

Expression profiles of putative defence-related proteins in oil palm (*Elaeis guineensis*) colonized by *Ganoderma boninense*.

Abstract

Basal stem rot (BSR) is a major disease of oil palm caused by a pathogenic fungus, *Ganoderma boninense*. However, the interaction between the host plant and its pathogen is not well characterized. To better understand the response of oil palm to *G. boninense*, transcript profiles of eleven putative defence-related genes from oil palm were measured by quantitative reverse-transcription (qRT)-PCR in the roots of oil palms treated with *G. boninense* from 3 to 12 weeks post infection (wpi). These transcripts encode putative Bowman-Birk serine protease inhibitors (EgBBI1 and 2), defensin (EgDFS), dehydrin (EgDHN), early methionine-labeled polypeptides (EgEMLP1 and 2), glycine-rich RNA binding protein (EgGRRBP), isoflavone reductase (EgIFR), metallothionein-like protein (EgMT), pathogenesis-related-1 protein (EgPRP), and type 2 ribosome-inactivating protein (EgT2RIP). The transcript abundance of EgBBI2 increased in *G. boninense*-treated roots at 3 and 6 wpi compared to those of controls; while the transcript abundance of EgBBI1, EgDFS, EgEMLP1, EgMT, and EgT2RIP increased in *G. boninense*-treated roots at 6 or 12 wpi. Meanwhile, the gene expression of EgDHN was up-regulated at all three time points in *G. boninense*-treated roots. The expression profiles of the eleven transcripts were also studied in leaf samples upon inoculation of *G. boninense* and *Trichoderma harzianum* to identify potential biomarkers for early detection of BSR. Two candidate genes (EgEMLP1 and EgMT) that have different profiles in *G. boninense*-treated leaves compared to those infected by *T. harzianum* may have the potential to be developed as biomarkers for early detection of *G. boninense* infection.

Keyword: Basal stem rot; *Elaeis guineensis*; *Ganoderma*; Oil palm; Real-time PCR.