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CLONAL VARIATIONS IN LIPID COMPOSITION OF *HEVEA BRASILIENSIS* AT YOUNG STAGE

Evolving desirable genotypes through breeding is time consuming in *Hevea brasiliensis* because of the long breeding cycle, around thirtytwo years. Many attempts have been made to evaluate yield potential of genotypes at young stages of growth. Among various methods, test tapping is generally adopted (Dijkman, 1951). Zhongyu *et al.* (1983) reported highly significant correlation between the petiolule rubber value (ratio of the weight of rubber obtanied from latex exuding from the cut end of petiolule to the dry weight of the leaf) and lateral vein latex yield (amount and duration of exudation of latex) of one year old buddings and the mean yield per tap over the first five years of tapping of the corresponding buddings. Henon *et al.* (1984) have suggested detection of biochemical, physiological and anatomical characters to provide information about yield potential at immature stage. Higher stability of lutoid membrane and the resultant low plugging index is one of the characters associated with high yield in *Hevea*. Jacob *et al.* (1975) suggested that phosphatidic acid of the lutoid membrane might contribute towards lutoid stability and that high phosphatidic acid content of the lutoid membranes might confer a highly electronegative charge, which must be particularly useful in maintaining the colloidal stability of latex. However, Ho *et al.* (1975) found that neutral lipid content of rubber particles is also one of the factors governing plugging index. Sherief and Sethuraj (1978) reported that the content of phospholipids in the lutoids and neutral lipids in rubber particles are associated with differences in plugging indices. The levels of these lipids were found to be negatively correlated with plugging indices. For the purpose of early prediction of yield characteristics, it is difficult to separate lutoid particles and rubber particles from latex samples obtained from young *Hevea* plants. The present study was undertaken to find out whether the lipid composition of the whole latex and leaf samples of young *Hevea* plants would give an indication of their yield potential assuming that the membrane compositions of latex and leaves are correlated.

Clonal variations in the lipid composition of leaf and latex in high, medium and low yielding clones were determined in two year old plants. Fully expanded and physiologically mature sun leaves were collected from plants belonging to six clones representing high (RRII 105 and RRIM 600), medium (GT 1 and RRII 118) and low (RRII 38 and HP 20) yielders. Six plants were selected at random from each clone from a completely randomized planting of different clones and three g of leaves were collected from each plant in June, 1987. Leaf samples were collected between 8.00 A. M. and 8.30 A. M. when PAR was around 600–800 $\mu E\ m^{-2}\ sec^{-1}$. Two g of leaf samples were used for lipid estimation and one g for determining dry weight. Latex samples were collected during test tapping in December 1988 from the same plants from which leaf samples were collected.

Leaf and latex samples from individual

plants were analysed separately. Total lipids were extracted according to Bligh and Dyer (1959) and estimated gravimetrically. Total lipids were separated by silicic acid, column chromatography into neutral lipids glycolipids and phospholipids and the amount of glycolipids, phospholipids and triglycerides were estimated according to Hasma and Subramaniam (1986). For the estimation of sterols, the diether eluant was made to a known volume and aliquots were evaporated and dissolved in acetic acid. The colour was developed by adding acetic anhydride, sulphuric acid (4:1) reagent and intensity was measured at 625 nm using β-sitosterol as standard. The data were statistically analysed and correlation coefficients were calculated between latex and leaf lipid contents.

The lipid contents of latex and leaf samples are given in Table 1 and Table 2, respectively. The contents of total lipids, triglycerides, sterols and phospholipids were significantly high in the high and medium yielding clones except in clone RRII 118, which is a medium yielding clone (Table 1). Though plugging index is correlated to yield (Sethuraj, 1985), different clones might show variations in girth. Length of the tapping cut will have opposite effect to that of plugging index in determining latex output. Hence analysis of lipid composition of latex obtained by test tapping may not always hold good.

Table 1. **Partitioning of latex lipids (mg g^{-1} dry wt) in 42 month old plants of *H. brasiliensis* (mean of six values)**

Clones	Total lipids	Triglycerides	Phospholipids	Sterols
RRII 105	60.13	8.39	16.69	8.97
RRIM 600	58.28	7.95	18.40	9.15
GT 1	60.26	8.06	16.14	9.79
RRII 118	46.33	3.60	15.00	6.85
RRII 38	53.26	7.05	15.14	7.43
HP 20	51.62	6.49	15.42	6.28
CD (P = 0.05)	1.18	0.217	0.480	0.415

Table 2. **Partitioning of leaf lipids (mg g^{-1} dry wt) in 24 month old plants of *H. brasiliensis* (mean of six values)**

Clones	Total lipids	Triglycerides	Phospholipids	Sterols	Glycolipids
RRII 105	118.82	10.88	6.08	21.75	70.86
RRIM 600	106.08	9.50	6.07	19.97	72.42
GT 1	94.80	10.85	6.79	18.63	63.90
RRII 118	95.36	9.41	5.81	17.35	63.08
RRII 38	89.69	8.13	5.12	17.84	62.70
HP 20	89.98	7.69	4.66	15.46	62.55
CD (P = 0.05)	3.24	0.49	0.37	0.66	2.69

The data given in Table 2 show that total lipid contents in the leaves were high in clones RRII 105 and RRIM 600. The amounts of glycolipids, sterols, triglycerides and phospholipids were also high in the leaves of these clones compared to those in the leaves of low yielding clones. In the case of medium yielding clones intermediate values were obtained with respect to the total lipid content. However, amounts of glycolipids in these clones were comparable to the respective values observed in low yielding clones.

Significant correlations were obtained between the contents of total leaf lipids and total latex lipids ($r = 0.455^{**}$) and between the contents of sterols in the latex and leaf samples ($r = 0.556^{**}$). For the remaining parameters the correlations were non significant indicating that all latex and leaf lipid parameters may not be related.

The results of this study indicate that leaf and latex lipid components can possibly be included among early prediction parameters for yield characteristics of *H. brasiliensis* and that analysis of latex lipids alone may not be enough.

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