DISEASE RESISTANCE SIGNALING IN *HEVEA-CORYNESPORA* INTERACTION DISCOVERED THROUGH TRANSCRIPTOME SEQUENCING - FROM RECOGNITION TO TRANSCRIPTIONAL REPROGRAMMING

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Hevea brasiliensis is the major source of latex for the commercial production of natural rubber (NR). Corynespora leaf fall disease caused by *Corynespora cassiicola* is one of the major diseases affecting both nursery and mature rubber trees. Next-generation sequence based transcriptome assembly of tolerant (GT 1) and susceptible (RRII 105) clones in control (healthy) and pathogen challenge inoculated (treated) conditions elucidated the role of several transcripts in subduing the infection of *C. cassiicola* in *H. brasiliensis.* Classical defense-related genes involved in systemic acquired resistance, cell wall reinforcement, NBS-LRR proteins and phytoalexin biosynthesis were highly upregulated in GT 1 under healthy (unchallenged) condition. Expression of genes encoding leucine-rich repeat proteins, serine/threonine protein kinase and phytoalexins in the tolerant clone GT 1 were remarkably increased but were almost suppressed or downregulated in the susceptible clone RRII 105 under pathogen inoculated conditions, demonstrating importance of these genes in imparting disease resistance against *C. cassiicola.* Significant upregulation of negative hypersensitive response and antioxidant defense in inoculated tolerant clone GT 1 revealed their role in suppression of necrotic symptoms induced by *C. cassiicola*. Downstream analysis of selected differentially regulated genes would assist in development of marker-based selection tools to rapidly identify tolerant clones of *Hevea* at an early stage of screening.

Keywords: Antioxidant defense, Hypersensitive response, NBS-LRR, Phytoalexins, Systemic acquired resistance, Transcriptome sequencing

INTRODUCTION

Hevea brasiliensis (Para rubber) is a major source of natural rubber. The high tensile strength, tear-resistance and temperature flexibility of NR makes it suitable for making more than 50,000 products used in day-to-day life. The majority of NR production is from Asia, with Thailand ranking first (48.5 lakh tonnes) in production. India ranks second in average annual yield, with 1485 kg ha^{-1} and production at 8,57,000 MT (ANRPC, 2024).

Diseases are a major constraint hindering the production of NR latex. The high yielding clone RRII 105 developed by the Rubber Research Institute of India is

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