C0161

Gene expression analysis shows differences in cold acclimation between three almond cultivars

Israel Ávila[1,2], Beatriz Bielsa[1,2], Jerôme Grimplet[1,2], María José Rubio-Cabetas[1,2]

[1]Unidad de Hortofruticultura. Centro de Investigación y Tecnología Agroalimentaria de Aragón (CITA). Avda. Montañana 930, 50059, Zaragoza, España.
[2]Instituto Agroalimentario de Aragón – IA2 (CITA-Universidad de Zaragoza), Zaragoza, España.

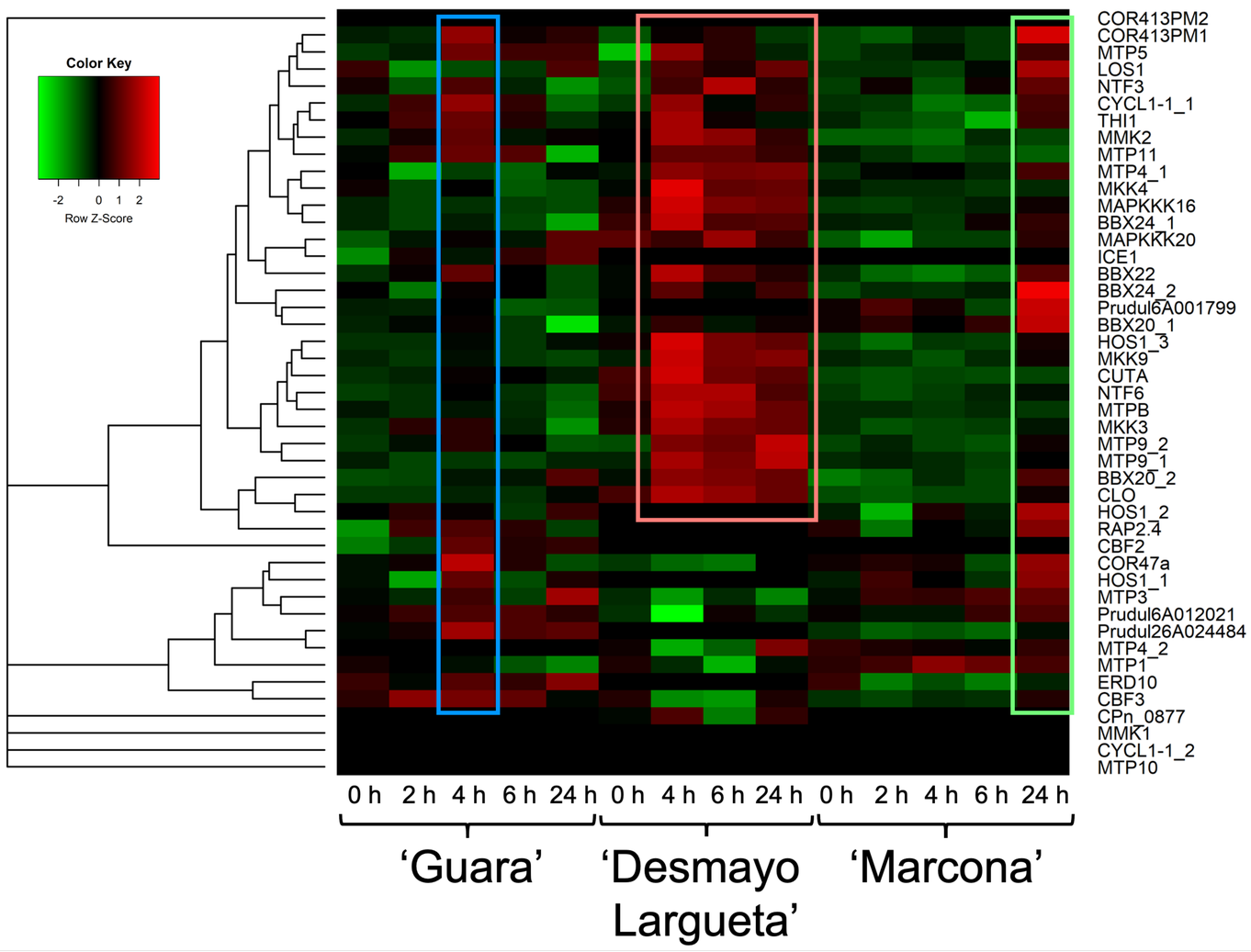
Late spring frosts can become one of the limiting factors of the almond (*Prunus dulcis* [Mill.]) crop preventing the expansion of cultivation area towards the harsher climate. Frost can damage up to 90% of the harvest.

In this work 46 genes involved in key cold-response pathways such as kinase-response, cold-regulated genes (COR) and brassinosteroids-response were analysed to elucidate the potential tolerance to cold in almond and thus, identify biomarkers that could be used in *Prunus* breeding programs.

