

STUDIES ON SOIL-PLANT-ATMOSPHERE SYSTEM IN *HEVEA* : II. SEASONAL EFFECTS ON WATER RELATIONS AND YIELD

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Influence of soil moisture status during dry and wet periods on yield, yield components and water relations was studied in four *Hevea* clones (RRII 105, RRII 118, GI 1 and Tjir 1). Low dry rubber yield in all the clones was associated with high plugging index and low initial flow rate of latex in the dry season. However, decrease in plugging index and increase in initial flow rate of latex more than compensated for the drop in dry rubber content in the wet season. RRII 105 had higher rubber yield in both the seasons. Transpiration rate was also low in RRII 105 in both the seasons. High latex vessel turgor and low latex solute potential in this clone in the dry season reveal osmotic adjustment. Maintenance of high plant moisture status in RRII 105 was also associated with higher stomatal resistance and higher xylem sap speed. The transpiration coefficient of different clones varied between 0.11 to 0.24 in the summer month and between 0.90 to 1.13 in the wet month. The results indicate that low transpiration coefficients are associated with high yields and drought tolerance in RRII 105 and GI 1. Significant seasonal differences are not observed in the minimum stomatal resistance. In *Hevea*, low latex yield during the dry period need not be due to low plant moisture status alone. Drought induced biochemical changes leading to higher plugging may also be important, which need further studies.

Key words - *Hevea*, Drought tolerance, Yield, Yield components, Water relations, Plant moisture status, Plugging, Transpiration coefficient

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INTRODUCTION

Latex from the Para rubber tree, *Hevea brasiliensis* (Willd. ex Ait. de Juss). Muell. Arg. exudes when the bark is severed on tapping, resulting in rapid elastic expulsion of the fluid cytoplasm (latex) due to the high hydrostatic pressure in latex vessels (Buttery and Boatman, 1976). The flow of latex is rapid in the beginning and declines gradually until it finally ceases as the latex at the cut ends of laticifers coagulates. Though latex flow characteristics including water relations of laticifers have been studied under moisture stress situations (Buttery and Boatman, 1976;

Sethuraj and George, 1976; Raghavendra *et al*, 1984), no systematic approach has been made to find out the relationship between flow characteristics with various components of soil-plant-atmosphere system. This paper describes some of the observations made on the relationship between the factors governing water relations in a soil-plant-atmosphere system and yield during dry and wet seasons in a few clones of *Hevea*.

EXPERIMENTAL DETAILS

Observations were made on clones RRII 105 and RRII 118 (drought tolerant and