

Effects of salt stress on ecophysiological and molecular characteristics of *Populus euphratica* Oliv., *Populus x canescens* (Aiton) Sm. and *Arabidopsis thaliana* L.



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(Mrs. Novella Will)

EFFECTS OF SALT STRESS ON ECOPHYSIOLOGICAL AND MOLECULAR CHARACTERISTICS OF *POPULUS EUPHRATICA* OLIV., *POPULUS X CANESCENS* (AITON) SM. AND *ARABIDOPSIS THALIANA* L.

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Cuvillier Verlag Sep 2015, 2015. Taschenbuch. Book Condition: Neu. 211x146x17 mm. Neuware - Salt tolerance is a complex trait that involves biochemical, physiological and morphological modifications that are regulated at the molecular level. The aim of this work was to understand the effects of salinity on *P. euphratica*, a salt tolerant species. For this purpose ecophysiological and molecular methods were applied and necessary comparisons were conducted with *P. x canescens*, a salt sensitive species or *A. thaliana*, the model plant for herbaceous species. The present work shows that *P. euphratica* under salinity is able to protect its plasma membrane and maintain quantum yield efficiency of PSII. Molecular analysis showed that the expression levels of two genes were increased in response to salinity (TIL and SIS) in both *P. euphratica* (PeuTIL) and *P. x canescens* (PcaTIL). These genes were characterized to study their functions with respect to salt tolerance. In both root and leaf, PeuTIL was up-regulated after salt stress and decreased to the control level within few hours. Comparison of PeuTIL and PcaTIL showed that the transcript level of TIL in *P. euphratica* was significantly higher than that of its homolog in *P. x canescens* both under control conditions and salt stress. It has also been found that the expression of PeuTIL in leaves was considerably higher than in roots. In silico analysis of PeuTIL revealed evidence for a transmembrane segment. The homolog segment in AthTIL exhibited lower hydrophobicity than that of PeuTIL and PcaTIL, respectively. To obtain evidence for factors controlling gene expression of TILs, the upstream regions of AthTIL and PtrTIL were searched for cis-acting elements and the results were compared. Elements related to ABA signalling, early response to dehydration, endosperm specific expression (DOF-binding site) and seed storage regulation were common and highly present in the upstream regions of both genes. ABA signalling and early response to dehydration elements were more frequently present in the PtrTIL...



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