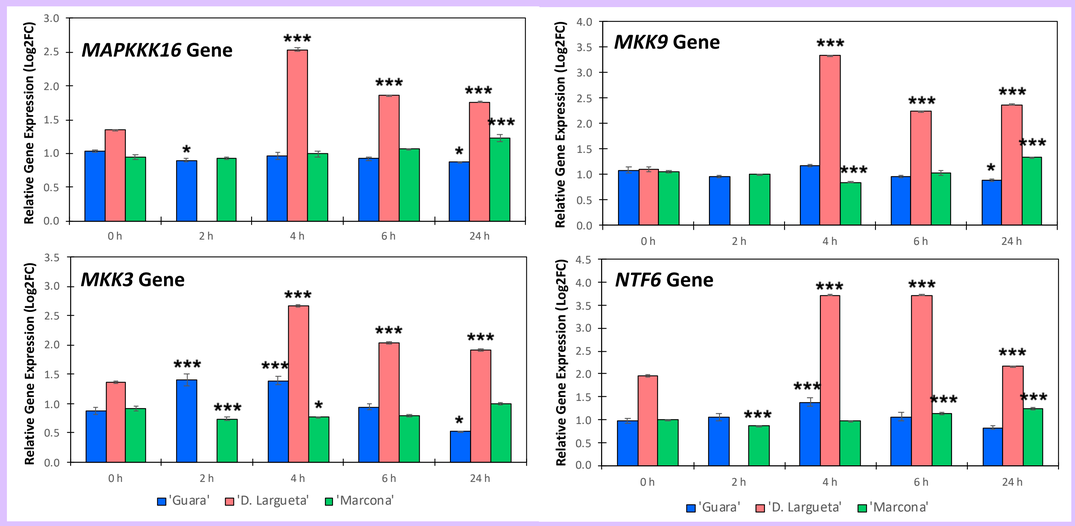
Therefore, branches from three almond cultivars: 'Desmayo Largueta', 'Marcona', and 'Guara', one of the most planted cultivars in Spain during the last 20 years, were exposed at -4 ºC during 24 h in a constant climate chamber. The qRT-PCR Fluidigm technology was used to study the relative expression of 46 candidate genes previously identified *in silico*.

