, among which the values are highest in the CK and NP treatments. Long-term rational K fertilization could increase rice yield and sustain soil K fertility.

## Keywords:

Received 2008-11-18;

## 引用本文:

廖育林<sup>1,2,3</sup>, 郑圣先<sup>2,3\*</sup>, 鲁艳红<sup>1,2,3</sup>, 谢坚<sup>1,2</sup>, 聂军<sup>2,3</sup>, 向艳文<sup>2</sup>. 长期施钾对红壤水稻土水稻产量及土壤钾素状况的影响 [J] 植物营养与肥科学报, 2009, V15(6): 1372-1379LIAO Yu-lin<sup>1,2,3</sup>, ZHENG Sheng-xian<sup>2,3\*</sup>, LU Yan-hong<sup>1,2,3</sup>, XIE Jian<sup>1,2</sup>, NIE Jun<sup>2, 3</sup>, XIANG Yan-wen<sup>2</sup>. Effects of long-term K fertilization on rice yield and soil K status

in reddish paddy soil

[J] Acta Metallurgica Sinica, 2009, V15(6): 1372-1379

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