Rice Transformation with Genes Reported To Give Salt Tolerance

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Salinity is one of the major problems encountered during crop production in Bangladesh. Different transgenic approaches to solve this problem have been reported, but success with rice has been limited. Several genes, shown to confer improved salt tolerance were used for producing transgenic rice. We have transformed the tissue culture-responsive landrace, *Binnatoa* (BA), with the OsNHX1 constructs containing the 5′ UTR and ORF and also cDNA. OsNHX1 transformed plants showed improved tolerance during seedling salinity screening. The transgenic *Binnatoa* (BA) has been crossed with farmer-popular dry-season cultivars, BR28 and BR45. The F_1 plantlets were selected by RT-PCR, F_2 progenies were screened for agronomic properties and F3 plants were taken for salt screening. Half of the F_3 plants showed better tolerance than their parents and agronomic properties close to their farmer popular parents. Another gene, the Pea DNA helicase (*PDH45*), obtained from ICGEB, New Delhi, was also used for transformation. *PDH45*-transformed T_1 BA rice having a single gene insertion showed very good morphology as well as dramatically improved salt stress tolerance at the seedling stage. The Glyoxalase pathway was also reported to be important in improving salt tolerance. Therefore, genes for the two enzymes of this pathway obtained from ICGEB, New Delhi, are also being used for transformation of BA rice.

To express all these genes, a good promoter is essential. Commercial binary vectors contain the CaMV 35S promoter which is weak promoter for gene expression in rice. Therefore, we are isolating and characterizing promoters reported to be salt stress-inducible.