

Responses of Na⁺/H⁺ Exchanger Gene Expression to Salt Stress in Barley

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Objectives

Barley varieties with improved salt-tolerance can be used at the earlier stage of desalinization of newly reclaimed tideland. A strategic combination of conventional and molecular approaches will facilitate development of varieties with improved salt tolerance. The potential of Arabidopsis Na⁺/H⁺ exchanger (NHX) gene in improving salt-tolerance has been demonstrated recently. In this study we isolated a barley NHX cDNA clone and characterized its molecular structures and expression patterns under salt stress conditions.

Materials and Methods

Plant Materials

- Barley (cv. Neulssalbori)
- NaCl treatments: Three-week-old barley seedlings were treated with 200 mM NaCl for 0, 1, 2, or 5 days.

Methods

- cDNA cloning and characterization: Standard protocols and methods

Results and Discussion

A barley NHX cDNA clone (HvNHX1) was isolated and characterized. HvNHX1 contains an 2559 bp-long open reading frame for a 538 aa-long polypeptide. The deduced amino acid sequence of HvNHX1 contains 12 membrane-spanning domains and shares 74% sequence similarity with wheat NHX cDNA clone TaNHX1. HvNHX1 transcripts were detected in the roots but not in the shoots of barley seedlings treated with 200 mM NaCl, and they were gradually increased with the treatment period.

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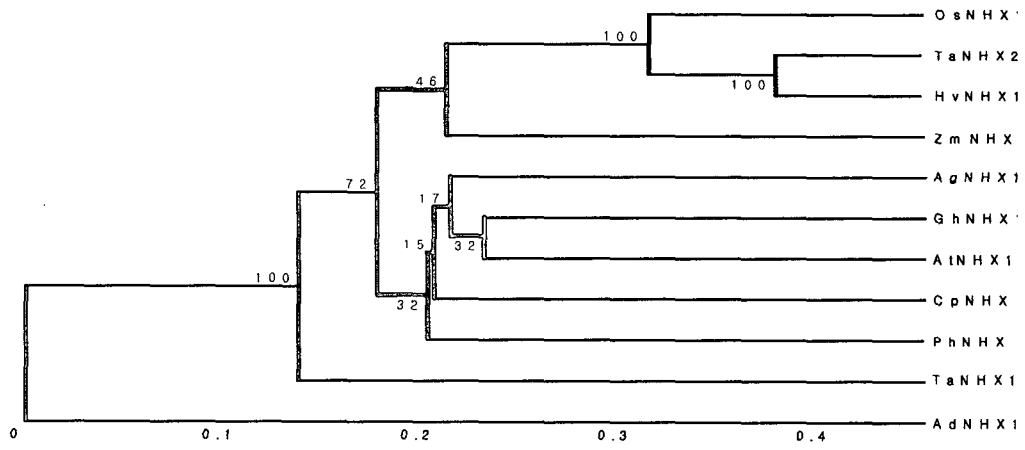


Fig. 1. Phylogenetic relationship of HvNHX to other plant NHXs.