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Rice *OsDof24* Delays Leaf Senescence by Downregulating Senescence-Associated and Chlorophyll Degradation Genes

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[Introduction]

Leaf senescence is a final stage of leaf development, which largely affects grain yield in cereal crops. Although many genetic factors has been reported, it is still necessary to determine the key regulators that can delay leaf yellowing during grain filling in staple crop plants. Here we show that *OsDof24*, a member of DOF (DNA-binding One zinc Finger) transcription factor family, acts as a repressor of leaf senescence in rice.

[Materials and Methods]

The *osdof24-D* mutant is T-DNA insertion mutant, in whose promoter region T-DNA fragment with tetramerized 35S enhancer was integrated, as previously described (Jeon *et al*., 2000). Several independent *OsDof24* overexpressed-transgenic lines driven by 35S promoters (OsDof24-OE) were generated by the Agrobacterium-mediated transformation method. The parental line of both plant materials is *japonica* cultivar 'Dongjin'. All rice plants were grown under natural long day conditions (approximately 14 h light/day) in a paddy field (Suwon, Korea, 37°N latitude).

[Results and Discussions]

Temporal and spatial expression patterns provided us clues that *OsDof24* would play an important role in regulation of leaf senescence in rice;its transcript is accumulated in leaf blade and flag leaf and was decreased during natural and dark-induced senescence. *osdof24-D* mutants showed delayed senescence phenotype in both natural long day and dark-induced senescence conditions and it was confirmed by various senescence parameters including chlorophyll concentration and *Fv/Fm* ratio. Delayed senescence phenotype was also observed during exogenous treatment of MeJA, which is well-known phytohormone accelerating senescence in plants. As a transcription factor, *OsDof24* altered transcripts level of several SAGs, CDGs, and genes involved in MeJA response during dark-induced senescence. In future research, binding assays can be conducted to determine whether *OsDof24* binds to the promoters of those genes indicating altered expression level.

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