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Characterization and fine mapping of early senescence leaf sheath (*esls*) gene in rice (*Oryza sativa* L.)

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A novel rice mutant, early senescence leaf sheath (*esls*), was generated from the Koshihikari cultivar by EMS treatment. This mutant exhibited spontaneous lesions mimic spots on the leaf sheath in the absence of the pathogen attack. Lesion mimic spots were observed from the appearance of the third leaf and gradually spread through the whole leaf sheath onwards in the *esls* plant. Interestingly, the observation of the lesion mimic spots were restricted only to the leaf sheath and not observed on the leaf. Subsequently the leaves of the *esls* plants turned yellow and exhibited more severe symptoms during reproductive and ripening stages. SPAD value and soluble protein content related to plant leaf senescence decreased steeply after the heading stage of *esls* flag leaves. The growth vigor was much weaker and slower in *esls* plants. Moreover the yield-related agronomic traits such as spikelet number per panicle, seed setting rate, and 1,000-grain weight were significantly reduced in *esls* plants. The genetic segregation in the F₂ population from the *esls*/Koshihikari cross fitted the expected ratio of 3:1, indicating that *esls* is controlled by a single recessive gene. Using F₂ population of *esls*/M.23, *esls* was mapped to 66-kb region between STS markers 147-1 and 147-2 on the long arm of chromosome 7. Within the candidate region of *esls*, eight candidate genes were predicted by Rice Genome Annotation Project. These results will facilitate the positional cloning and functional studies of the *esls* gene.

Biography

Dongryung Lee is currently working at Crop Molecular Breeding Lab Seoul National University, Republic of Korea and his expertise is in forward genetic studies and passion in interpreting molecular mechanism of plant senescence. He has fine mapped a genomic region which is responsible for early senescence in rice. These results provide the necessary foundation for identifying the gene and facilitate the functional studies associated with early senescence in rice.

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