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TaERECTA improves photosynthesis-related traits in *Triticum aestivum L.*

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ERECTA was originally isolated from Arabidopsis ecotype Landsberg, a natural erecta mutant, and encodes a Leucine-rich receptor-like serine/threonine protein kinase (LRR-RLK). There is a substantial evidence indicating ER is involved in regulation of inflorescence architecture, stomatal formation and patterning, ovule development, cell proliferation, metal accumulation and pathogen resistance. ERECTA in Arabidopsis contributes to photosynthesis by regulating the development of leaf architecture. Manipulation of TaERECTA is a potential route to improve photosynthesis related traits in bread wheat. The functions of TaERECTA was characterized by using transgenic wheat lines overexpressing TaERECTA gene and plants infected with BSMV-VIGS (Barley Stripe Mosaic Virus-mediated virus-induced gene silencing) constructs targeting TaERECTA. Under well-watered condition, overexpressing TaERECTA stimulated the significantly larger flag leaf area and lower stomatal density, leading to higher photosynthetic rate and lower transpiration rate, and the significantly increased WUEi (water use efficiency), contributing to the increased grain number spike-1, biomass yield plant-1 and grain yield plant-1, compared to the transgenic bar control and wild type plants. In general, the opposite trend on these traits was observed in BSMV-VIGS treated plants (TaERECTA-silence). We demonstrate that overexpressing TaERECTA results in improved photosynthesis -related traits in bread wheat, contributing towards enhanced grain production.

Biography

Jiacheng Zheng, PhD, is currently a Lecturer at the College of Agronomy of Anhui University of Science and Technology (P R China). He is involved in the Joint Student's Project at Chinese Academy of Agricultural Sciences, Beijing and Rothamsted Research, Harpenden, UK, respectively, and has his expertise in germplasm resources and genetic breeding of wheat and sorghum. He is actively involved in teaching molecular biology, crop breeding, agriculture and experimental statistical technique for undergraduate students. His open and contextual evaluation based on improving photosynthesis and transpiration efficiency-related traits of bread wheat and selecting excellent genetic resources of sweet sorghum. He has completed two provincial projects in photosynthesis and thermotolerance of wheat. He has authored more than 10 publications in peer reviewed national and international journals.

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