Proceedings of the XLIX Italian Society of Agricultural Genetics Annual Congress
Potenza, Italy – 12/15 September, 2005
ISBN **88-900622-6-6**

Poster Abstract - D.09

EXPRESSION STUDY OF A GENE FOR A DEHYDRATION-RESPONSIVE TRANSCRIPTION FACTOR IN DURUM WHEAT

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hydric stress, durum wheat, dehydration responsive factors, molecular assisted breeding

The repeatability of dry years makes now necessary a new orientation of selection activity of cultivation species, characterized by high yield to meet population increase and industry demand, considering the climatic tendencies. An effective merging of classical breeding techniques with modern plant biotechnologies is foreseen to increase agricultural productivity.

It is known that the *DREB* genes, firstly isolated from *Arabidopsis* genome, are the key-genes confering resistance to water stress, high salinity and cold, in the ABA-independent pathway. These *DREB* genes codify for transcription factors that control the expression of several target genes involved in the mechanism of tolerance to the above mentioned stresses. In a previous studies, we isolated and characterized a gene for a factor responsive to dehydration, *DREB*-related, in durum wheat (*TdDRF1: Triticum durum* Dehydration Responsive Factor 1) and this gene is highly homologous to the barley gene *HvDRF1*. The primary transcript of this gene produces three mRNAs by alternative splicing, two of them (*TdDRF1.1* and *1.3*) codifying transcriptional activators, involved in the genic ABA-mediated regulation through their AP2 DNA-binding domain.

We have investigated the expression profiles of this gene in different moments of hydric stress and our results indicate that *TdDRF1.1* and *1.3* transcripts are very low abundant when water is available to the plant and their quantity increase when it is not available, while *TdDRF1.2* transcripts seems to be always expressed.

We preliminarly used this gene as a marker and analized the expression levels of the three messangers of *TdDRF1* throught Real-Time RT-PCR in several durum wheat varieties, having different features concerning drought tolerance, yield and other agronomic traits. Two set of experiments were carried out both in controlled greenhouse and in open experimental fields.

After an improved understanding of the role of TdDRF1 in hydric stress adaptation, this gene, or the quantity of these transcripts, could be selected as tolerance indicator to hydric stress. Dehydration-responsive molecular markers will permit a selection of adapted durum wheat varieties to be used in Molecular Assisted Breeding (MAB). The future application consists in the generation and production of new durum wheat varieties (genotypes) drought-resistant, either by assisted breeding or by transgenesis.