

机插稻鸭共作系统氮素基肥用量对水稻群体质量与氮素利用的影响

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Effects of the amount of basic and tillering nitrogen on population quality and nitrogen utilization of machine-transplanted rice in rice-duck farming system

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摘要 以武粳15为试材, 研究了氮素基肥用量对机插稻鸭共作水稻群体特征、氮素吸收利用的影响。结果表明: 1) 在稻鸭共作系统中, 随氮素基肥用量的减少, 机插水稻群体最高分蘖数减少, 最高分蘖数前后的分蘖发生和消亡速率降低, 粒叶比、有效叶面积率、高效叶面积率提高, 齐穗期和成熟期干物质积累量降低, 各阶段尤其是拔节至齐穗期的吸氮量降低。2) 当氮素基肥用量适宜, 基、穗肥比4.5 : 5.5时, 机插水稻群体的分蘖成穗率较高, 叶面积指数适宜, 齐穗期至成熟期的干物质积累量最大, 拔节前氮素基肥利用率、氮肥当季利用率、氮素农学利用率、氮素收获指数和氮肥偏因素生产力协同提高, 群体穗数合理, 产量最高。3) 稻鸭共作不仅提高拔节前氮素基肥利用率和氮肥当季利用率, 而且改善机插水稻的群体质量, 提高抽穗后群体的生产能力和水稻产量。

关键词: 机插水稻 稻鸭共作 氮素用量 群体质量 氮素利用 机插水稻 稻鸭共作 氮素用量 群体质量 氮素利用

Abstract:

Wujing15 (japonica rice cultivar) was used, and four different amount of basal and tillering nitrogen fertilizer (BN) were conducted to investigate the effects of nitrogen fertilizer on the population quality and nitrogen utilization of machine-transplanted rice in rice-duck farming system. The results showed as followed: 1) In rice-duck farming system, along with the reduction of the amount of BN, the maximum number of tillers and the speed of tiller appearance and dying decreased; the proportion of effective leaf area, high effective leaf area and the ratio of spikelets number to leaf area increased; dry matter and nitrogen accumulated from heading to maturity decreased; nitrogen uptake decreased at each stage especially from jointing to heading. 2) when the amount of BN at a suitable level, and the ratio of BN to topdressing nitrogen was 4.5: 5.5 the ratio of panicle number to maximum number of tillers was higher under the machine-transplanted rice-duck farming system which at the same time contained a suitable LAI and reached the highest amount of day matter accumulated from heading to maturity. Moreover, higher BN utilization efficiency before jointing stage, nitrogen utilization efficiency, nitrogen harvest index, nitrogen agricultural efficiency and nitrogen partial factor productivity were achieved at that point also. 3) machine-transplanted rice-duck farming system not only enhanced the nitrogen fertilizer use efficiency before jointing and of the whole planting season, but also improved the population quality and thus strengthen the ability of day matter producing and eventually rice yield.

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