

## 不同氮效率玉米干物质形成及氮素营养特性差异研究

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## Dry matter formation and nitrogen uptake in two maize cultivars differing in nitrogen use efficiency

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**摘要** 通过田间小区试验, 开展了两个氮素供应水平 (N0和N180) 下, 两个不同氮效率玉米品种 [氮高效品种先玉335 (V1) 低效品种吉单535 (V2)] 干物质形成与氮素营养特性差异研究。结果表明, 在氮素胁迫条件下, 氮高效品种先玉335具有较高的耐低氮能力, 表现为N0处理其干物质质量及吸氮量均显著高于氮低效品种吉单535的N180处理。成熟期, 先玉335的子粒干物质质量和吸氮量均显著高于吉单535, 且N180处理显著高于N0处理; 品种和氮素处理间的交互作用达极显著水平, 表现为N180处理先玉335子粒干物质质量和吸氮量最高。另外, 两品种子粒中85.6%~97.6%的碳来源于粒重形成阶段叶片的光合作用, 仅2.4%~14.1%源于抽雄前营养体的碳素转移。先玉335子粒氮素来源更多依赖于生育后期根系对氮素的吸收和转移, N0和N180处理中, 根系氮素吸收转移量对子粒的贡献分别为45.4%和59.3%; 而吉单535子粒的氮素来源则以生育前期地上部营养体的氮素转移为主, N0和N180处理中, 转移量对子粒贡献分别为65.5%和67.9%。先玉335的氮肥回收利用率、氮肥农学效率及氮肥偏生产力均高于吉单535。

**关键词:** 氮效率 玉米 干物质 氮素 转运

**Abstract:** Field experiment was conducted to investigate dry matter accumulation and N uptake under two N levels (N0 and N180) in two maize cultivars with contrasting N use efficiency. The results indicated that Xianyu 335 with high N efficiency had great tolerance to N stress. The dry matter weight and N absorption of Xianyu 335 in N0 treatment were both higher than those of Jidan 535 in N180 treatment. In maturity stage, the dry matter weight and N absorption of grain in Xianyu 335 was significant higher than Jidan 535, and those in N180 treatment was higher than N0 treatment. Moreover, the interaction between variety and N application reached extremely significant level. The dry matter weight and N absorption of grain was highest in Xianyu 335 with 180 kg/ha N application. In addition, a majority of grain carbon (85.6%-97.6%) relied on photosynthesis in the stage of grain formation, only a minority of grain carbon (2.4%-14.1%) relied on carbon translocation from vegetative organs. For Xianyu 335, nitrogen in grain mainly relied on N uptake by root at reproductive stage, which accounted for 45.4% and 59.3% of total N of grain in N0 and N180 treatment respectively; but for Jidan 535, N in grain mainly relied on N translocation from vegetative 335 the nitrogen recovery use efficiency (NRUE), nitrogen agronomic efficiency (NAE) and nitrogen partial factor productivity organs, which accounted for 65.5% and 67.9% of total N grain in N0 and N180 treatment respectively. In Xianyu (NPPF) were all higher than Jidan 535.

**Keywords:** nitrogen efficiency maize; dry matter; nitrogen; transportation

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