1232

Journal of Plantation Crops 26 (1): 83-86, June, 1998

A NOTE ON THE EARLY PERFORMANCE OF SOME PROMISING CLONES OF RUBBER *(HEVEA BRASILIENSIS)*

(Manuscript received: 05.05.97; revised: 08.10.97; accepted: 24.10.97)

Genetic improvement of rubber in India has led to tremendous increase in productivity from the low yielding seedlings of the 1940s to the high yielding clones of the present day. India ranks first among the rubber growing countries with a productivity of 1422 kg of dry rubber per hectare per year (Rubber Board, 1997). One of the major factors responsible for the high yield level realised, is the widespread use of the high yielding Indian clone RRII 105 as planting material.

At present, breeding efforts are directed towards evolving clones which out yield RRII 105. Ortet selection and hybridisation followed by clonal selection are the major methods adopted for genetic improvement of rubber. The present communication reports on the early performance of some newly evolved hybrids and ortet clones.

A small scale evaluation trial, which is the first stage of clonal selection in rubber, was laid out at the RRII experiment station at Kottayam, Kerala. The study included 15 clones of which nine were the test clones consisting of four hybrids and five ortet selections (Table 1). The rest comprised the parental clones and checks, RRII 105 and GT1. A randomised block design with three replications and four trees per plot was adopted. Planting was done on contours with a spacing of 6.7m X 3.4m.

The trees were subjected to test tapping following the Hammaker-Morris-Mann method (Tan and Subramaniam, 1976) at a height of 15 cm from the ground level, on ten alternate days in October-November, at the fifth and sixth years after planting. The test tap yield of dry rubber along with volume of latex, dry rubber content (DRC), and girth were recorded from the clones during both the years. Secondary attributes like wintering pattern and incidence of powdery mildew were also monitored by visual observation. The analysis of variance was done for a comparison among the fifteen clones with respect to the traits studied. Clone means were compared employing the Duncan's Multiple Range Test (Gomez and Gomez, 1984).

The performance of the fifteen clones studied are given in tables 1 to 3. At both the fifth and sixth years after planting, significant clonal variation was evident for test tap yield, girth and volume of latex while the clones were on par with respect to DRC. The results of pooled analysis (Table 2) also indicated the same.

Test tapping is a reliable method for prediction of mature yield as proven by earlier studies (Tan, 1987; Licy *et al.*, 1996). The technique is effectively used for shortening the selection cycle in an effort to speed up the release of newer clones.

At the fifth year after planting (Table 1), seven clones gave a higher test tap yield than the check, RRII 105. Notable among them are clones 33/8 and 32/6 which gave yields of 222.58 g $tree^{-1}$ $tappings^{-10}$ (71.11% higher than that of RRII 105) and 186.81 g $tree^{-1}$ $tappings^{-10}$ (42.33% higher than that of RRII 105) respectively. These two clones also gave a high volume of latex. Clones 31, Fx 516, 33/8 and 35 were superior in terms of girth.

Table 1. *Performance of clones at the 5th and 6th year after planting*

Clone	Source	Year	Test tap yield (g tree^{-1} tappings^{-10})	Volume of latex (ml tree^{-1} tap^{-1})	DRC (%)	Girth (cm)
RRII 105	Check	5th	131.25 BCD	51.00 ABCD	23.82 AB	35.96 ABC
		6th	207.33 B	46..03 CDE	31.68 A	42.98 ABCD
RRII 102	Parent	5th	116.25 CD	42.67 CD	24.81 AB	31.84 CDE
		6th	172.50 BC	36.58 E	29.07 AB	38.31 DEF
GT1	Check	5th	178.33 ABC	71.94 AB	25.99 A	30.07 DE
		6th	240.28 AB	77.81 B	27.64 AB	35.20 F
Tjir1	Parent	5th	131.67 BCD	41.56 CD	26.28 A	32.34 CDE
		6th	208.06 B	68.89 BCD	25.75 AB	41.82 BCDE
Fx 516	Parent	5th	137.78 BCD	46.50 BCD	21.38 AB	38.64 A
		6th	176.11 BC	54.94 BCDE	25.75 AB	47.48 A
Ch 31	Parent	5th	97.50 D	47.25 BCD	19.76 AB	28.71 E
		6th	143.75 BC	71.17 BC	28.06 AB	35.40 F
31	Hybrid: Tjir1 x RRII 102	5th	135.42 BCD	56.75 ABCD	24.09 AB	39.55 A
		6th	204.58 B	47.33 CDE	22.13 B	47.14 AB
35	Tjir1 x RRII 102	5th	136.94 BCD	51.78 ABCD	23.33 AB	37.92 AB
		6th	179.03 BC	43.83 DE	28.94 AB	47.48 A
55	Tjir1 x G1-1	5th	75.83 D	32.75 D	26.41 A	35.50 ABC
		6th	102.08 C	29.92 E	29.22 AB	43.75 ABC
99	Fx 516 x Ch 31	5th	124.72 BCD	41.53 CD	28.59 A	35.52 ABC
		6th	167.22 BC	44.86 CDE	30.72 A	41.88 BCDE
32/6	Ortet selection from	5th	186.81 AB	67.75 ABC	20.88 AB	35.81 ABC
	Tjir1 seedling	6th	311.94 A	80.33 B	29.33 AB	43.78 ABC
33/8	"	5th	224.58 A	74.67 A	20.55 AB	37.92 AB
		6th	322.36 A	119.64 A	27.59 AB	46.71 AB
34/3	"	5th	116.67 CD	50.17 ABCD	16.61 B	31.67 CDE
		6th	153.75 BC	54.17 BCDE	25.67 AB	36.83 EF
38/1	"	5th	111.61 CD	42.79 CD	27.49 A	33.43 BCD
		6th	181.13 BC	48.56 CDE	25.75 AB	40.79 CDE
39/1	"	5th	96.25 D	35.08 D	28.82 A	35.25 ABC
		6th	142.08 BC	47.00 CDE	27.32 AB	41.96 BCDE
General		5th	133.44	50.28	23.92	34.67
Mean		6th	194.15	58.07	27.64	41.91
Variance		5th	3.46 **	2.44 *	NS	5.30 * *
Ratio		6th	4.11*	7.86*	NS	6.81*

