

不同氮肥用量下冬小麦土壤剖面累积硝态氮及其与氮素表观盈亏的关系

刘瑞¹, 戴相林¹, 周建斌^{1*}, 张鹏¹, 崔亚胜², 王天泰³¹西北农林科技大学资源环境学院, 陕西杨凌 712100; ²户县土肥站, 陕西户县 710300; ³周至县土肥站, 陕西周至 710400Relationship between accumulated NO₃-N in soil profiles and apparent nitrogen budget in winter wheat fields under nitrogen fertilizationLIU Rui¹, DAI Xiang lin¹, ZHOU Jian bin^{1*}, ZHANG Peng¹, CUI Ya sheng², WANG Tian tai^{3*}¹ College of Resource and Environmental Sciences, Northwest A & F University, Yangling, Shaanxi 712100, China; ² Station of Soil and Fertilizer of Huxian, Huxian, Shaanxi 710300, China; ³ Station of Soil and Fertilizer of Zhouzhi, Zhouzhi, Shaanxi 710400, China

摘要

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摘要 以在陕西关中地区户县、周至两县连续2年的20余个“3414”肥料田间试验为研究对象,研究了不同施氮量下冬小麦收获后土壤2 m剖面硝态氮的分布、累积及其与土壤氮素表观盈亏量间的关系。结果表明:随着氮肥用量的提高,土壤剖面硝态氮累积量明显增加,其向土壤下层淋溶的程度也越严重;当施氮量为180~240 kg/hm²时,一些试验点的土壤氮素已经表现出盈余;当施氮量达到270~360 kg/hm²,所有试验点土壤氮素均明显盈余。不同施氮量时土壤表观氮素平衡值(施氮量与氮素携出量的差值)与土壤0—2 m剖面硝态氮累积量之间呈极显著正相关,说明土壤表观氮素平衡和盈亏决定了土壤剖面硝酸盐的累积状况;土壤氮素表观盈余值每增加100 kg/hm²,0—2 m土壤剖面硝态氮累积量增加约62.5 kg/hm²。

关键词: 冬小麦 施氮量 土壤硝态氮 氮素表观盈亏

Abstract: More than 20 field experiments designed with the “3414” plan were carried out in Huxian County and Zhouzhi County, Guanzhong Plain, Shaanxi during 2008 and 2009 to evaluate the NO₃-N accumulation in soil profiles after harvesting winter wheat; and its relationship with the apparent N budget in soil was also studied. The results show the amounts of NO₃-N accumulation in the soil profiles and their extents to leach into the deeper soil layers are increased significantly as the nitrogen fertilizer usage increased. When the N fertilizer rate reaches to 180–240 kg/ha, positive budget of nitrogen in soil is observed in some experiment sites, and when N fertilizer rate reaches to the 270–360 kg/ha, positive budget of nitrogen in soil is observed in all experiment sites. There is a positive correlation between the apparent balances of soil N and the accumulation of NO₃-N in soil profiles (0–2 m). This indicates the amount of NO₃-N in the soil profile is mainly determined by the apparent N budget balances in soil. The NO₃-N accumulation in the soil profile is increased about 62.5 kg/ha when N balance in soil is at 100 kg/ha.

Keywords: winter wheat N- fertilizer rate soil NO₃-N apparent N budget in soil

Received 2011-04-12; published 2011-10-24

Fund:

国家“十一五”科技支撑计划课题;国家自然科学基金项目

Corresponding Authors: 刘瑞 Email: liurui766@163.com

引用本文:

刘瑞 戴相林 周建斌 张鹏 崔亚胜 王天泰.不同氮肥用量下冬小麦土壤剖面累积硝态氮及其与氮素表观盈亏的关系[J] 植物营养与肥料学报, 2011,V17(6): 1335-1341

LIU Rui DAI Xiang-lin ZHOU Jian-bin ZHANG Peng CUI Ya-sheng WANG Tian-tai. Relationship between accumulated NO₃-N in soil profiles and apparent nitrogen budget in winter wheat fields under nitrogen fertilization[J] Acta Metallurgica Sinica, 2011, V17(6): 1335-1341

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