

REICHEL, Tharyn^{*,**}, ALVES, Gabriel S.C.^{*,**}, AQUINO, Sinara O.^{*,**}, CARNEIRO, Fernanda A.^{*,**},
ANDRADE, Alan C.^{*,**}, MARRACCINI, Pierre^{*,**}

*Federal University of Lavras, MG, Lavras, BRAZIL, **Embrapa Genetic Resources and Biotechnology, Brasilia, DF, BRAZIL, ***EMBRAPA Coffee-INOVACAFÉ, Lavras, BRAZIL, ****CIRAD, UMR AGAP, Montpellier, FRANCE

Abstract

The main objectives of this work were to analyze the expression of the different *DREB* (coding Dehydration Responsive Element Binding Proteins) genes found in the genome of *C. canephora* by reverse transcription-quantitative PCR (RT-qPCR) in leaves and roots of drought-tolerant and drought-susceptible clones of *C. canephora* grown in greenhouse and submitted or not to water limitation. Among the different subgroups (SGs) of *DREB* genes, expression of *Cc05_g06840* and *Cc08_g13960* appeared highly up-regulated by drought in leaves of drought-tolerant clones 14 and 73, but not in those of the drought-susceptible clone 22.

Introduction

We recently reported that the *CcDREB1D* (coding for a Dehydration Responsive Element Binding Protein) was a key candidate gene in the responses of coffee plants to drought (1, 2, 3). In order to precise the roles of *DREB* genes, this work analyzed the expression profiles of their different subgroups (4) by real-time quantitative PCR (RT-qPCR) in leaves and roots of drought-tolerant (D^T : 14, 73 and 120) and drought-susceptible (D^S : 22) clones of *C. canephora* Conilon grown in greenhouse and submitted (or not) to drought.

Methods

Clones of *C. canephora* grown in greenhouse were submitted (NI: non-irrigated, $\Psi_{pd} = -3.0$ MPa) or not (I: irrigated, $\Psi_{pd} = -0.2$ MPa) to drought (see PB233). For each clone and water condition, total RNAs were extracted, reverse-transcribed and tested by RT-qPCR (Fig. 1) using primer pairs of *Cc05_g06840* (SG-I) and *Cc08_g13960* (SG-III) (Table 1).

Gene Name	Primer names	Primer sequences
<i>Cc05_g06840</i>	Cc05_g06840-F	ACCCTCCAACCTCCCATGAC
	Cc05_g06840-R	TGGCAGCTCTGGGATGTACA
<i>Cc08_g13960</i>	Cc08_g13960-F	GCCCAAGAGCCATCAATTC
	Cc08_g13960-R	CTTCCTCCCGCTCGCTTCT
<i>CcUBQ10</i>	BUBI-F	AAGACAGCTTCAACAGAGTACAGCAT
	BUBI-R	GGCAGGACCTTGCTGACTATA

Table 1. Primer pairs used for RT-qPCR assays. *DREB* gene names correspond to those available in the Coffee Genome Hub (<http://coffee-genome.org>)

Results and Discussion

RT-qPCR assays showed high up-regulated expression of *Cc05_g06840* (SG-I) and *Cc08_g13960* (SG-III) *DREB*-coding genes in leaves of D^T clones 14 and 73 submitted to drought, and to a lesser extent in those of D^T clone 120 (Fig. 1). However, expression of both genes did not increase upon drought in leaves of D^S clone 22.

