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A SUSTAINABLE DURUM WHEAT CHAIN
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THE EXPLOITATION OF GENETIC RESOURCES AND NEXT GENERATION BREEDING MAY OPEN NEW PERSPECTIVES TO INCREASE DURUM WHEAT ADAPTATION TO DROUGHT STRESS

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The Mediterranean region is one of the main region affected by the impact of global climate change (GCC) with strong drawbacks on agricultural productions and thus on food security. Durum wheat (*Triticum turgidum* L. var. durum) is a rain-fed crop mainly cultivated in the Mediterranean basin, which despite being able to survive various environmental stresses, is threatened by GCC. In particular drought stress (DS) is one of the major constraints that can negatively affect crops growth and yield. Identifying genotypes with higher adaptability to DS is thus a primary goal for researchers and breeders. In this research, we focused on a set of genes, known to be involved in DS response in other crop species, and characterise them at genomic and expression level. To better elucidate their involvement in DS response, a reverse genetic strategy was followed taking advantage of the wheat TILLING database (www.wheat-tilling.com, John Innes Centre, Norwich, UK). Several mutant lines carrying SNPs that should lead to a functional knock-out of each selected genes (both A and B alleles) were selected. The double mutants have been produced following a classical breeding scheme combined with the use of KASP markers. In parallel, an allele mining approach has been performed, with the aim to identify the presence of natural alleles of the selected genes within a durum wheat germplasm collection representative of the durum wheat Mediterranean cultivation area developed at IBBR-CNR Bari. The phenotypic effects of each mutation (both induced and natural) will be evaluated by using the high-throughput phenotyping platform held by ALSIA (Metaponto, Italy).

ABSTRACT