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Contribution of Nitrogen Absorbed during Ripening Period to Grain Filling in a High-Yielding Rice Variety, Takanari

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Abstract: High-yielding rice varieties require a large accumulation of N in panicles. The objectives of this study were to clarify the change in N allocation during the ripening period (Exp. 1) and to quantify the contribution of N absorbed during the ripening period to panicle N at maturity (Exp. 2) in the high-yielding variety Takanari in comparison with that in Nipponbare as a control. In Exp. 1, ^{15}N-labeled N (^{15}N) was applied at heading to investigate the distribution of newly absorbed N as well as the allocation of plant N. In Exp. 2, split ^{15}N application was performed during the filling period to estimate the above contribution. In Exp. 1, the allocation of plant N and absorbed ^{15}N to the panicles was larger and that to the leaves was smaller in Takanari than in Nipponbare during the ripening period, although Takanari accumulated more N at maturity. The difference in N allocation suggested that the difference in N demand in panicles would be larger than that in N uptake. In Exp. 2, the varietal difference in the grain filling duration was observed: Nipponbare accumulated little N in the panicles after 28 d after heading (DAH), while Takanari accumulated about a quarter of its panicle N during that time. An estimate showed that in Takanari, 13.5% of the panicle N was derived from N absorbed after 28 DAH. These results suggest that the utilization of newly absorbed N until a later period after heading is important for the achievement of high yields.

Keywords: Grain filling, High-yielding variety, Nitrogen partitioning, Rice, Ripening period

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