

---

## 57. Analysis of the *CcUNK8* orphan gene from *Coffea canephora* in Genetic Transformation of *Setaria viridis*

Karoline E. Duarte<sup>1,4</sup>, Natália G. Vieira<sup>1</sup>, Érica C. S. Rêgo<sup>4</sup>, Polyana K. Martins<sup>2</sup>, Ana P. Ribeiro<sup>1,2</sup>, Bárbara A. B. D. Cunha<sup>2</sup>, Hugo B. C. Molinari<sup>2</sup>, Adilson K. Kobayashi<sup>2</sup>, Carlos A. F. de Sousa<sup>2</sup>, Pierre Marraccini<sup>3,4</sup>, Alan C. Andrade<sup>4</sup>.

<sup>1</sup> University of Lavras, Lavras, MG, BR, <sup>2</sup>EMBRAPA Agroenergy, Brasília, DF, BR, <sup>3</sup>CIRAD UMR AGAP, Montpellier, FR, <sup>4</sup>Embrapa Genetic Resources and Biotechnology, Brasília, DF, BR.

Email: [karollduarte31@gmail.com](mailto:karollduarte31@gmail.com), [alan.andrade@embrapa.br](mailto:alan.andrade@embrapa.br)

Like in many higher plants, bioinformatics analyses of coffee *ESTs* and gene sequences showed that around 30% of them are novel in the sense that their corresponding sequences (nucleic or putative translated protein) do not exhibit similarity with those already deposited in public databases. Recent concepts called such sequences as "no hits" or "orphan" genes, and postulate that they resulted of plant specific and adaptive responses regarding stresses and adverse environmental conditions that occurred during the evolution of species. Our work is focused on the identification and functional characterization of coffee orphan genes which may have a high potential for innovation and biotechnological applications either for coffee itself but also for other higher plants. In the frame of identifying candidate genes for drought-tolerance in coffee, several orphan genes (herein called *Unk* for *Unknown*) were previously identified. For example, this was the case of *CcUNK8* gene that showed higher over-expression under drought in leaves of drought-tolerant clones of *C. canephora* than in those of the drought-susceptible clone. Aiming to identify the functions of *CcUNK8* protein, this gene was cloned in an expression vector used to transformed embryogenic callus of *Setaria viridis* by *Agrobacterium tumefaciens*. Thirteen T<sub>0</sub> transformed plants of *S. viridis* were selected and the presence of T-DNA was confirmed by conventional PCR. For these plants, leaf *CcUNK8* gene expression was analyzed by RT-qPCR and ranged from 1 to 20. In order to see if *CcUNK8* over-expression enhances drought tolerance in *S. viridis*, physiological and phenological analyses of T<sub>2</sub> plants grown under irrigated and non-irrigated conditions were carried out. For all transformed events of *S. viridis* grown under drought stress, we observed that accumulation of fresh biomass in roots and shoot was higher than in WT (untransformed) plants. These preliminary results, suggesting that *CcUNK8* could play in protecting plant against drought, should be confirmed in homozygous T<sub>3</sub> of *S. viridis* that are currently being analyzed.

Support: CAPES, INCT-Café, CNPq and Consórcio Pesquisa Café