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Mutation of Os4bglu18, a Monolignol β-Glucosidase Improves Salinity Insensitivity in a Rice Mutant

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[Introduction]

Abiotic stress is major environmental factors that limit plant growth and yield of a wide variety of crops including rice. Among abiotic stresses, rice is considered a salt-sensitive crop, and the growth and yield of rice are greatly affected by the salinity. In general, rice can be grown with no difference in growth and yield even with a small amount of salt, but there are differences depending on the type and variety of rice. Using a forward genetics approach, a salt insensitive line 300-883(75) was selected from 100 rice mutant lines (M10) induced by gamma-ray irradiation.

[Materials and Methods]

Salt insensitive mutant screening and plant material growth conditions : 7day-olds WT and *300-883(75)* mutant were treated with 100mM NaCl for 7days. Measure length, weight, chloropyll, H_2O_2.

Ionomic analysis : Na+ and K+ analysis using ICP-OES

Molecular cloning and subcellular localization : Clone the full-length CDS sequence of Os4bglu18. Transfected protoplasts and then subcellular localization was observed using a SR-CLSM.

[Results and Discussion]

The *300-883(75)* mutant showed more freshweight and chlorophyll content and lower hydrogen peroxide(H_2O_2) accumulation under salt treatment conditions. And the *300-883(75)* mutant showed lower Na+ content and higher K+ content in shoots and roots. In whole genome re-sequencing of *300-883(75)* mutant, a single base guanine deletion of the LOC_Os04g43410 gene, which is annotated Os4bglu18, was found. In addition, the difference in protein size were confirmed through protein expression. Subcellular localization Os4bglu18 and Os4bGlu18p.Gly115fs GFP-tagging protein were the cytosol in rice protoplast. The Os4bglu18 was expressed relatively high in the roots under the salt treatment condition than shoots. The genes related to lignin biosynthesis pathway were selected, the overall expression level of the *300-883(75)* mutant was high, whereas the expression level of the Os4bglu18 gene and UDP-glucosyltransferase gene were low.

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