

Abstract

Drought, an abiotic stress and one of the factors behind limited food resources, should be investigated meticulously. Wheat durum (*Triticum turgidum* L), next to common wheat, due to its specific features and qualities can be of high value economically. The importance of identifying drought tolerant species in, above all, parts of Iran with dry climate cannot be overstated. This paper reports a study aimed at examining and comparing morphological and physiological attributes, and gene expressions related to *NAC* and *MYB* transcription factors in different species of Wheat durum (Aria, Dena, Karkhe, Shabrang, and Behrang) undergoing drought treatment and stress. In the first step, seeds from five species of Wheat durum were planted in pots employing a factorial randomized blocks design with three repeats. After 45 days (tillering stage) the plants were subjected to (5, 10, 15, 20, 25 percent) drought stress, and morphological and physiological attributes were measured and recorded. Morphological attributes under study included stem, root, and leaf length and fresh and dry weight of shoot and root, width and number of leaves, as well as number of roots. Morphological attributes measured included: photosynthetic pigments (chlorophylls a, b, carotenoid and total), antioxidant enzymes (catalase, ascorbate peroxidase, guaiacol peroxidase, and poly-phenol oxidase), and osmoregulators (carbohydrate and proline). The next step involved extracting RNA and cDNA synthesis in order to examine the gene expression patterns related to *NAC* and *MYB* transcription factors under drought condition, after which gene expression patterns of the studied species were examined and compared employing Real-time PCR method. The data obtained from the morphological, physiological, and molecular measurements were analyzed using SAS v9/1. The results from morphological, physiological, and molecular data demonstrated that most of Wheat durum species examined were significantly different at 10 and 5 percent levels. Also, there was a statically significant difference among various levels of water stress compared to the base line level (25%). The interaction between drought and species for all of the physiological attributes was investigated to determine whether there is a meaningful difference. The results revealed an increase in gene expression in *NAC* and *MYB* under drought stress and the effect of stress and species in both genes in the 1% level displayed a meaningful difference, which in turn shows the impact of drought stress on these genes' expressions. In this study, Shabrang and Behrang species, especially Shabrang, in regards with all the examined attributes, in drought conditions compared to the base line returned the most favorable results, identifying them as drought tolerant species.

Key Words: gene expression, Durum wheat (*Triticum turgidum* L), Transcription factors *NAC* and *MYB*, Drought, Shabrang figure.



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