



# Molecular cloning and characterization of a chlorophyll degradation regulatory gene (*ZjSGR*) from *Zoysia japonica*

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**ABSTRACT.** The stay-green gene (*SGR*) is a key regulatory factor for chlorophyll degradation and senescence. However, to date, little is known about *SGR* in *Zoysia japonica*. In this study, *ZjSGR* was cloned, using rapid amplification of cDNA ends-polymerase chain reaction (PCR). The target sequence is 831 bp in length, corresponding to 276 amino acids. Protein BLAST results showed that *ZjSGR* belongs to the stay-green superfamily. A phylogenetic analysis implied that *ZjSGR* is most closely related to *ZmSGR1*. The subcellular localization of *ZjSGR* was investigated, using an *Agrobacterium*-mediated transient expression assay in *Nicotiana benthamiana*. Our results demonstrated that *ZjSGR* protein is localized in the chloroplasts. Quantitative real time PCR was carried out to investigate the expression characteristics of *ZjSGR*. The expression level of *ZjSGR* was found to be highest in leaves, and could be strongly induced by natural senescence, darkness, abscisic acid (ABA), and methyl jasmonate treatment. Moreover, an *in*

*vivo* function analysis indicated that transient overexpression of *ZjSGR* could accelerate chlorophyll degradation, up-regulate the expression of *SAG113*, and activate ABA biosynthesis. Taken together, these results provide evidence that *ZjSGR* could play an important regulatory role in leaf chlorophyll degradation and senescence in plants at the molecular level.

**Key words:** *Zoysia japonica*; *SGR*; Chlorophyll degradation; Leaf senescence