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EARLY PERFORMANCE OF A FEW *HEVEA* CLONES IN LARGE SCALE TRIAL

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ABSTRACT

Eleven clones of *Hevea brasiliensis* Muell. Arg., three (RRII 5, RRII 104 and RRII 116) evolved by the Rubber Research Institute of India and eight (RRIM 513, RRIM 519, RRIM 600, RRIM 628, PB 5/76, PB 206, PB 213 and PB 217) of Malaysian origin were evaluated in a statistically laid out large scale trial in the South Central part of Kerala. Clone Tjir 1 was used as the control. Vigour during the immaturity period, girth increment on tapping, thickness of virgin bark, thickness of renewed bark, yield during first four years of tapping, yield depression during wintering, incidence of diseases like pink and brown blast and damage caused by wind were recorded. Clonal differences were observed with regard to the major characters and the results are discussed.

INTRODUCTION

The Rubber Research Institute of India is making regular attempts to develop new clones of *Hevea* by hybridization and ortet selection. In addition, improved clones are periodically introduced to India from other rubber growing countries. These clones are evaluated under experimental plantings and promising ones are released for commercial use. In this paper observations made on twelve clones in a large scale trial in Quilon region of Kerala State are presented.

MATERIALS AND METHODS

The clones RRII 5, RRII 104, RRII 116, RRIM 513, RRIM 519, RRIM 600, RRIM 628, PB 206, PB 213, PB 217, PB 5/76 were evaluated in a field trial. The clone Tjir 1 was used as the control. RRII 5 is a primary clone (Joseph *et al*; 1980) and RRII 104, and RRII 116 are secondary clones, developed by the Rubber Research Institute of India (Bhaskaran Nair and George, 1968). The RRIM clones were evolved by the Rubber Research Institute of Malaysia and are of hybrid origin (Bhaskaran Nair and Joseph, 1975). The Prang Besar Research Station of Malaysia has produced the PB clones (Ang and Shepherd, 1979) of which PB 206 is a primary clone and PB 213, PB 217 and PB 5/76 secondary in origin (Paardekooper, 1965). These exotic clones were introduced to our country (Anonymous, 1962) for their evaluation under Indian conditions. Quilon region, where the study was conducted, is an important rubber growing region of the main rubber growing tract of India. The trial was laid out in a randomised block design with three replicates. The spacing

was 4.9 m × 4.9 m, with a plot size of 0.23 ha. The number of plants per plot was 30 gross and twelve net. The important characters recorded were girth during immaturity period, girth increment after commencement of tapping, thickness of virigin bark and renewed bark, annual yield of rubber, yield depression during summer, susceptibility to diseases and proneness to damages caused by wind. Girth during immaturity phase and girth increment after opening were recorded by measuring the girth of the trunk at a height of 150 cm above the bud union with a tailor's tape. Thickness of bark was noted with a Schleipers gauge (Bhaskaran Nair and Joseph, 1981). Yield was determined by coagulating the latex from individual trees in collecting cups itself. Incidence of pink disease and wind damage was ascertained by counting the number of affected trees. Diseases of general nature like abnormal leaf fall and powdery mildew were assessed by visual observation. Yield depression during summer was computed by considering the yield during the period February to May as the percentage of the average yield during the year. Data on mean yield, yield during wintering, girth at opening, girth increment on tapping, thickness of virgin bark and thickness of renewed bark were statistically analysed. The values for RRIM 513 in one of the three replicates are estimated by Missing Plot Technique due to the low number of trees present.

RESULTS AND DISCUSSION

Data on yield and secondary characters are presented in Table I.

Table I. *Performance of clones in the trial*

Clone	Mean yield in Panel 'A' g/tree/tap	Yield during wintering as percentage of mean yield	Mean girth at opening (cm)	Mean annual girth increment after opening (cm)	Mean thickness of virgin bark (mm)	Mean thickness of 4 year renewed bark (mm)
RRII 5	57.46	71.0	63.80	4.38	9.84	8.58
RRII 104	46.75	65.0	54.90	5.29	10.94	9.61
RRII 116	52.14	73.0	62.30	5.22	9.66	8.15
RRIM 513	47.73	60.7	56.30	3.36	8.55	8.04
RRIM 519	46.02	54.7	56.79	5.32	10.10	9.41
RRIM 600	49.05	78.0	59.64	4.87	9.17	8.62
RRIM 628	58.33	74.3	54.21	3.63	8.85	7.90
PB 206	49.12	78.7	56.20	4.78	8.88	7.65
PB 213	42.28	55.0	52.89	4.16	9.44	8.42
PB 217	40.07	73.7	58.42	5.28	9.47	8.69
PB 5/76	38.90	69.3	59.02	4.66	9.43	8.16
Tjir 1	44.44	62.0	59.44	4.96	10.16	8.92
General						
Mean	47.69	67.9	57.83	4.66	9.54	8.51
S.E.	4.04	8.7	2.09	0.37	0.32	0.28
C.D.	11.85	—	6.12	1.09	0.94	0.83
C.D.*	13.41	—	6.92	1.23	1.09	0.94

*for comparing RRIM 513 with other clones

The 12 clones evaluated had very wide variation for yield. RRIM 628 recorded the highest yield (58.33 g) and PB 5/76 the lowest (38.90 g). Only two clones viz., RRIM 628 and RRII 5 were found to be significantly superior to the control. Earlier reports also indicate that these two clones are high yielding in the initial years (Anonymous, 1980; Joseph *et al;* 1980).

