STRESS RESPONSE OF SIEVE TUBES DURING INTENSIVE TAPPING IN *HEVEA BRASILIENSIS:* AN ANATOMICAL PERSPECTIVE

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Major quantum of natural rubber is being recovered as an industrial raw material from the latex obtained on tapping the bark of *Hevea brasiliensis,* a deciduous tropical tree with an economic life span of about thirty years. Genetic improvement for achieving better attributes including high yield is one of the prime areas of research in this crop. It has been established that high latex yielding clones are vulnerable to a syndrome termed Tapping Panel Dryness (TPD), when the trees are subjected to intensive tapping. Cessation of latex flow from the tapping panel is the initial symptom, followed by the occurrence of a number of morphological, structural, biochemical and physiological changes resulting in complete drying of the bark. Even though different reasons are attributed for this century old problem, till now there is no remedy other than a few management practices. Sieve tubes, the prime channel for photoassimilate translocation in the bark of the tree that cater nourishments for latex biosynthesis exhibit an array of deformations following TPD. In this context, stress responsive plant deformations *viz.*, permanently altered cambial activity, intense deposition of definitive callose and P-protein, chaotic dynamic system in the sieve tube, peroxidase activity, protein storing cells and phytoplasma with respect to TPD are reviewed.

Keywords: Definitive callose, Dynamic system, *Hevea brasiliensis*, P-protein, Phytoplasma, Sieve tubes, Tapping panel dryness

INTRODUCTION

The tropical deciduous tree *Hevea brasiliensis*, yields natural rubber as latex which is collected from the bark of the trunk by a systematic wounding (Fig. 1) termed tapping. In each tapping, a thin shaving of the bark is removed by which interspersed laticifers are opened for initiating the flow of latex, leaving the cambium undisturbed. The cambial zone together with the inner soft bark left uncut in each tapping is called residual bark which is instrumental in healing and subsequent bark regeneration. After a period of time, uniform bark regeneration occurs if the cambium is not injured and repeated tapping in the same region is possible (Thomas *et al*., 1995). The quality and frequency of tapping influence the exploitation period of tapping panels, making the trees productive for a longer period.

In India, nearly one million hectares of land is under rubber cultivation of which more than 80 per cent is planted with the

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