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Senescence Phenotypes and Agronomic Trait and Yield of NIL, Milyang374, at Late Grain Filling Stage Grown in the Field

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[Introduction]

To meet the demand for rice to feed the increasing human population, increasing rice yield is essential. Improving the genetic yield potential of rice is one ideal solution. Asian rice cultivars belong mostly to two subspecies, *O. sativa* L. ssp. japonica and indica, which bear distinct morphological and physiological features and show drastically different lifespans, with indica showing early senescence. Increased grain yield will be critical to meet the growing demand for food, and could be achieved by delaying crop senescence.

[Materials and Methods]

We used IR72-NIL (harboring japonica-type OsSGR allele), M21-NIL, and M23-NIL plants were generated by backcrossing the IR72 × JN, M21 × JN, and M23 × Saeilmi and further four times with its recurrent parents, IR72, M21, and M23, respectively. Especially, M21-NIL, Milyang374, was transplanted 3 times (5.10/5.25/6.10) to compare with M21 increasing grain filling and yield. Accessions used in this study were cultivated in the paddy field located at National Institute of Crop Science, RDA (Miryang; 35.3° N; 128.5° E) in 2019 and 2020.

[Results and Discussions]

When comparing Milyang 374 and Milyang 21 in the field, the grain filling rate of Milyang 21 was 66.4% and the yield was 411.7kg/10a, but the grain filling rate of Milyang 374 was 73.7%, and the yield was 474kg/10a, which grain filling rate increased by 7.3%, yield increased 15.3%. The Agronomic traits and yield of the delays senescence NIL Milyang 374 were analyzed for each transplantation period. Compared to Milyang 21, the grain filling rate and yield were higher in all three periods. In particular, in the case of early transplanting on May 10, the grain filling rate increased by 11.5%, and the yield increased by 16.7% to 635kg/10a. This work shows Milyang374 that introgression of the japonica OsSGR allele into elite indica-type cultivars, Milyang21, delays senescence, thereby further increasing grain filling and yield in the already highyielding cultivars in the single-cropping systems in Korean rice.

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