

## 不同肥力土壤下施氮与玉米秸秆还田对冬小麦氮素吸收利用的影响

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Effect of maize straw applied with N fertilizer on nitrogen adsorption of winter wheat under different soil fertility

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**摘要** 为了解华北潮土区不同土壤肥力水平下施氮与玉米秸秆还田对冬小麦氮素吸收利用的影响, 采用<sup>15</sup>N标记氮肥和<sup>15</sup>N标记玉米秸秆的双标记方法, 在两种肥力水平土壤上进行盆栽试验, 研究了玉米秸秆全量直接还田对冬小麦地上部氮素累积量、氮素分配和氮肥回收率的影响。结果表明: (1) 等氮肥用量条件下, 与不配施玉米秸秆相比, 施用玉米秸秆则显著降低了冬小麦地上部氮素累积量; 高肥力土壤的子粒氮素累积量高于低肥力土壤, 冬小麦秸秆氮素累积量则以低肥力土壤为高; 氮肥配施玉米秸秆使得氮肥回收率下降9.6%~15.7%, 土壤残留率增加12.2%~16.4%。(2) 氮肥用量为N 150和300 kg/hm<sup>2</sup>时, 玉米秸秆氮素的当季回收率达到22.8%~33.1%, 冬小麦子粒氮素约7%~10%来源于还田的玉米秸秆。(3) 等氮肥用量和相同土壤肥力条件下, 氮肥配施玉米秸秆对冬小麦子粒产量影响不显著, 在氮肥用量为N 150和300 kg/hm<sup>2</sup>条件下, 影响冬小麦子粒产量主要是土壤肥力水平, 该试验结果还有待于田间进一步验证。

**关键词:** 玉米秸秆还田 冬小麦 氮素累积量 氮素分配 氮肥回收率

**Abstract:** By adopting the doubly-labeled method of <sup>15</sup>N-labeled urea and <sup>15</sup>N-labeled maize straw, pot experiments were carried out to study the effect of maize straw direct return on winter wheat's N accumulation, nitrogen distribution and nitrogen fertilizer recovery in 2 soils with different fertility. These results indicate that under the condition of same N fertilizer application amount, the nitrogen accumulation of winter wheat is decreased with the return of maize straw compared with non maize straw return, while the nitrogen harvest index is increased with the return of maize straw since nitrogen accumulation is decreased more significantly in winter wheat's stalk than that in its kernel. The nitrogen content of winter wheat seed cultivated in the high fertility soil is higher than that in the low fertility soil, while the nitrogen recovery rates are declined by 9.6%-15.7% and nitrogen residual rates are increased by 12.2%-16.4% under the nitrogen fertilization applied with maize straw return. About 22.8%-33.1% nitrogen accumulation of winter wheat and 7%-10% nitrogen accumulation of winter wheat seed are from the returned maize straw when the N-fertilizer application rates are N 150 and 300 kg/ha. Under the condition of the same N fertilizer application rate and the same soil fertility, the impact of N fertilizer applied with maize straw on the seed yield of winter wheat is not significant, and the effect of soil fertility on the use efficiency of maize straw nitrogen is larger than that of the nitrogen fertilizer. This result should be proved by further field experiment.

**Keywords:** maize straw return winter wheat nitrogen accumulation nitrogen distribution recovery of nitrogen fertilizer

Received 2011-06-30; published 2011-12-26

Fund:

国家重点基础研究发展计划资助课题; 国家重点基础研究发展计划资助课题

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**引用本文:**

单鹤翔 卢昌艾 张金涛 王金洲 徐明岗. 不同肥力土壤下施氮与玉米秸秆还田对冬小麦氮素吸收利用的影响[J] 植物营养与肥料学报, 2012, V18(1): 35-41

SHAN He-xiang LU Chang-ai ZHANG Jin-tao WANG Jin-zhou XU Ming-gang. Effect of maize straw applied with N fertilizer on nitrogen adsorption of winter wheat under different soil fertility[J] Acta Metallurgica Sinica, 2012, V18(1): 35-41

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