

SOME ASPECTS OF SOIL MOISTURE STRESS IN *Hevea brasiliensis*
GROWN UNDER SRI LANKAN CONDITION

by

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ABSTRACT

In this study, effects of moisture stress on growth and latex production of *Hevea brasiliensis* grown under Sri Lankan conditions were investigated to device suitable agronomic practices to overcome the adverse effects with the view to obtain optimum levels of production, considering ground cover management and potassium fertilizer programme.

Among the different soil management practices dead mulch (rice straw) exhibited the highest girthing of plants in comparison with other practices such as growing leguminous covers or naturals. Similarly, tapability % and yield were much higher in mulched plots. Contributions of soil nutrients, soil pH and CEC also, were all in favour of mulching. Another benefit of mulching is that it gave the highest soil and leaf K content in comparison with the other practices.

Soil moisture storage capacity in plots that were mulched was also higher than in the other plots. More ever some plant physiological measurements made, for example leaf water potential, relative water content and leaf water deficit, all

indicate that the water status of plants was improved in plots that were in mulch in comparison with the plants in naturals or legumes.

Further, there was a quadratic response due to application of K, showing an increase in girthing at K_1 level and a decrease at K_2 level, under no stress conditions. It was also noted that the plant diameter and height at 50% field capacity (M_2 level) with recommended potassium level (K_1) were almost equal to the diameter and height at the 10% field capacity (M_0 level) in combination with the K_2 level suggesting that under condition of moisture stress increasing the level of K would help in restoring normal growth of rubber plants. These results are supported by some physiological parameters such as stomatal conductance, transpiration and leaf water potential.

INTRODUCTION

A uniform annual distribution of rainfall is regarded as favourable for the growth of *Hevea* plants. In Sri Lanka dry spells are common in some months and prolonged drought periods also occur in regions with distinct dry seasons. These lead to soil moisture stress of differential magnitude, affecting adversely the growth and productivity of rubber.

During the immature period, soil moisture is important for the growth of rubber. At the same time, it is during this period that attempts are made to establish and grow leguminous cover as a soil conservation measure. The influence of ground covers on

early growth of the rubber trees is believed to be mainly the result of moisture and nutritional advantage (Yogaratnam *et al* 1984), and at the same time ground covers may also compete for moisture and nutrients with the young rubber plants. In this respect mulching has the advantage over these practices because in addition to conserving the available moisture there is no competition for moisture by mulch (Samarappuli & Yogaratnam 1984).

A major factor influencing crop yield is the amount of moisture available to the crop during the growing season. Adequate fertility is important in getting the most out of the moisture that is present. It is well documented that an adequate supply of K has an important role in resistance or tolerance to moisture stress by influencing the rate of transpiration, CO₂ assimilation and expansive growth (Hsiao and Lauchli, 1985).

The objective of this study is to investigate the effects of moisture stress on growth and latex production of *Hevea brasiliensis* grown under Sri Lankan conditions and to devise suitable agronomic practices to overcome the adverse effects with the view to obtain optimum levels of production, considering ground cover management and potassium fertilizer programme.