

SCREENING WINTER WHEAT GERMPLASM FOR DETECTION OF 1-FEH W3 VARIANTS FOR IMPROVEMENT OF DROUGHT TOLERANCE USING KASP ASSAY

Matilda CIUCA¹, Alina-Gabriela TURCU¹, Elena-Laura CONTESCU¹, Alexandru DUMITRU¹,
Daniel CRISTINA¹

e-mail: danielcristina89@gmail.com

Abstract

Wheat yield levels and stability are endangered by drought, which is one of the main effects of current climate changes. A possible way of increasing wheat yield under water stress could be the remobilization of stem assimilates for grain filling. *1-FEH w3 (1-FEH-6B)* is a key enzyme involved in stem water-soluble carbohydrates (WSC) remobilization, playing an important role during grain filling under drought stress. The objective of this study was the screening of a winter wheat collection from NARDI Fundulea regarding the *1-FEH w3* haplotypes using Kompetitive Allele Specific PCR (KASP) SNP marker. KASP genotyping assay on 64 wheat genotypes (cultivars, breeding and pre-breeding lines) showed that 25 genotypes carried the “Kauz” type susceptible haplotype (K) and 39 genotypes carried the “Westonia” type haplotype (W), considered the favorable haplotype in drought conditions. The favorable haplotype (W) was found in several cultivars known for their good performance under water stress (such as Fundulea 133, or A15), but also in some cultivars with poor performance under drought (such as Apache, Ariesan or Bezostaya 1), which suggests that *1-FEH w3* is not the only factor determining drought response. On the other hand, the haplotype associated with water stress susceptibility was found in cultivars known as drought resistant (such as Izvor or Dropia), suggesting that the performance of these cultivars under drought might be further improved by incorporating the favorable variant of the *1-FEH w3* gene. These results open perspectives of breeding for improved drought resistance by pyramiding several favorable alleles for response to water stress.

Key words: 1-FEH, wheat, drought tolerance, WSC, KASP
