



Phylogenetic analysis of DNA and RNA polymerases from a *Moniliophthora perniciosa* mitochondrial plasmid reveals probable lateral gene transfer

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ABSTRACT. The filamentous fungus *Moniliophthora perniciosa* is a hemibiotrophic basidiomycete that causes witches' broom disease of cacao (*Theobroma cacao* L.). Many fungal mitochondrial plasmids are DNA and RNA polymerase-encoding invertrons with terminal inverted repeats and 5'-linked proteins. The aim of this study was to carry out comparative and phylogenetic analyses of DNA and RNA polymerases for all known linear mitochondrial plasmids in fungi. We performed these analyses at both gene and protein levels and assessed differences between fungal and viral polymerases in order to test the lateral gene transfer (LGT) hypothesis. We analyzed all mitochondrial plasmids of the invertron type within the fungal clade, including five from Ascomycota, seven from Basidiomycota, and one from Chytridiomycota. All phylogenetic analyses generated similar tree topologies regardless of the methods and datasets used. It is likely that DNA and RNA polymerase genes were inserted into the mitochondrial genomes

of the 13 fungal species examined in our study as a result of different LGT events. These findings are important for a better understanding of the evolutionary relationships between fungal mitochondrial plasmids.

Key words: *Moniliophthora perniciosa*; Mitochondrial plasmids; Fungi; Molecular phylogeny