

ROOTSTOCK INFLUENCES GENE EXPRESSION IN SCION IN *HEVEA BRASILIENSIS*

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Bud-grafting is the most popular propagation method to produce a large number of "true-to-type" plants of desirable clones of *Hevea brasiliensis*. However, variability can exist among bud-grafted plants of the same clone due to the influence of genetically heterogeneous rootstocks used for budding. Two groups of plants of the same clone RRII 105, viz. mature trees in the field raised through shoot tip culture (devoid of any rootstock) and normal bud-grafted trees of the same age (with genetically different rootstocks) were used for the present study to determine whether the rootstock has influenced gene expression in the scion. DDRT-PCR analysis showed transcript-level changes in the latex collected from the scion of the tissue-cultured and bud-grafted trees. The similarity index (SI) was 57% for bud-grafted trees and 80% for tissue-cultured trees. Less similarity in transcript levels among the bud-grafted trees could be attributed to the influence of heterogeneous rootstocks on gene expression in scions. Greater similarity in gene expression among the tissue-cultured trees may be due to the absence of rootstocks.

Keywords: DDRT-PCR, Gene expression, Genetic heterogeneity, *Hevea brasiliensis*, Rootstock influence, Rootstock-scion interaction

INTRODUCTION

Natural rubber, *Hevea brasiliensis*, is propagated commercially through bud-grafting elite scions (clones) on genetically heterogeneous rootstock plants derived from polyclonal seeds. The heterogeneous rootstocks used for bud-grafting may impart intraclonal (tree-to-tree) variation. Rootstock-scion interactions have been reported as a complex phenomenon in several species of bud-grafted plants (Tartman and Kester, 1976) including *H. brasiliensis* (Sobhana, 1988; Krishnakumar *et al.*, 1992; Sobhana *et al.*, 2001). Graft-induced changes in fruit yield and quality have been reported in apple (Lord *et al.*, 1985), *Capsicum annuum* (Yagishita and Hirata, 1987) and *Annona* sp. (George and Nissen, 1987).

The metabolic activities of bud-grafted plants may be different from the two graft partners (*i.e.* scion and rootstock) and when the genetic constitution of these two partners is different, there are chances of incompatibility (Andrews and Marquez, 1993). Rootstock influence on growth and yield in *Hevea* was reported earlier (Templeton, 1960; Buttery, 1961; Ng *et al.*, 1981; Cardinal *et al.*, 2007). In rubber, subtle symptoms of rootstock-scion interaction are often reflected in many physiological and biochemical characteristics of the scion (Sobhana, 1998; Ahmed, 1999). Isozymes, the biochemical markers of gene expression, were also reported to be influenced by rootstocks in natural rubber (Krishnakumar *et al.*, 1992; Sobhana *et al.*, 2001) and mango