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ZMCCD8B ENCODES A CAROTENOID CLEAVAGE DIOXYGENASE REGULATING THE PLANT RESPONSE TO PHOSPHORUS LIMITATION

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In our study, overexpression of *ZmCCD8b*, a paralogous gene of ZmCCD8a, in Arabidopsis mutant max4 failed to rescue the mutant phenotype. However, we found *ZmCCD8b* expression is significantly higher in silk, while relative higher in ear and root under low phosphorus (LP) condition reciprocal to control (sufficient nutrients) reaching the highest level on the tenth day. The expression was stronger in pericycle of the meristematic zone and the elongation zone as revealed by In situ hybridization. Protoplast amplification showed that this gene was localized to the plastid. We used virus induced gene silencing (VIGS) technology to silence *ZmCCD8b* and the results indicated that in contrast to GFP control, the carotenoid contents significantly reduced in leaves of *Zmccd8b* lines. In contrast to increased phosphorus concentration in root whereas, decreased phosphorus concentration in shoot, root biomass of *Zmccd8b* silenced lines non-significant. While shoot dry weight decreased significantly as compared to GFP control, contributing to an increased root to shoot ratio of *Zmccd8b* silenced lines. Furthermore, *ZmCCD8b* may affect the expression of *PHO2* and *PHO1* through PHRs. Additionally, ZmPht1;1 and *ZmPht1;6* were down-regulated whereas, *ZmPht1;3* and *ZmPht1;13* were up-regulated in *Zmccd8b* silenced lines under LP conditions. Yeast one-hybrid and EMSA experiments verified that *ZmPHR1*s can regulate *ZmCCD8b* through P1BS element. Transcriptome analysis indicated increased expression of genes related to stress and signal transduction in *ZmCCD8b* heterologous overexpression lines.

Biography

Zhong yanting, is pursuing his PhD from College of resources and environmental sciences, China Agricultural University, Beijing, China. His research broadly focuses on Molecular Biology of Plant Nutrition, and currently working on Phosphorus .

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