M&M

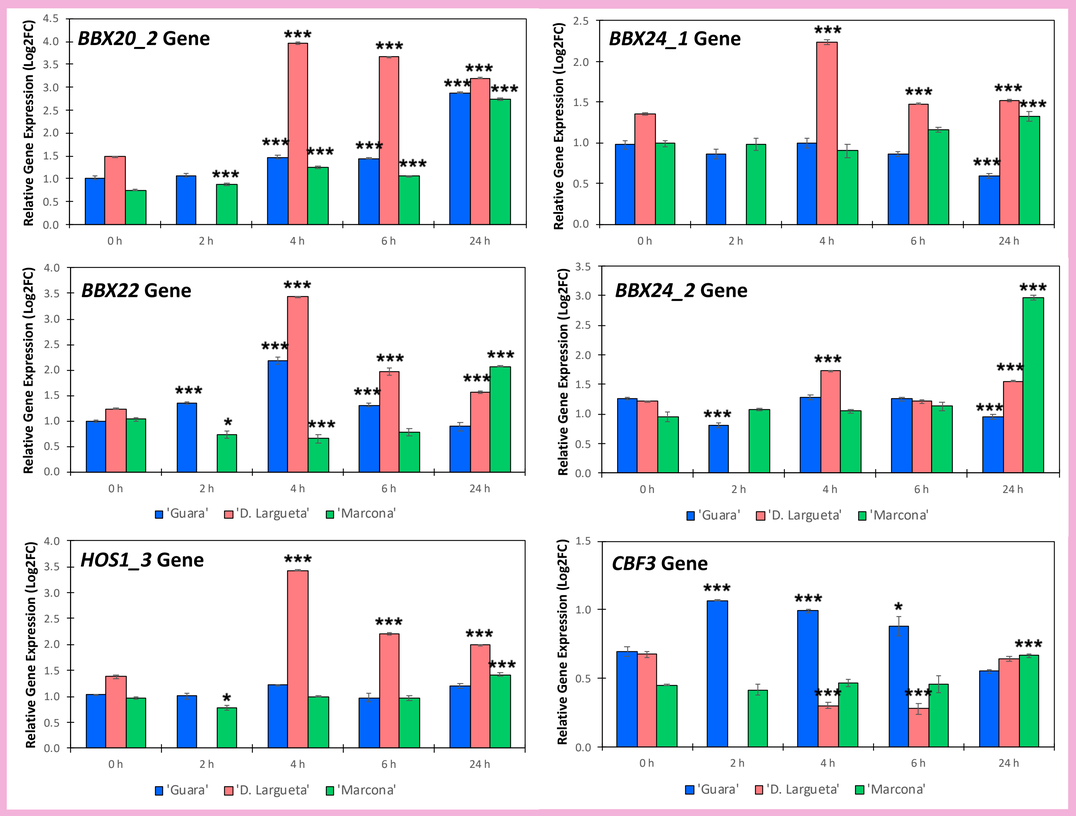
Differential Gene Expression Patterns



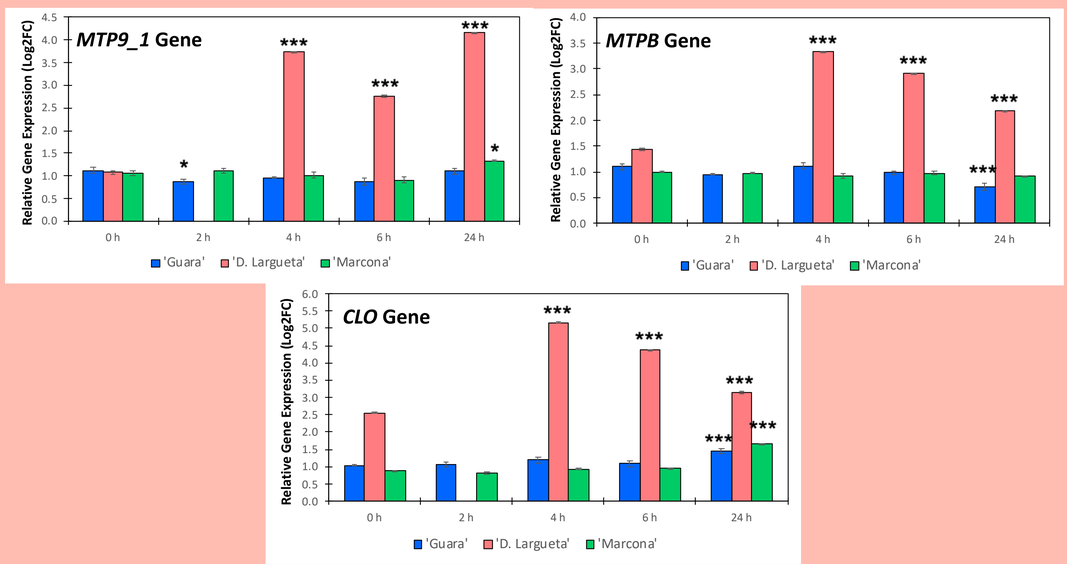
Stress signal perception



Signal perpetuation: Transcriptor Factors



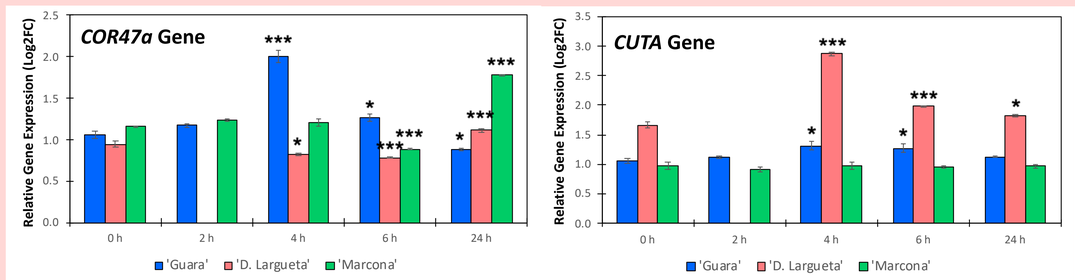
Other functional genes with a potential role in cold stress response



Asterisks indicate significantly different expression values (* : p ≤ 0.05; ***: p ≤0.001) for each genotype with respect to 0 h following the Student’s t-test. Error bars represent the standard error of the mean.

The significant levels of expression found in other functional genes (*MTP9_1*, *MTPB* and *CLO*) reveal a potentially relevant role in response to cold.

Effector Genes



Asterisks indicate significantly different expression values (* : p ≤ 0.05; ***: p ≤0.001) for each genotype with respect to 0 h following the Student’s t-test. Error bars represent the standard error of the mean.

'D. Largueta' shows an early response to cold from 4 h. However, 'Marcona' perceives later this signal stress, at 24 h. This would indicate the potential for cold tolerance of 'D. Largueta' with respect to 'Marcona’.

The levels of expression of *CBF3* and *COR47a* in 'Guara' from 2 h confirm its capacity to tolerate low temperatures.

ACKNOWLEDGEMENTS:
This work was supported by RTA-2014-00062, RFP2015-00015-00-00 and RTI2018-094210-R-I00 and the research group A-12 of Aragón.