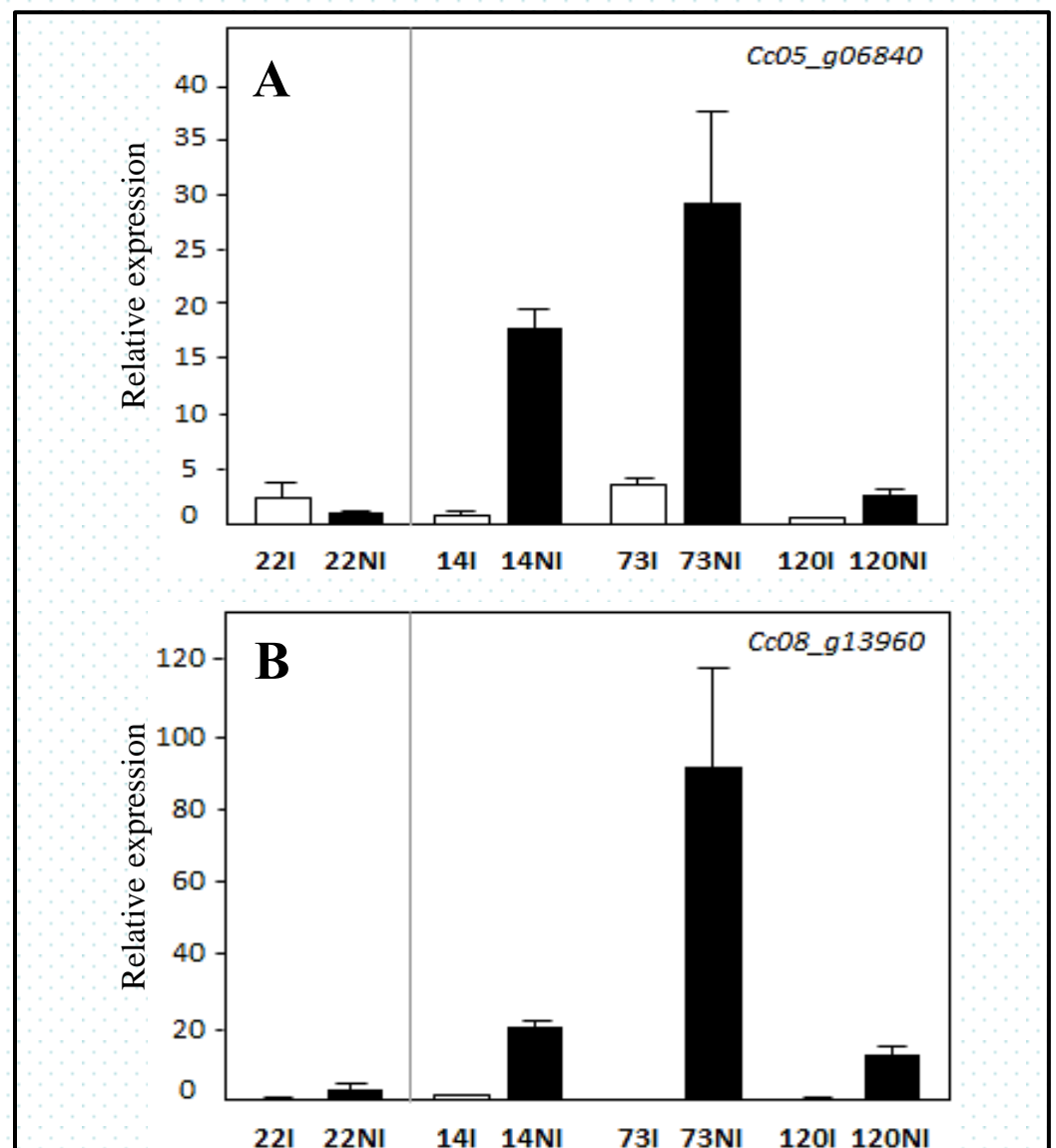


Figure 1. Expression profiles of *Cc05_g06840* (A) and *Cc08_g13960* (B) *DREB*-coding genes in leaves of D^S (22) and D^T (14, 73 and 120) clones of *C. canephora* grown with (I: control) or without (NI: drought) irrigation. In each case, values of relative expression (RE in arbitrary units) correspond to the mean of at least three technical repetitions \pm SD. The expression of the *CcUBQ10* gene was used as a reference and the sample 14I as internal calibrator (RE = 1).

Conclusion

The fact that *Cc05_g06840* and *Cc08_g13960* *DREB*-coding genes showed up-regulated expression in leaves of D^T clones (mainly in 73) and not in those of D^S clone 22 highly suggests that they play a key role in response to drought of *C. canephora*.

Expression of other *DREB*-coding genes is undergoing.

References:

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