

不同施氮水平对冬小麦季化肥氮去向及土壤氮素平衡的影响

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Effects of different N rates on fate of N fertilizer and balance of soil N of winter wheat

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摘要

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摘要 采用田间微区¹⁵N示踪技术,研究了冬小麦季化肥氮去向及土壤氮素平衡。结果表明,在供试土壤肥力水平和生产条件下,N 150 kg/hm²的施肥量已达到较高产量,再增加氮肥用量小麦产量不再增加。随着施肥量的增加,地上部吸氮量有所增加,氮肥的表现利用率和农学利用率持续下降,而生理利用率则表现为低—高一低的变化趋势。在低施氮条件下,小麦主要吸收土壤氮的比例高于化肥氮;在高施氮条件下,小麦吸收土壤氮的比例下降。冬小麦收获后,仍有26.7%~40.6%的氮肥残留在0—100 cm土层中,17.4%~24.8%的氮肥损失。残留在土壤剖面中的氮肥主要分布在表土层。随着施氮量的增加,土壤氮素总平衡由亏缺转为盈余;土壤根区硝态氮也由播前消耗转为在播前的基础上累加,两个小麦品种表现为相同的趋势。

关键词: 冬小麦 氮去向 氮素平衡 ¹⁵N

Abstract: The fate of N fertilizer and balance of soil N under winter wheat farming were studied using filed¹⁵N micro-plot. The results show that crop yield would not increase when the nitrogen application rate is above N 150 kg/ha. Apparent recovery efficiency and agronomic efficiency of nitrogen fertilizer are constantly decreased with increasing of rate of nitrogen fertilizer, while the trend of physiological efficiency is low-high-low. At lower N rate, more soil N is absorbed by winter wheat than that from fertilizer N, and the ratio of soil N absorption to fertilizer N absorption is decreased under high N application. After the harvest of winter wheat, 26.7%-40.6% of fertilizer N is resided in 0-100 cm, and 17.4%-24.8% of fertilizer N is lost. With increasing of nitrogen fertilizer application, the total balance of soil N is from deficiency to surplus, and NO₃⁻-N in the root zone soil is from consuming nitrogen to cumulating nitrogen before seeding. There is similar trend between two wheat varieties.

Keywords: winter wheat fate of N balance of N ¹⁵N

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