A CONSERVED GROUP OF CCCH ZINC FINGER PROTEINS IS INVOLVED IN RESPONSE TO ABIOTIC STRESSES IN DURUM WHEAT AND ARABIDOPSIS


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CCCH zinc finger, durum wheat, Arabidopsis, cold and salt stresses, ihpRNA interference

CCCH zinc finger domain consists of a sequence with three cysteines and one histidine residues with strictly defined spacing: C-X$_{4-15}$-C-X$_{4-6}$-C-X$_{3}$-H. First identified in proteins of Tristetraprolin family in mammals, involved in regulation of stability of cytokine mRNAs, this domain has been found in other RNA-binding proteins, also in plants, as involved in control of important biological processes as floral reproductive organ identity determination and calmodulin-mediated RNA processing in Arabidopsis.

A gene coding for a CCCH zinc finger protein, 2H8, was isolated in durum wheat and characterised as responsive to cold and dehydration stresses. Six cDNA sequences were identified in the wheat EST database following a similarity search carried out by using the sequence of 2H8 as a query. These genes were characterized by expression studies under cold and water stress conditions. A gene family of more than sixty members coding for CCCH proteins was described in Arabidopsis. The expression profile also was studied for At2g19810 and At4g29190 genes, belonging to a sub-group of this family and showing the highest similarity level with respect to 2H8 gene at level of aminoacid sequence. As found for durum wheat 2H8 gene, they also showed variations in transcript accumulation in Arabidopsis plants subject to cold and salt stress. These findings suggest a functional correspondence between Arabidopsis and durum wheat CCCH sequences, which could represent a conserved mechanism implicated in control of nucleic acid metabolism in stress conditions.

Therefore, a functional study is ongoing based on the characterization of two T-DNA Arabidopsis insertion lines for the At2g19810 gene, and a set of Arabidopsis lines generated by ihpRNA interference and amiRNA technology resulting in a down-regulation of the At4g29190 gene. Analysis of germination of seeds derived from these mutant lines suggests the involvement of these genes in the regulation of germination by salt and temperature stimuli.