

## Response of a boron tolerant *Triticum dicoccum* genotype under high boron concentrations

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### INTRODUCTION & AIM

- Wild emmer wheat was domesticated approximately 10000 years ago, to develop cultivated emmer wheat, *Triticum dicoccum* with AB genome (Luo et al. 2007).
- It is a potential candidate for durum wheat breeding programs due to its compatibility with modern tetraploid wheat.
- Along with high protein content and productive tillers, it has also been reported as a crucial source of different stresses such as yellow rust, common bunt, drought stress etc.
- The information about its boron toxicity tolerance is limited (Khan et al. 2023).
- **Aim was to understand differential response of a boron tolerant *T. dicoccum* genotype (PI94655) towards boron toxic growth conditions**

### METHOD

- The genotype was hydroponically grown for 7 days under three different boron treatments including Control and 10 mM in triplicates (Figure 2).
- Shoot RNA samples from both treatments were subjected to RNA sequencing.
- Pathway enrichment analysis and functional annotation of the Significant Differentially Expressed Genes (DEGs) under boron toxicity were carried out.

### RESULTS & DISCUSSION

- A total of 483 genes were significantly differentially expressed with 371 up-regulated genes and 112 down-regulated genes.
- Several transporters including transmembrane proteins, aquaporins and ABC transporters have been determined as potential candidate genes for developing B toxicity tolerance.
- Not only caffeine metabolism and photosynthesis–antenna proteins pathways were highly enriched under high boron, but also oxidative phosphorylation, biosynthesis of secondary metabolites, and metabolic pathways showed maximum number of DEGs (Figure 1).

### CONCLUSION

- Several genes implicated in various important processes may have contributed to the boron toxicity tolerance of the studied *T. dicoccum* genotype.
- Additional omics research in wheat and other cereal crops can be facilitated by identified candidate genes that respond to stress caused by boron toxicity.
- The limited genetic diversity of contemporary wheat cultivars can be increased through genetic engineering or molecular breeding with the help of potential candidate genes.

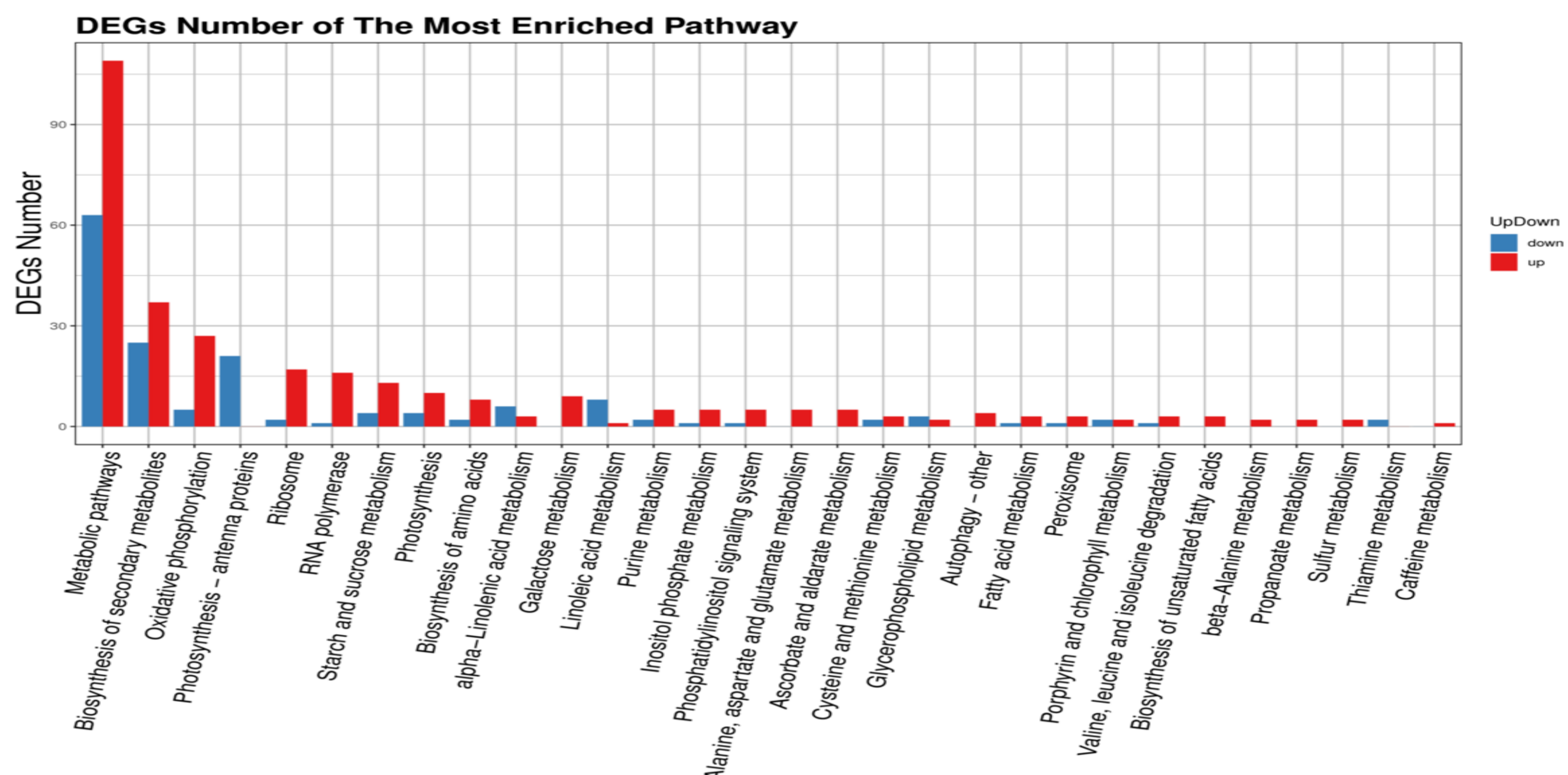


Figure 1.  
Enriched KEGG Pathways

### REFERENCES

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