Functional Genomics of Drought Tolerance in Bioenergy Crops

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Background:

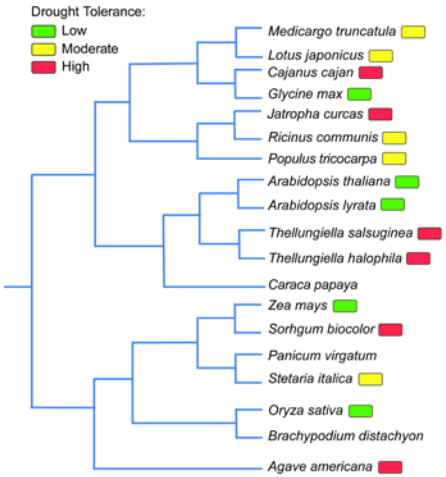
With predicted global changes in temperature and precipitation, drought will increasingly impose a challenge to biomass production. Most bioenergy crops have some degree of drought susceptibility as revealed through measures of low water-use efficiency (WUE). This work reviews recent progress in functional genomics of bioenergy crops in a comparative framework.

Approach:

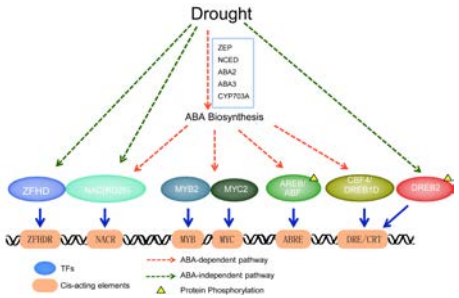
- Genetics and genomics resources
- Drought-responsive signaling pathways
- Regulation of drought response

Significance:

- Unraveling the complexity of drought response pathways will require a systems biology approach, including genomics, transcriptomics, proteomics, metabolomics and phenomics.
- Exploration of genomics and functional genomics into the understudied molecular and biochemical basis of Crassulacean Acid Metabolism (CAM) domain may open a new door to genetic improvement in WUE in bioenergy crops, as shown in genetic engineering for other traits



Phylogenetic tree of bioenergy crops and related model species.



Drought responsive pathways in plants.

Citation: Yin H, Chen CJ, Yang J, Weston DJ, Chen JG, Muchero W, Ye N, Tschaplinski TJ, Wullschleger SD, Cheng ZM, Tuskan GA, Yang X. 2014. Functional Genomics of Drought Tolerance in Bioenergy Crops. *Critical Reviews in Plant Sciences* 33:205–224. DOI: 10.1080/07352689.2014.870417.

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