

氮素运筹对夏玉米产量形成与氮素利用效果的影响

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Effects of nitrogen management modes on yield formation and nitrogen utilization efficiency of summer maize

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摘要 以郑单958玉米为材料, 研究了氮素运筹对夏玉米产量形成与氮素利用效果的影响。结果表明, 合理氮素运筹能显著提高夏玉米果穗的穗粒数、粒重、容重以及整个生育时期植株的氮素积累量, 经济产量增加16.4%。施氮量与夏玉米秸秆、子粒的氮素积累量呈极显著正相关; 但在相同施氮量下, 分期施用对其无显著影响。施氮量超过 N 300 kg/hm², 且于花粒期施氮, 营养器官氮素转运量显著降低, 营养器官和子粒的含氮量及积累量升高, 出现了氮素奢侈吸收现象, 导致氮素的表观利用率、农艺效率、生理效率、干物质和子粒生产效率显著降低。转运氮贡献率与施氮量呈显著的二次曲线关系。在本试验条件下, 最佳施肥量为N 300 kg/hm², 采用种肥配合大喇叭口期一次追施为宜。

关键词: 夏玉米 氮素运筹 产量形成 氮素利用效果

Abstract: A field experiment was conducted to study the effects of nitrogen management modes on yield formation and nitrogen utilization efficiency of summer maize, Zhengdan 958. The results showed that the rational nitrogen management could remarkably increase the kernel numbers of ear, kernel weight, bulk density, grain yield, biomass and plant nitrogen accumulation of the summer maize, and the grain yield was increased by 16.4% due to the nitrogen application. There were significant positive correlations between the nitrogen uptakes in stalk, grain and nitrogen application amounts, while split applications of nitrogen in the same application rate had no significant effects on the nitrogen uptake amounts. When the nitrogen application rate was beyond 300 kg/ha with a split application at flowering and milky stage, the transfer nitrogen to grain was decreased significantly. Moreover, with the increase of the nitrogen application rates the nitrogen contents and accumulations in maize straw and grain were continuously increased, and extravagant nitrogen absorption happened, therefore the apparent utilization ratio, agronomic efficiency, physiological efficiency, dry matter production efficiency and grain production efficiency of nitrogen were decreased remarkably. The contribution ratio of nitrogen to grain showed a fluctuation from an initial rising to a drop. Under the condition of the experiment, the 300 kg/ha of nitrogen application is the optimum amount for high yield and nitrogen utilization efficiency, and it is reasonable to change split nitrogen applications at different growing stages to the applications at the seeding and 12-leaf stage.

Keywords: summer maize nitrogen management yield formation nitrogen utilization efficiency

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