

## GENOME-WIDE SURVEY AND EXPRESSION ANALYSIS OF THE CYNARA CARDUNCULUS DOF GENE FAMILY REVEAL A POTENTIAL ROLE OF CCDOF18 AND CCDOF20 IN ABIOTIC STRESS RESPONSE

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The plant DNA-binding with one finger (*Dof*) gene family is a class of plant-specific transcription factors involved in several biological processes, including response to biotic and abiotic stresses. Although genome-wide identification of this family has been reported for many plant species, clues about the roles of *Dof* genes in cultivated cardoon (*Cynara cardunculus* L. var *altilis*), and more in general in the *Asteraceae* family, are still lacking.

Here, we performed a comprehensive bioinformatics analysis to identify and characterize the entire *Dof* family in cardoon, a traditional food crop that is also being exploited for industrial purposes in green chemistry.

Using the protein sequences of *Arabidopsis thaliana* as baits, a total of 39 *Dof* candidate genes unevenly distributed on the 17 cardoon chromosomes were identified. Phylogenetic analysis of *CcDof* proteins revealed that our candidates could be classified into nine subfamilies (A, B1, B2, C1, C2.1, C2.2, C3, D1, and D2), in line with other comparative analyses. Although most of the members belonging to the same subgroup displayed conserved gene structure and similar protein motifs distribution, differences within putative promoter regions were observed by exploring their cis-regulatory elements, suggesting that specific candidates of *CcDof* might have potential roles in organ development, transition from vegetative to reproductive stage, light responsiveness, hormone responses, flavonoid biosynthesis

regulation as well as abiotic stress responses. These differences allowed us to select seven candidates putatively involved in the regulation of abiotic stress response. Therefore, cardoon calli were grown under chilling (6°C for 7 and 14 days) and saline (0, 50mM and 150mM NaCl for 28 days) stress conditions. Expression analysis of selected *CcDof* genes using quantitative real-time polymerase chain reaction (qRT-PCR) revealed that *CcDof18* and *CcDof20* were highly induced both in salt- and in cold-stressed cardoon calli. Their functional characterization is currently undergoing to confirm their roles. Overall, this study provides a hint on *CcDof* genes involvement in regulation of abiotic stress responses such as cold and salt, and more in general on the role of *Dof* genes in the agronomically and economically important *Asteraceae* family.