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Analysis of the Factors of High Yielding Ability for a Japonica Type Rice Line, 9004, Bred in China : III. The effects of stage and amount of nitrogen application on yield formation

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Abstract:

Japonica type rice line 9004, high yielding glutinous rice developed in Jiangsu Province, China, was cultivated with and without nitrogen at early tillering (ETS), spikelet differentiation (PFS I), spikelet degeneration (PFS II) or heading (HS) stage, and including ETS in stages 2-4, to analyze the effects of application stages and amounts (0-30.0gN/m²) of nitrogen on yield formation. 1) Winnouwed paddy yield ranged from 804 to 1081g/m², and the ranges for number of spikelets, percentage of ripened grains and 1000 kernel weight were 3.14-5.06×10⁴/m², 79.6-93.7% and 25.2-29.0g, respectively. 2)The yields in ETS, PFS I and II plots were increased due to an increased number of spikelets per area owing to the increase in the number of panicles and spikelets per panicle, respectively. The yield in HS plot increased due to an increased percentage of ripened grains and 1000 kernel weight when less nitrogen was applied before heading. Higher yields were obtained in those plots to which a higher amount of nitrogen was applied, and the increasing trend was PFS I > PFS II > ETS > HS. 3)Yield was affected by the number of spikelets per area and dry matter production during the ripening period. The number of spikelets per area had a significant correlation to the number of grains per panicle, and the dry matter production during the ripening period also had a significant correlation to LAI, the amount of absorbed nitrogen and the number of spikelets per area. 4)The results mentioned above suggest that the increments of nitrogen absorption from the panicle initiation stage to heading and dry matter accumulation before and after heading play very important roles to ensure the number of spikelets per area and the dry matter distributed for each spikelet, respectively, in the panicle weight type variety bred in China recently.

Keywords:

Amount of absorbed nitrogen, Amount of nitrogen application, Dry matter production, Efficiency of spikelet production, Rice, Stage of nitrogen application, Yield, Yiled components

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