E-ISSN 2411-9725
ISSN 2410-759X

Balkan Journal of
Interdisciplinary Research

Vol.10 No.3
December, 2024

sciendo

Research Article

Memory of wheat to repeated Heat Stress during pre-anthesis could be responsible for improved tolerance

Ariola Bacu
Department of Biotechnology, Faculty of Natural Sciences, University of Tirana, Albania

Krisida Ciko
Laboratory of Mycotoxins, Department of Toxicology and Veterinary Drug Residues, Food Safety and Veterinary Institute, Albania

Vjollca Ibro
Department of Agronomy Sciences, Agricultural University of Tirana, Tirana, Albania

DOI: https://doi.org/10.2478/bjir-2024-0021

Abstract

Risk imposed by high temperatures (HT) to the quality and yield of cereals, requires evaluation of naturally resistant resources, and finding of methods to improve it. In this research, were analyzed the tolerance to HT of 19 winter wheat cultivars (*Triticum aestivum* L.) in use in Albania, and the possible memory gained to the repeated stress, before anthesis. Biometric (root, shoot, leafs length), physiological (fine root cells death, Relative Water Content-RWC), and biochemical parameters (*chla*, *chlb*, carotenoids and xantophylls, and total carbohydrates) were measured, and the impact of a short shock (SS) at 42°C/2hrs versus a longer treatment (LT) at 38-35°C/24hrs on pigment synthesis, and on the expression of rubisco activase (*Rca1*) coding gene were investigated. A classification system was built to describe the tolerance to HT, and cultivars were grouped via UPGMA, and PCoA. Results show that SS impacted pigment synthesis more than LT, while expression of *Rca1* was cultivar-specific; In a group of 19 cultivars under two treatments (T1, T2) at 30°C, the vulnerable: moderately tolerant: tolerant were 4: 11: 5, and 3:9:7, respectively. Values were cultivar-specific for single parameters, yet a general trend was evident for some. Improved tolerance to repeated stress was described as gained stress memory.

Keywords: biochemical synthesis, gene expression, primed stress memory, hierarchical clustering.

Full Text: PDF