There was variation among clones in their yield during wintering period also, PB 206 giving the maximum (78.7%) and RRIM 519 the minimum (54.7%). Malaysian reports indicate that RRIM 519 give high yield during wintering period (Anonymous, 1971). This difference in performance may be due to the difference in climatic conditions existing in India. No clone had significant superiority for girth at the time of opening for tapping, although RRII 5 was numerically better. PB 213 was found to be significantly inferior to Tjir 1. High vigour of RRII 5 and low girth of PB 213 have already been reported (Joseph *et al.*, 1980; Paardekooper, 1965). Rate of girth increment after commencement of tapping also differed among the various clones. PB 519 (5.32 cm) and RRII 104 (5.29 cm) showed more girth increment compared to RRIM 513 (3.36 cm) and RRIM 628 (3.63 cm). The two least vigorous clones mentioned above were found to be significantly inferior to Tjir 1. High girth increment of RRIM 519 has already been reported from Malaysia (Anonymous, 1971). Earlier reports also indicate that RRIM 513 and RRIM 628 show poor girth increment after tapping (Anonymous, 1976, 1980). Thickness of virgin bark at the time of commencement of tapping was maximum (10.94 mm) in RRII 104 minimum (8.55 mm) in RRIM 513. Tjir 1 had a thickness of 10.16 mm and was second in the order of performance. Difference between Tjir 1 and RRII 104 was however not significant, whereas the four clones, RRIM 600 (9.17 mm), PB 206 (8.88 mm), RRIM 628 (8.85 mm) and RRIM 513 (8.55 mm) were found to be significantly inferior to the control in this aspect. Thin virgin bark has already been reported in RRIM 513 (Anonymous, 1965) and RRIM 600 (Anonymous, 1980).

Rate of bark renewal was another character in which the clones under evaluation varied. When renewed bark of RRII 104 attained a thickness of 9.61 mm, that of PB 206 had attained only 7.65 mm. Though none of the clones was found to be significantly superior, RRIM 628 (7.90 mm) and PB 206 (7.65 mm) were significantly inferior to the control. Poor bark renewal of RRIM 628 has been reported earlier (Anonymous, 1983).

All clones were found to be susceptible to abnormal leaf fall disease caused by *Phytophthora* spp. While four clones showed comparatively less incidence four others were found to be more severely affected by this disease. High susceptibility of clones like RRIM 600 to this malady observed in the trial has been reported earlier also (Anonymous, 1980). Powdery mildew caused by *Oidium* was also found infecting all clones at varying degrees of intensity. The severity of the incidence was moderate in RRIM 600, which confirm the reports from Malaysia (Anonymous, 1983).

Detailed observations on secondary characters are given in Table II. Incidence of pink disease was noticed

Table II. *Secondary characters of clones*

Clone	Wind damage percentage incidence	Pink disease percentage incidence	Brown bast incidence %	Bark rot percentage incidence	Powdery mildew incidence	Abnormal leaf fall incidence
RRII 5	Nil	Nil	3.6	3.6	Severe	Severe
RRII 104	3.8	Nil	3.8	3.8	Severe	Severe
RRII 116	4.5	Nil	Nil	Nil	Very severe	Moderate
RRIM 513	Nil	Nil	Nil	Nil	Severe	Moderate
PRIM 519	3.8	Nil	Nil	Nil	Severe	Moderate
RRIM 600	7.1	10.7	10.7	Nil	Moderate	Severe
RRIM 628	9.9	13.3	13.3	10.0	Moderate	Moderate
PB 206	8.0	4.0	Nil	Nil	Very severe	Severe
PB 213	3.2	3.2	3.2	Nil	Moderate	Moderate
PB 217	3.2	3.2	Nil	Nil	Very severe	Severe
PB 5/76	Nil	7.7	3.8	Nil	Severe	Severe
Tjir 1	4.5	Nil	Nil	Nil	Very severe	Severe

only in the case of six clones three of which showed high susceptibility and the remaining low susceptibility. RRIM 600 and RRIM 628 which showed high susceptibility in the trial are reported to be highly susceptible to this disease in Malaysia also (Anonymous, 1980). Six clones showed proneness to Brownbast at varying degrees. While RRIM 628 (13.3%) was the most susceptible to this disease, PB 213 (3.2%) was the least susceptible. High susceptibility of RRIM 628 is indicated in Malaysian reports also. However, RRIM 600 which is reported to be more resistant (Anonymous, 1980), does not show the same trend in India. Only three clones, RRIM 628, RRII 104, and RRII 5 were affected by bark rot.

Out of the 12 clones under observation nine clones were affected by wind. Incidence of wind damage was the highest in RRIM 628 (9.9%). All the major three types of wind damage, namely, trunk snap, branch snap, and uprooting were found affecting the trees. Trunk snap was the most common type of damage affecting a total of eight trees followed by branch snap and uprooting damaging four and one tree respectively in the trial. Incidence of trunk snap was maximum in the case of RRIM 600 (7.1%) and minimum in PB 213 (3.2%) out of the six clones affected. Four clones showed branch snap. Only PB 206 was damaged by uprooting, affecting four percent of the trees. Reports from Malaysia also show that RRIM 628 is highly susceptible to wind damage (Anonymous, 1980).

Results discussed above indicate that the general trend of performance of the imported clones in India is comparable to that in Malaysia the country of their origin. However, in certain specific characters some of the clones exhibited slight difference from their reported performance in Malaysia. In their early performance RRIM 628 and RRII 5 were found superior to other clones with regard to yield.

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