

Abstract

Correction of drought-tolerant wheat varieties is one of the goals of corrective programs. Grain yield in drought stress conditions depends on many phenological, morphological and physiological characteristics. Induction of mutation is an effective way to increase the genetic diversity of plants, especially for traits with low genetic diversity. In this experiment, in order to study the effect of different dose of gamma rays (control, 150, 200 and 250 G) on morphological, physiological and *NAC* and *MYB* gene expression in four different cultivars of wheat, Sistan (Afshian wheat, Bolanian coffee E, white whites and camel teeth) under drought stress conditions, an experiment was conducted in a research greenhouse of the Faculty of Agriculture, University of Zabol. Firstly, irradiated wheat seeds from a Sistan field research center were cultivated in a pot in a factorial arrangement in a completely randomized design with three replications. After emergence of seedlings to the 4-5 stage, drought stress was applied at 5 levels (5, 10, 15, 20, 25 percent). After harvesting, the traits were morphological traits (stem length, root length, root number, leaf length, leaf width, leaf number, fresh weight of the shoot, aerobic weight of the shoot, root fresh weight, root dry weight) Antioxidant enzymes (polyphenol oxidase, catalase, guaiacol peroxidase, ascorbate peroxidase), photosynthetic pigments (chlorophyll a, chlorophyll b, carotenoid and total), as well as the pattern of expression of *NAC* and *MYB* genes were studied. And the results indicated that different gamma-ray dosages had a significant effect on the promotion of most traits related to drought tolerance in wheat, so that by increasing the dose of gamma treatments and drought stress, the resistance levels of the samples Compared to control, the highest expression of the studied genes was observed in 250g radionuclide treatment and drought stress of 5% crop capacity. Also, among the cultivars studied, the camel's genotype showed a better response to drought and irradiation treatments, which was introduced as a resistant cultivar in this experiment.

Keywords: Wheat, Drought stress, gamma rays, gene expression, *NAC* and *MYB* gen



University of Zabol

Graduate school

Faculty of Agriculture

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The Thesis Submitted for the Degree of Master of Science

Plant Breeding and Biotechnology

Assessment of *MYB* and *NAC* genes expression under drought stress in Irradiated wheat varieties

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November 2017