CHAPTER

3

Engineering Signaling Molecules to Improve Abiotic Stress Tolerance in Crop Plants

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OUTLINE

3.1 INTRODUCTION

Plants as sessile organisms come across several biotic and abiotic stresses during their course of growth and development. Global climatic changes impose abiotic stresses such as drought, salt, and extreme temperatures, which majorly affect geographical distribution of plants and agricultural productivity and cause a dearth of food (Fedoroff et al., 2010). It has been estimated that globally 70% of plants' potential yield is reduced by abiotic stresses (Acquaah, 2007). Rapid changes in global climate are predicted to increase the intensity of abiotic stresses in the near future; at the same time global population is expected to reach 9 billion by 2030 (Husaini and Tuteja, 2013). Plant scientists anticipate a need to improve plants to enhance productivity under adverse climatic conditions to meet the global population demands. Conventional breeding methods proved unsuccessful for complex traits, that is, abiotic stress. Advancements in the field of plant improvement technologies such as transgenic approaches permit to introduce gene(s) from a wide range of organisms into plants and to develop transgenic plants to cope with complex abiotic stresses in a faster way. Identification of candidate genes is the foremost step in the development of transgenic plants. It is of utmost importance to understand how the plants sense abiotic stress signals and transduce at the molecular level for successful

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