[O34] O_2 Deficiency, Submergence

Chair: Mikio Nakazono (Nagoya University, Japan)
Chair: Feng Yu (Hubei University, China)
Fri. Sep 10, 2021 9:45 AM - 11:45 AM Room 3 (Oral) (Abiotic Stress for Crop Production)

9:45 AM - 10:05 AM

[O34-01]A Group VII Ethylene Response Factor Gene, *Zmereb180*, Coordinates Waterlogging Tolerance in Maize Seedlings

(Invited Speaker)

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Group VII ethylene response factors (ERFVIIs) play important roles in ethylene signaling and plant responses to fl ooding. However, natural ERFVII variations in maize (ZmERFVIIs) that are directly associated with waterlogging tolerance have not been reported. Here, a candidate gene association analysis of the ZmERFVII gene family showed that a waterlogging-responsive gene, ZmEREB180, was tightly associated with waterlogging tolerance. ZmEREB180 expression specifi cally responded to waterlogging and was up-regulated by ethylene; in addition, its gene product localized to the nucleus. Variations in the 5′-untranslated region (5′-UTR) and mRNA abundance of this gene under waterlogging conditions were signifi cantly associated with survival rate (SR). Ectopic expression of ZmEREB180 in Arabidopsis increased the SR after submergence stress, and overexpression of ZmEREB180 in maize also enhanced the SR after long-term waterlogging stress, apparently through enhanced formation of adventitious roots (ARs) and regulation of antioxidant levels. Transcriptomic assays of the transgenic maize line under normal and waterlogged conditions further provided evidence that ZmEREB180 regulated AR develop-ment and reactive oxygen species homeostasis. Our study provides direct evidence that a ZmERFVII gene is involved in waterlogging tolerance. The detailed regulatory networks involved by ZmEREB180 have been investigating. These fi ndings could be applied directly to breed waterlogging-tolerant maize cultivars and improve our understanding of waterlogging stress.