Soybean physiology and gene expression during drought

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ABSTRACT. Soybean genotypes MG/BR46 (Conquista) and BR16, drought-tolerant and -sensitive, respectively, were compared in terms of morphophysiological and gene-expression responses to water stress during two stages of development. Gene-expression analysis showed differential responses in Gmdreb1a and Gmpip1b mRNA expression within 30 days of water-deficit initiation in MG/BR46 (Conquista) plants. Within 45 days of initiating stress, Gmp5cs and Gmpip1b had relatively higher expression. Initially, BR16 showed increased expression only for Gmdreb1a, and later (45 days) for Gmp5cs, Gmdefensin and Gmpip1b. Only BR16 presented down-regulated expression of genes, such as Gmp5cs and Gmpip1b, 30 days after the onset of moisture stress, and Gmgols after 45 days of stress. The faster perception of water stress in MG/BR46 (Conquista) and the better maintenance of up-regulated gene expression than in the sensitive BR16 genotype imply mechanisms by which the former is better adapted to tolerate moisture deficiency.

Key words: Photosynthesis and real-time quantitative PCR; Drought; Glycine max