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Grafting as a way to modulate expression of physiological and biochemical parameters linked to drought tolerance in *Coffea canephora*

S3-PO-08

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Research and Development

Introduction

To face climate change, **grafting could improve drought tolerance in coffee**. Our study in the frame of Silva *et al*., (2018)[1] evaluates the impact of reciprocal grafting of drought tolerant (dT) or drought sensitive (dS) clones on physiological or biochemical traits expressed during water stress.

Materials/Methods

Greenhouse cultivated *Coffea canephora* cuttings from dS FRT133 and dT FRT140 (5 control plants and 3 reciprocal grafted plants and 14 days water stress). Leaf water potential (LWP) recorded with Schölander pressure chambers, proline and mannitol studied with HPLC for 14 days.

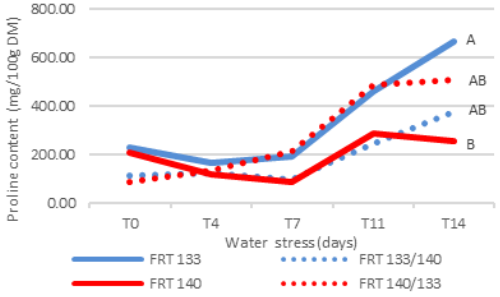

Figure 1: Proline content (control and grafted plants)

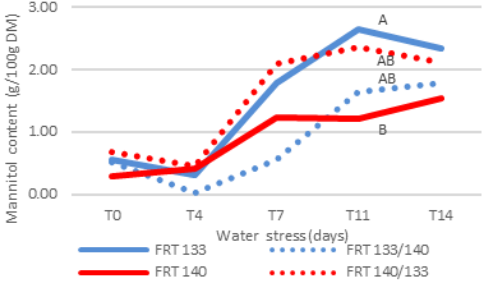

Figure 2: Mannitol content (control & grafted plants)

Figure 3: dS FRT133 and dT FRT140 clones following 14 days water stress two weeks after rewatering

Results/Discussion

During water stress, 2-3 fold **higher level** of **proline** (14d) & **mannitol** (11d) are expressed for dS FRT133 vs dT FRT140.

dS clone grafted onto dT clone produces less mannitol or proline than control. The opposite is recorded for dT clone grafted onto dS clone.

Conclusion/Perspectives

Biochemical results of dS FRT133 and dT FRT140 clones match with phenotypic and physiological measurements. Reciprocal grafting highlights the impact of rootstocks on metabolites linked to drought stress mechanisms[2]. Grafting could be used to mitigate water stress and therefore limit the impact of global warming in dS clones of *Coffea canephora* genotypes.

References: [1] *Silva et al., 2018: Plant Growth Regulation 85:221–229.* [2] *Karunakaran & Ilango 2019: The Journal of Agricultural Science 157, 217–225*