

Mutation of *ONAC096* delays leaf senescence and increases grain yield in rice

Kiyoong Kang¹ and Nam-Chon Paek^{1*}

¹Department of Plant Science, Plant Genomics and Breeding Institute, Research Institute of Agriculture and Life Sciences, Seoul National University, Seoul 08826, Republic of Korea

[Introduction]

ONAC096 is directly associated with promotion of leaf senescence, and investigated its preliminary function during the process of leaf senescence. The qRT-PCR showed that expression of *ONAC096* gradually increases in response to leaf aging and abscisic acid (ABA) treatment. Knockout mutant of *ONAC096* delayed leaf senescence, whereas overexpression of *ONAC096* accelerated leaf senescence, by controlling several chlorophyll degradation genes (CDGs) and senescence-associated genes (SAGs)

[Materials and Methods]

The *ONAC096* mutant line, T-DNA-tagged mutant PFG 1B-02928, was obtained from the Crop Biotech Institute at Kyung Hee University, Republic of Korea. Plants were grown in a paddy field during the rice growing period or in the growth chamber.

[Results and Discussions]

The expression of *ONAC096* increased not only natural senescence but dark-induced senescence conditions. *ONAC096* is expressed preferentially in the leaf blade and leaf sheath, but accumulation of *OsNAC096* transcript level was low in root, culm and panicle. The SPAD value, indicator for leaf greenness, of the *onac096* mutants was higher than the wild-type in flag leaves after 24 DAH. The Fv/Fm ratio, a parameter of PSII activity, was also retained higher than wild-type after 32 DAH. The level of photosynthetic protein previously tested dramatically decreased at 4 DDI in the wild type plants but remained in the *onac096* mutants. Mutation of *ONAC096* resulted in altered response to natural and dark-induced leaf senescence conditions. The RNA transcript levels of all CDGs and SAGs were significantly lower in the senescent flag leaves of the *onac096* mutants than in wild type plants. Increasing yield per plant in *onac096* mutants compared with wild type is because of more effective tiller number per plants rather than fertility and 500-grain weight which is phenomenon of extend the functional period of photosynthesis.

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*Corresponding author: Tel. +82-2-880-4543, E-mail. ncpaek@snu.ac.kr