Study on mechanisms of salt tolerance in wild *Oryza* species, *O. latifolia* Desv.

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Summary

We had isolated the wild *Oryza* species, *O. latifolia* Desv., which could survive under the conditions that the salt-tolerant cultivated rice SR26B died. The CO_2 assimilation rate was maintained under the high salinity condition that the leaf water potential was decreased with increased NaCl level in the water-culture solution. To elucidate the mechanisms of salt tolerance in *O. latifolia*, we compared the photosynthetic activities of leaves and thylakoid membranes in this wild *Oryza* species with those in a salt susceptible wild *Oryza* species, *O. rufipogon* under high salt conditions. Photosynthetic O_2 evolution rate (OER) of leaves measured with liquid-phase type oxygen electrode was maintained in *O. latifolia* under the salt stress condition. In *O. rufipogon* the OER declined by 75% and 30% of that in non-stress leaves under 300mM and 655mMNaCl, respectively. Whereas in *O. latifolia* the OER was unchanged under 300mMNaCl, and decreased under 655mM NaCl by 60% of that in non-stress leaves. Thylakoid membrane of *O. latifolia* also showed salt tolerance. The OER from isolated thylakoid membrane in *O. latifolia* decreased only 13% under 655mMNaCl. On the other hand, in *O. rufipogon*, it decreased 30% under 655mMNaCl. The peptide compositions of thylakoid membranes examined by SDS‐PAGE showed that *O. latifolia* has species-pecific proteins with 20.3 kDa and 22.4 kDa of molecular weight. Two-dimensional electrophoresis (2-DE) of thylakoid membrane proteins showed that the 20.3 kDa and 22.4 kDa proteins contained at least two or three proteins with different isoelectric points. Some of them were novel proteins that had not been published in the data base.

These results suggest that thylakoid membrane of *O. latifolia* has high salt tolerance and this plant can maintain photosynthetic activity under high NaCl condition. The results of SDS-PAGE and 2-DE showed that the thylakoid membrane of *O. latifolia* had specific proteins which may be partially responsible for the salt tolerance.