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Genome-wide identification and expression analysis of the bhlh transcription factor family and its response to abiotic stress in sorghum [Sorghum bicolor (L.) Moench]

Statement of the Problem: Basic helix-loop-helix (BHLH) is a superfamily of transcription factors that is widely found in plants and animals and is the second largest transcription factor family in eukaryotes after myb. They have been shown to be important regulatory components in tissue development and many different biological processes. However, no systemic analysis of the BHLH transcription factor family has yet been reported in Sorghum bicolor.

Methodology & Theoretical Orientation: We conducted the first genome-wide analysis of the BHLH transcription factor family of Sorghum bicolor and identified 174 SBBHLH genes. Phylogenetic analysis of SBBHLH proteins and 158 Arabidopsis thaliana BHLH proteins was performed to determine their homology. In addition, conserved motifs, gene structure, chromosomal spread and gene duplication of SBBHLH genes were studied in depth. To further infer the phylogenetic mechanisms in the SBBHLH family, we constructed six comparative syntonic maps of S. bicolor associated with six representative species. Finally, we analyzed the gene-expression response and tissue-development characteristics of 12 typical SBBHLH genes in plants subjected to six different abiotic stresses. Gene expression during flower and fruit development was also examined.

Conclusion & Significance: This study is of great significance for functional identification and confirmation of the S. bicolor BHLH superfamily and for our understanding of the BHLH superfamily in higher plants.

Biography

Yu Fan focuses on the regulatory roles of transcription factor families in plant environmental adaptation and the conservation and utilization of crop germplasm resources. His research focuses on coarse grain crops such as buckwheat, sorghum and millet. The College of Agriculture of Guizhou University pays special attention to the improvement and supplement function of coarse grain nutrition for human health.

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