

# Leaf anatomical traits responsiveness to warming in *Coffea arabica* L. cv. Geisha 3 plants

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## Introduction

Different heat acclimation ability was reported among *C. arabica* genotypes [1]. Foliar traits are important for such plant acclimation in the context of climate changes [2], and can be assessed through anatomical analysis. Thus, leaf anatomical responses to supra-optimal temperatures in cv. Geisha 3 were evaluated.

## Materials/Methods

- C. arabica* L. cv. Geisha 3
- 700–800  $\mu\text{mol m}^{-2} \text{s}^{-1}$ , 12 h
- 70 %
- 25/20 °C (control) (day/night)
- Well-watered conditions
- 400  $\mu\text{L L}^{-1}$
- Temperature rise from 25/20 °C up to 42/30 °C (0.5 °C day<sup>-1</sup>), followed by a 14 days recovery period (Rec14)

Leaf samples were prepared for microscopic anatomical quantitative analysis [3, 4]

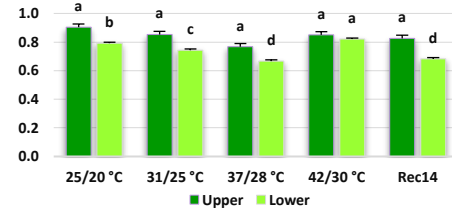


Figure 1: Effect of temperature variation on the upper and lower cuticle thickness ( $\mu\text{m}$ ) of *C. arabica* cv. Geisha 3. Means with different letters were statistically different (one-way ANOVA and Tukey test).

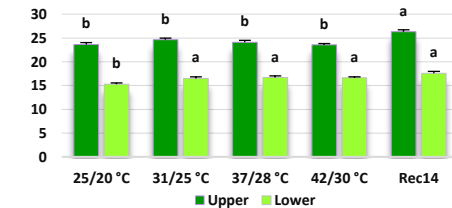


Figure 2: Effect of temperature variation on upper and lower epidermis thickness ( $\mu\text{m}$ ) of *C. arabica* cv. Geisha 3. Statistics as in Fig. 1 caption.

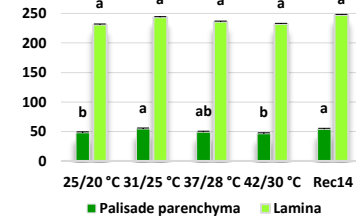


Figure 3: Effect of temperature variation on leaf lamina and palisade parenchyma thickness ( $\mu\text{m}$ ) of *C. arabica* cv. Geisha 3. Statistics as in Fig. 1 caption.

## Results/Discussion

The lower cuticle thickness changed with warming, reaching the maximum value at 42/30 °C, and the minimum at 37/28 °C and Rec14, while in upper cuticle the results are not significantly different (Fig. 1). The thickness of the upper epidermis had at Rec14 a significant maximum while lower epidermis showed a significant minimum at 25/20 °C (Fig. 2). Leaf lamina thickness did not change with temperature (Fig. 3). Palisade parenchyma thickness at 31/25 °C and Rec14 °C were significantly higher than at 25/20 °C (Fig. 3).

## Conclusion/Perspectives

Lamina and upper cuticle showed to be quite stable, whereas lower cuticle and lower epidermis were altered upon supra-optimal temperatures exposure. Studies are needed to associate temperature-dependent changes to ecophysiological and biochemical trends, and their potential role on plant acclimation [5].

## References:

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