Genome-wide monitoring expression changes of wild emmer wheat exposed to shock-drought stress

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Abiotic stresses are major constraints on crop productivity. Water stress is the main reason for yield loss in wheat production (*Barnabas et al., 2008, PCE, 31:11-38; Rampino et al., 2006, PCE, 29:2143-2152*). The increase in human population and decrease in water availability for agricultural use necessitate engineering of cultivated wheat for better adaptation to water scarcity without or minimum yield loss (*Tuberosa and Salvi, 2006, TIPS, 11:405-411; Valliyodan and Nguyen, Curr Opin Plant Biol, 2006, 9:189-195*). More than ten thousand years of domestication caused the loss of genetic background for environmental stress tolerance of hexaploid wheat (*Araus et al., 2007, JXB, 58:131-145; Mohammadi et al., 2007, PCE, 30:630-645*). The Fertile Crescent is characterized by its cold winters and drought summers, i.e. wild relatives of cultivated crops originated from this area are promising candidates for bioengineering to cope with environmental stresses (*Dubcovsky and Dvorak, 2007, Science, 316:1862-1866; Peleg et al., 2005, PCE, 28:176-191*). Twenty-eight wild emmer wheat genotypes (*Triticum turgidum* L. subsp. *diccocoides*) specific to Turkey were analyzed for their physiological and phenological characteristics under slow drying conditions. A tolerant and a sensitive genotype, in comparison to cultivated durum wheat were chosen for further studies. Selected tolerant and sensitive wild emmer wheats were grown in hydroponics and shock-drought stressed to induce differentially regulated transcripts. As drought stress causes changes in a wide range of physiological and biochemical processes (*Shinozaki and Yamaguchi-Shinozaki, 2007, JXB, 58:221-227*), hybridization to Affymetrix GeneChip® Wheat Genome Array was selected as a method to profile genome-wide expression changes. The preliminary results show unique responses of wild emmer wheat with different tolerance to water scarcity, especially in timing of signal transduction and gives insight to understand the reason of better tolerance and adaptation to drought environment.