CLONAL VARIATION IN LEAF EPICUTICULAR WAXES AND REFLECTANCE: POSSIBLE ROLE IN DROUGHT TOLERANCE IN *HEVEA*

Soil and atmospheric drought and high temperature are major environmental factors limiting growth and yield in *Hevea* in traditional and non-traditional regions. Identification and breeding of clones tolerant to these stresses are important. Stress tolerant clones are of special importance for successful cultivation of *Hevea* in the non-traditional regions under rainfed conditions. Early evaluation of stress resistant traits will be highly useful in this context. Amount of epicuticular wax on the leaf surface is reported to be an important parameter associated with drought and heat tolerance (Levitt, 1972; Bengtson *et al*, 1978; Rajagopal *et al*, 1988). Presence of epicuticular wax helps in reducing cuticular transpiration (Bengtson *et al*, 1978; Rao *et al*, 1981; Reddy *et al*, 1982; Gururaja Rao, 1983) and stomatal transpiration (Ehleringer *et al*, 1976; Ehleringer, 1981) and promotes reflection of radiant energy by canopies (Eller and Willi, 1981; Lee and Graham, 1986). This paper presents observations made on clonal variations in leaf epicuticular wax and optical properties in young *Hevea* plants. Possible use of these parameters for screening for drought tolerance in *Hevea* is discussed.

Fully expanded and physiologically mature sun leaves (second leaf from the bottom in the second flush in a branch) collected from three year old rubber plants, belonging to six clones *viz*., Gl 1, RRII 308, RRII 105, RRIM 623, RRII 43 and Tjir 1 during the dry season of 1988 were used for estimation of epicuticular wax and spectral properties. Six plants were selected at random from a complete random planting of various clones and three sun leaves were collected from each plant. Leaf epicuticular waxes were extracted using chloroform. The extract was evaporated and the wax contents were determined gravimetrically (Ebercon *et al*, 1977). For studying optical properties, leaves were collected in polythene bags to avoid transpirational water loss and to minimise errors. The leaves were analysed for diffuse reflectance and diffuse transmittance allowing calculation of absorptance from the abaxial surfaces. For optical analysis, a Li-Cor 1800–12 Integrating Sphere attached by a Fibre Optic cable to a LI-1800 Spectroradiometer was used in all measurements. The leaf sample was placed against an outside port of the sphere and diffuse transmittance and reflectance were compared with those of a barium sulphate standard. The experimental setup provided a spectral range of 350–1100 nm at scanning intervals of 2 nm. Programmes in the instrument's microcomputer were made use of in the calculation of diffuse reflectance, diffuse transmittance, absorptance of each leaf and the ratio of reflectance to transmittance.

The absorptance was calculated using the equation:

Absorptance = 1 – (reflectance + transmittance).

Regression equation was developed using the mean values of epicuticular wax and reflectance for individual plant. The data collected were statistically analysed.

Data on leaf epicuticular waxes and optical properties are given in Table 1. Highly significant clonal variations were found in the levels of epicuticular wax in the young