

## SEASONAL ACTIVITY OF CAMBIUM AND CHANGES IN BARK STRUCTURE OF *HEVEA BRASILIENSIS*

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Seasonal activity of vascular cambium and bark anatomical parameters related to latex yield such as thickness of soft bark, latex vessel rows, height and width of ray cells in *Hevea brasiliensis* were studied for two consecutive annual cycles. Climatic variations have significant influence on cambial rhythm. With the onset of rain in April-May, the cambium started to divide periclinally to produce daughter cells, which differentiated into secondary vascular tissues. Mean maximum thickness for the cambial zone was the highest during monsoon (June-September) and least during summer (February-May). Bark thickness was high during July to October and low during February to May. The number of latex vessel rows in the soft bark was higher during the monsoon season and declined gradually in the succeeding months to a considerably lower number during the summer. While ray height showed significant variation between seasons, width did not. Starch grains varied considerably both in size and distribution in bark, cambium and wood with seasonal fluctuations and were not located in the soft bark during January to March. Calcium oxalate crystals were found throughout the year in the bark with abundance in the month of June, November and February. Depletion of crystals was noticed in August, January and May. The role of reserve metabolites and especially that of crystals in plant metabolism is discussed.

Key words: Calcium oxalate crystals, *Hevea brasiliensis*, Latex vessels, Seasonal cambial activity, Starch, Vascular ray.

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### INTRODUCTION

*Hevea brasiliensis* (Willd. ex Ait. de Juss.) Muell. Arg., the prime source of natural rubber, is a deciduous tree exhibiting rhythmic seasonal growth characteristics, which are reflected in the morphology, structure and function of the plant. Seasonal activity of cambium in trees is governed to a great extent by climatic factors (Cutter, 1978; Kramer and Kozlowski, 1979). The rubber trees defoliate during winter (December-January) and re-leaf after 2-3 weeks with functional extrafloral nectaries, followed by flowering. While growth (girdling) is higher during the monsoon (June-September) season high latex yielding period is October to December (Sethuraj *et al.*, 1989; Chandrashekar *et al.*, 1998).

Seasonal activity of the plant is re-

flected in the cambium and bark anatomical features. The secondary phloem, which contains articulated and branched laticifers in the trunk, is tapped for latex. Studies on the consequences of periodic activity of the cambium in the trunk with respect to anatomical parameters contributing to yield in *Hevea* are meagre. Rao (1972) and Premakumari *et al.* (1981) studied the periodic activity of cambium in *Hevea* using twigs collected from trees under tapping. The present study is aimed at elucidating the seasonal activity of cambium in the trunk and corresponding changes in bark anatomical features of untapped *Hevea* trees.

### MATERIALS AND METHODS

Wood and bark samples together with intact cambium from the trunk at a height