Accepted Manuscript

ScDREB8, a novel A-5 type of *DREB* gene in the desert moss *Syntrichia caninervis*, confers salt tolerance to *Arabidopsis*

Yuqing Liang, Xiaoshuang Li, Daoyuan Zhang, Bei Gao, Honglan Yang, Yucheng Wang, Kaiyun Guan, Andrew J. Wood

PII: S0981-9428(17)30305-4

DOI: 10.1016/j.plaphy.2017.09.014

Reference: PLAPHY 4998

To appear in: *Plant Physiology and Biochemistry*

Received Date: 9 June 2017

Revised Date: 8 September 2017

Accepted Date: 19 September 2017

Please cite this article as: Y. Liang, X. Li, D. Zhang, B. Gao, H. Yang, Y. Wang, K. Guan, A.J. Wood, *ScDREB8*, a novel A-5 type of *DREB* gene in the desert moss *Syntrichia caninervis*, confers salt tolerance to *Arabidopsis*, *Plant Physiology et Biochemistry* (2017), doi: 10.1016/j.plaphy.2017.09.014.

ScDREB8, a novel A-5 type of *DREB* gene in the desert moss *Syntrichia caninervis*, confers salt tolerance to *Arabidopsis*

Yuqing Liang[1,2#], Xiaoshuang Li[1#], Daoyuan Zhang[1]*, Bei Gao[3], Honglan Yang[1], Yucheng Wang[1], Kaiyun Guan[1], Andrew J Wood[4].

[1]Key Laboratory of Biogeography and Bioresource in Arid Land, Xinjiang Institute of Ecology and Geography, Chinese Academy of Sciences, Xinjiang Urumqi 830011, China

[2] University of Chinese Academy of Sciences, Beijing 100049, China

[3]School of Life Sciences and State Key Laboratory of Agrobiotechnology, The Chinese University of Hong Kong, Hong Kong

[4]Department of Plant Biology, Southern Illinois University, Carbondale, IL 62901-6899, USA

Co-first author

* to whom correspondence should be addressed. E-mail: zhangdy@ms.xjb.ac.cn

Abstract

Salinity is a major limitation factor for crop productivity worldwide. DREB transcription factors broadly participate in plant stress response and have been extensively identified in a wide variety of plants. In this study, we characterized and analyzed the function of a novel A-5 type *DREB* gene *ScDREB8* from the desiccation tolerant moss *Syntrichia caninervis*. Yeast one-hybid experiment showed that ScDREB8 had no transactivation activity. Transient expression assay in onion epidermal cells revealed that ScDREB8 is distributed throughout the cell with no apparent specificity. Overexpression of *ScDREB8* significantly increased the germination rate of Arabidopsis under salt stress and improved the salt tolerance of Arabidopsis at the seedling stage by up-regulating the expression of downstream stress-related genes and improving ROS scavenging ability. ScDREB8 is a promising candidate gene for improving crop salt stress and will provide greater insight to the molecular mechanism of stress tolerance of A-5 type DREB proteins.

Keywords: *Syntrichia caninervis*, Desiccation Tolerance, DREB transcription factor, salt stress, ROS-scavenging ability

1. Introduction

Salinity is an important environmental stress factor that can severely impair plant growth and limit crop productivity worldwide (Boyer, 1982). High salinity impairs cellular osmotic and ionic homeostasis and also compromises photosynthesis, depletes cellular energy, and leads to redox imbalances (Parida and Das, 2005). To adapt this adverse condition, plants exhibit a variety of responses to salt stress