

TAPPING INDUCED BIOMASS LOSS IN NATURAL RUBBER (*HEVEA BRASILIENSIS*) TREES: PUTATIVE FACTORS EXPLAINING THE UNKNOWN MECHANISM

K. Annamalaiathan, James Jacob, K. K. Vinod*, K.U. Thomas,
S. Sreelatha, K.V. Sumesh and M. Suryakumar

Rubber Research Institute of India, Kottayam - 686009, Kerala, India

*Indian Agricultural Research Institute, Rice Breeding & Genetics Research Centre,
Aduthurai - 612101, Tamil Nadu, India

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The mechanisms of biomass loss in Para rubber tree (*Hevea brasiliensis*) due to regular harvesting of latex have not been studied in detail. Annual shoot biomass increment of five different clones of natural rubber tree that were tapped under two different frequencies for twelve years have been monitored. Accrual of biomass was lesser in tapped trees when compared to untapped trees. Trees began losing biomass since the very first year of tapping. Higher the intensity of tapping there was corresponding more loss of shoot biomass. After twelve years of tapping, the most popular high yielding clone, RRII 105 lost around 39 per cent of shoot biomass with reference to biomass of untapped trees. Two clones, RRII 300 and PB 235 lost relatively smaller amount of biomass. The possible mechanisms of tapping mediated biomass loss that was not accounted either by removal of latex or standing biomass known as 'k factor' were explored. In tapped trees, non-phosphorylative alternative respiration was found significantly increased in and around tapping panel region due to continuous tapping. Those clones which recorded increased rate of alternative oxidase (AOX) activity tended to lose more shoot biomass. Tapped trees had higher amount of accumulated carbohydrates in the soft bark tissues and increased ATP level in the latex indicating increased sink activity induced by tapping process. A large amount of ATP and other resources like sugars and proteins were lost through the latex. All these putative factors accounted for the missing biomass in tapped trees.

Keywords: Alternative respiration, ATP, Biomass, Tapping

INTRODUCTION

Tapping, the process of harvesting latex from rubber trees is essentially a process of controlled wounding (Thomas *et al.*, 1995). This process is known to enhance the metabolic activities of laticiferous sink

tissues in order to regenerate the components of the latex between successive tapping as well as for wound healing (Chrestin *et al.*, 1989). It has been known for long time that a negative relationship exists between latex production and wood