

P094

Overexpression of the *OsbZIP66* transcription factor enhances drought tolerance of rice plants

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Abstract

Drought stress is a major constraint of crop development and productivity. Plants have evolutionally developed several mechanisms at the molecular, cellular, and physiological levels to overcome drought stress. The basic Leucine zipper (bZIP) transcription factor (TF) family members are starting to be concerned about their roles in drought stress responses. In this study, we functionally characterized *OsbZIP66*, a rice group-E bZIP TF, to be associated with rice drought tolerance mechanisms. Expression of *OsbZIP66* was significantly induced upon treatments of rice plants with drought, high salinity, and ABA. These observations and the fact that the *OsbZIP66* promoter contains ten ABA-responsive elements suggest that *OsbZIP66* is up-regulated by drought stress in an ABA-dependent manner. Overexpression of both *OsbZIP66* in a whole plant body and specifically in roots enhanced drought tolerance of rice plants, indicating that the rice drought tolerance positively correlates with the expression levels of *OsbZIP66*. Thus, our results demonstrated that *OsbZIP66* has a potential for use in biotechnological development of high-yielding rice plants under drought conditions.

Keywords: ABA, Basic leucine zipper, drought, Transgenic crop, Transcriptional regulation, Rice