**Using the differential senescence pattern of rice subspecies to increase rice productivity**

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**Abstract**

Increased grain yield will be critical to meet the growing demand for food, and could be achieved by delaying crop senescence. Two major subspecies of rice, *indica* and *japonica*, show drastic differences in leaf senescence, with the former showing earlier than the latter. Here, quantitative trait locus (QTL) mapping was used to discover the genetic mechanisms underlying distinct life cycles and senescence patterns of two rice subspecies. We found that variations of the promoter but not the coding region of the *Stay-Green* (*OsSGR*) gene on chromosome 9 are responsible for shorter lifespans of *indica* rice through earlier and higher induction of *OsSGR* encoding chlorophyll-degrading Mg++-dechetalase. *Japonica* *OsSGR* alleles introgressed into *indica*-type cultivars in Korean rice fields lead to delayed senescence, with the enhanced photosynthetic capacity and grain filling rate, leading to increased grain yield. Taken together, our data suggest that naturally occurring *OsSGR* promoter and related lifespan variations can be exploited in breeding programs to augment rice yield.