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Overexpression of *BrTSR53* Enhances Tolerance to Drought Stress in Rice

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Plants often face a variety of biotic and abiotic stresses that influence their development, growth and productivity. *BrTSR53* gene is a putative stress-related gene isolated from *Brassica rapa*. We generated BrTSR53-OX transgenic rice plants through Agrobacterium-mediated transformation. We measured expression level of *BrTSR53* gene by quantitative RT-PCR and western blot analysis.

To elucidate the role of *BrTSR53* in stress tolerance, we examined responses of BrTSR53-OX transgenic rice plants to salt stress conditions. We treated BrTSR53-OX #12, #28, and #32 lines with salt stress on MS medium containing 100 mM or 200 mM of NaCl for 5 and 14 days. Morphological analysis revealed differences between the three transgenic BrTSR53-OX rice and wild-type rice. The germination rates of the three transgenic BrTSR53-OX lines of rice were significantly higher than that of the wild type rice, indicating that they were more tolerant to 200 mM NaCl than the wild type rice. In addition, the three transgenic BrTSR53-OX rice lines had significantly longer length of root and shoot compared to the wild type rice.

To characterize the function of *BrTSR53* in response to drought stress, we generated BrTSR53-OX transgenic rice and wild-type rice. The four-week-old transgenic line and wild-type plant had water withheld for two to four days and then were rehydrated. The transgenic lines showed that average survival rates improved compared to wild-type plants after re-watering. These results suggest that the *BrTSR53* gene played an important role in the tolerance of rice to drought stress.

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