

Draft genome of the Híbrido de Timor coffee reveals resistance genes against *Hemileia vastatrix*

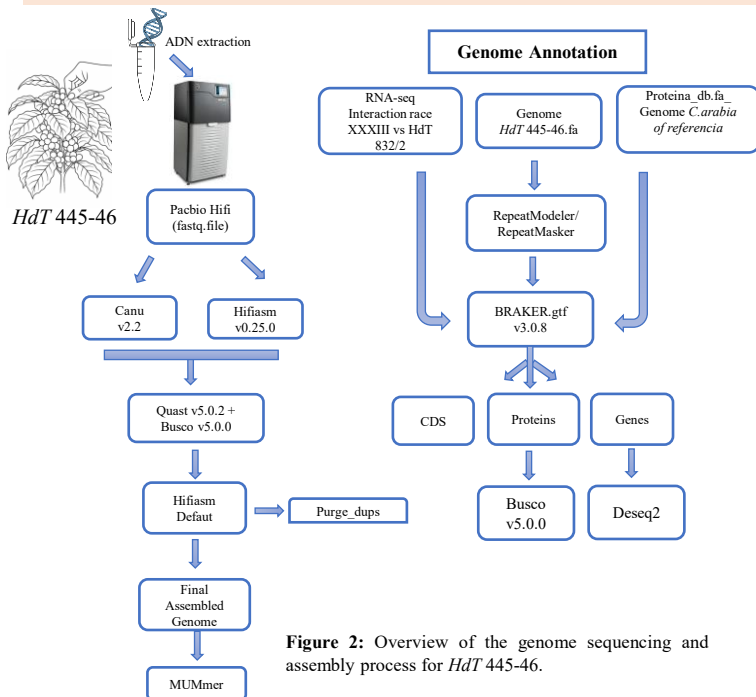
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Introduction

The Híbrido de Timor (*HdT*) is a natural interspecific hybrid between *Coffea arabica* and *Coffea canephora*. *HdT* is an important source of durable resistance to coffee leaf rust (*Hemileia vastatrix*) and is widely used in breeding programs worldwide [1]. Despite the high variability of the pathogen, most *HdT* coffees maintain resistance, probably due to unique combinations of major S_H resistance genes and genes with minor effects [2]. Given its importance in breeding programs, the lack of an available genome for *HdT* highlights the need for its sequencing and annotation to better understand the molecular basis of resistance and accelerate the development of resistant cultivars.

Materials/Methods



Results/Discussion

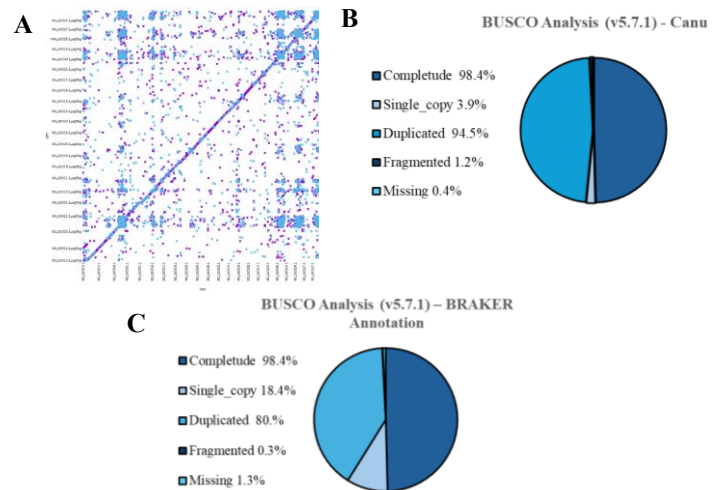


Figure 1: MUMmer-based genomic collinearity plots comparing *HdT* 445-46 assemblies obtained with (A) Canu, (B) BUSCO analysis for the Canu assembly, and (C) BUSCO analysis after BRAKER annotation using the eudicots_odb10 (2326).

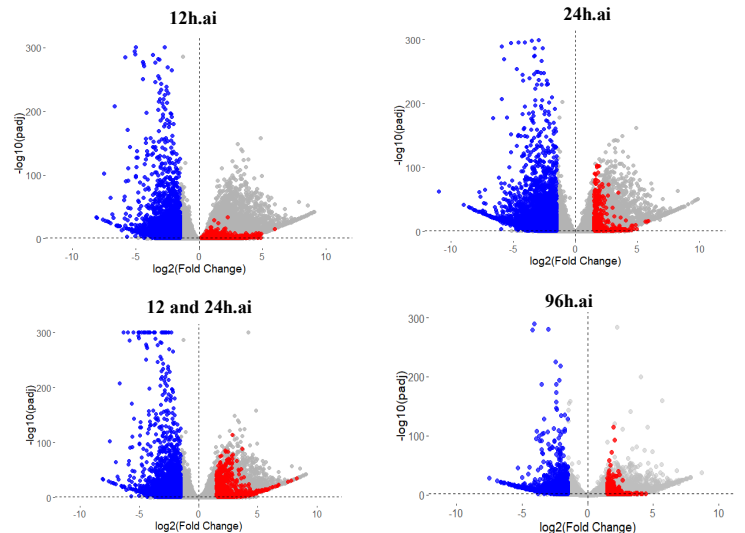


Figure 3: Volcano plot of differential gene expression (DESeq2) at 12, 24 (12 and 24), and 96 hours after inoculation (h.a.i). Up-regulated genes exclusively in the resistant genotype are shown in red, down-regulated genes across both compatible and incompatible interactions in blue, and all other genes in gray.

Conclusion/Perspectives

We report the first draft genome of *HdT* (UFV 445-46), providing for the first time a crucial reference for understanding the genomic basis of durable resistance in *C. arabica*. The gene expression and annotation data allowed us to reveal genes involved in defense responses to *H. vastatrix*. These data are being exploited in comparative genomics analyses to identify conserved resistance mechanisms and defense pathways, with the aim of advancing genetic improvement strategies for rust resistance.

References:

- 1-Zambolim, L.; Caixeta, E. T. 2021. An overview of physiological specialization of coffee leaf rust: new designation of pathotypes. International Journal of Current Research, 13: 15479–15490.
- 2-Alves, D. R. et al. 2024. Unravelling the role of key genes involved coffee leaf rust resistance. Current Plant Biology, 38: 100347.