Responsiveness of the antioxidative enzyme system to drought and its interaction with increased air [CO_2] in elite genotypes of *Coffea arabica* L.

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INTRODUCTION

Coffee crop may be threatened by climate change [1]. Here, we investigated the impact of drought on antioxidative responses in cropped *C. arabica* L. genotypes, in interaction with elevated air [CO_2] (expected to occur along this century).

MATERIAL AND METHODS

Plants of *C. arabica* L. *cvs*. (**G**eisha**3**, **Mar**sellesa, and their **Hy**brid)

400 or 700 µL CO_2 L^{-1} (**aCO_2** or **eCO_2**)

Well-**W**atered; **M**ild **W**ater **D**eficit; **S**evere **W**ater **D**eficit; **Rec**overy **14** days period.

Enzyme activity determined in chloroplasts extracts [2].

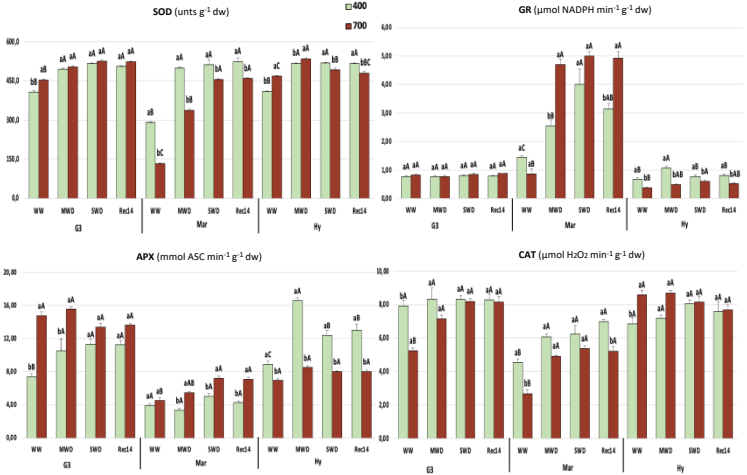

Figure 1. Changes in antioxidative enzyme activities (superoxide dismutase, SOD; ascorbate peroxidase, APX; glutathione reductase, GR; catalase, CAT). For each parameter, the mean values +/- SE (n = 4 plants) followed by different letters express significant differences between CO_2 treatments for each water treatment (a, b), or between water treatment for the same CO_2 treatment (A, B, C), always separately for each genotype, where a > b and A > B > C.

RESULTS AND DISCUSSION

Gradual drought usually promoted enzyme activity, excepted in GR (Hy), and APX (Mar, Hy) at aCO_2. The eCO_2 amplified such activity in GR (Mar), APX (G3, Mar), and CAT (Hy), or reduced it for SOD (Mar), GR (Hy), APX (Hy) and CAT (G3, Mar), as compared with aCO_2 plants. By Rec14, the enzymes activity usually did not differ from SWD plants, regardless genotype and [CO_2].

CONCLUSIONS

The antioxidative system role in drought response is evident, with plants SWD and eCO_2 displaying comparable or greater activities than those under aCO_2. The sustained elevated activities in Rec14 suggest an ongoing need for antioxidative protection, resembling a "vaccine" response, which is relevant for coffee plants adaptation the expected climate changes.

References: 1. Semedo et al. 2021. Tree Physiol., doi: 10.1093/treephys/tpaa158.
2. Ramalho et al. 2018. PLoS ONE, doi: 10.1371/jornal.pone.019869.

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