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Agronomic characteristics of stay-green mutant derived from an early-maturing rice variety ‘Pyeongwon’

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Abstract

We found a new stay-green mutant from ‘Pyeongwon’ which is an early-maturing rice variety in Korea. The mutant showed green leaves after grain ripening period and it maintained higher SPAD value than wild type rice plant and original variety ‘Pyeongwon’. The stay-green trait in rice, three genes have been identified up to date. The non-yellow coloring1 (*NYC1*) gene encodes a chloroplast-localized short-chain dehydrogenase/reductase (SDR) with three transmembrane domains. The non-yellow coloring3 (*NYC3*) gene encodes a plastid-localizing alpha/beta hydrolase-fold family protein with an esterase/lipase motif. The *Sgr* gene encodes a novel chloroplast protein and regulates the destabilization of the light-harvesting chlorophyll binding protein (LHCP) complexes of the thylakoid membranes, which is a prerequisite event for the degradation of chlorophylls and LHCPs during senescence. After sequencing the PCR products, we found a single nucleotide variation(A→T) in the *NYC1* gene, which changes the amino acid lysine to methionine. The *NYC1* gene encodes a short-chain dehydrogenase/reductase(SDR) protein. And we confirmed the co-segregation between SNP and stay-green trait from genotyping the progenies of the mutant.

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