

Abstract

Bread wheat with scientific name of (*Triticum aestivum*, L) is a one year old monocotyledon, herbaceous. The aim of this study was to investigate the morphological and physiological characteristics as well as the pattern of *NAC* gene expression in five species of arable wheat of Sistan province (Hamoun, Hirmand, Kavir, Bolani, Cross Bolani) under different levels of drought stress. At first, the seeds of five wheat species were cultivated in a completely randomized block design with three replications in greenhouse conditions. 45 days after planting, drought stress was applied at different levels (5% - 10% - 15% - 20% 25%). In order to study the pattern of expression of the genes associated with *NAC* transcription factors, the leaves of the plant were sampled at the four leaf stage and after extracting RNA and synthesizing cDNA, the investigation of the pattern of expression of the genes was performed by using the Real-time PCR method. Also, some morphological characteristics related to drought including stem length, leaf numbers, leaf length, leaf width, fresh and dry weight of plant's organs, , root number, root length, root fresh and dry weight and physiological traits of chlorophyll a and b, total chlorophyll, carotenoid, carbohydrate, catalase enzyme, polyphenol oxidase and proline were measured. Analysis of variance and mean comparison for traits and molecular data were performed using SAS 9.1 software. The results of analysis of morphological, physiological and molecular variance data showed that most bread wheat species which were studied, had a significant difference at level 1 and 5%. Statistically, in different levels of irrigation stress into irrigation level, there was a significant difference (25%). The interaction between species and drought was significant for all morphological traits except fresh root trait. Results showed that expression of *NAC* gene under drought stress had increased, and the effect of stress and variety on *NAC* gene at 1% level showed a significant difference, indicating the effect of drought stress on expression of these genes. In this study, among the studied species, Hirmand was recognized as a drought tolerant.

Key words: *Triticum aestivum*, Transcription factor, Morphological traits, Real-Time PCR Method



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