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KERNEL ABORTION IS COUPLED WITH CIS-REGULATION OF ZMAAP2 AND ZMLHT1 BY ZMPHRS IN THE PHOSPHATE LIMITED MAIZE EAR

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Maize grain yield is depending on ear development and kernel number which is associated with the crucial silking stage. However, low P-caused consequences in developing maize ear remains elusive. Morphological alteration in the Pi deficient ear showed less kernel number but no less longitudinal growth. A cut down of soluble proteins, free amino acids and variation in hormone profiling, especially a significant drop in IAA accumulation were examined in low P feed ear as well. Transcriptional analysis uncovered 847 genes differentially expressed, with 423 genes induced and 424 genes repressed, which were characterized of genes related to hormones, transcription factors and the dominating repression of genes in transport category. To further investigate if those genes are directly bound to P deficiency, 313 out of 847 genes were found harbouring PHR1 Binding Sequence (P1BS) and featured in the pathways of N metabolism, lipid metabolism and photosynthesis indicating the wide spectrum consequences caused by Pi deficiency and the direct cross-talk between phosphorus and nitrogen signalling pathway. Furthermore, with yeast one-hybrid assay and EMSA, we detected the interaction between ZmPHR1 and P1BS at the promoter region of two amino acid transporters, ZmAAP2 and ZmLHT1,which function in transport of several key amino acids, and ZmPHR1 represses the expression of ZmAAP2 and ZmLHT1, consolidating the potential interaction between N and P. Taken together, these results suggest that the kernel abortion caused by Pi deficiency was associated with hormones variation and may intensively connected with the overall down regulation of genes in transport and especially the alteration of N metabolism.

Biography

Ruifeng Wang is pursuing his PhD (third year) from Department of Plant Nutrition, China Agricultural University. His research works are focused on the molecular basis of phosphate deficiency to the developing maize ear and characteristics of AUX/IAA involved in the root development under nitrogen limitation. Recently, he is doing analysis of fine mapping genes related to maize root architecture traits with a RIL population. He has published three papers in reputed journals as a co-author of which one is focused on maize ear development under nitrogen deficiency and the other two on the root morphological modification of foxtail millet under N and Pi deficiency respectively. His interest is on plant genomics and molecular breeding.

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