* Significant at P = 0.05 * * Significant at P = 0.01

Values followed by the same letter do not differ significantly according to Duncan's Multiple Range Test.

The same clones, 33/8 and 32/6 gave the highest test tap yield and volume of latex at the sixth year after planting (Table 1). The check, RRII 105 yielded 207.33 g tree^{-1} tappings^{-10} while clone 33/8 gave 322.36 g tree^{-1} tappings^{-10} (55.48% higher) and clone 32/6 gave 311.94 g tree^{-1} tappings^{-10} (50.46% higher). In terms of girth at the sixth year, clones Fx 516, 35, 31 and 33/8 were superior. Pooled analysis showed that clones 33/8 and

Table 2. *Yield components pooled over the two years of study*

Clone	Test tap yield (g tree^{-1} tappings^{-10})	Volume of latex (ml tree^{-1} tap^{-1})	D.R.C. (%)
RRII 105	169.30 BC	48 .53 CD	27.73 AB
RRII 102	144.37 BC	39.60 CD	26.93 AB
GT-1	209.33 AB	74.87 B	26.83 AB
Tjir-1	169.87 BC	55.23 BCD	26.03 AB
FX 516	156.97 BC	50.73 BCD	23.57 AB
Ch 31	120.63 C	59.20 BC	23.93 AB
31	170.03 BC	52.03 BCD	23.10 AB
35	158.00 BC	47.83 CD	26.13 AB
55	88.97 C	31.37 D	27.83 AB
99	145.97 BC	43.20 CD	29.67 A
32/6	249.40 A	74.03 B	25.10 AB
33/8	273.50 A	97.17 A	24.10 AB
34/3	135.23 BC	52.20 BCD	21.13 B
38/1	146.37 BC	45.67 CD	26.63 AB
39/1	119.20 C	41.07 CD	28.10 A
General mean	163.81	54.18	25.79
Variance ratio	4.08*	4.92*	NS

* Significant at P=0.05

Values followed by the same letter do not differ significantly according to Duncan's Multiple Range Test.

Table 3. *Secondary attributes of clones*

Clone	Wintering	Incidence of Powdery mildew
RRII 105	Medium	Moderate
RRII 102	Medium	High
GT1	Medium	High
Tjir1	Medium	High
Fx 516	Late	Low
Ch 31	Medium	Moderate
31	Medium	High
35	Late	High
55	Medium	High
99	Medium	Moderate
32/6	Medium	High
33/8	Medium	High
34/3	Medium	High
38/1	Early	High
39/1	Medium	High

Wintering Early : >50% of leaves shed by January 2nd week
Medium: >50% of leaves shed between the 2nd and last week of January
Late: >50% of leaves shed after February 1st week

Powdery mildew (recorded during February) Low : <25% of the leaves affected
Moderate: 25-50% of leaves affected
High : >50% of leaves affected

32/6 gave 65.5% and 47.31% higher yield respectively in comparison to RRII 105.

Secondary attributes like wintering and incidence of powdery mildew are shown in Table 3. The late wintering clone Fx 516 showed low incidence of powdery mildew and its progeny, clone 99 had only moderate incidence of the disease. However, the two promising yielders, clone 33/8 and 32/6 showed a high incidence of powdery mildew.

The present results indicate the superiority of clones 33/8 and 32/6 evolved by ortet selection, as early high yielders. Clone 33/8 has good yield combined with vigour. These two clones hold promise for further large scale evaluation to monitor their merits over RRII 105.

REFERENCES

GOMEZ, K. A. and GOMEZ, A. A. 1984. Statististical Procedures for Agricultural Research. 2nd Edn. John Wiley & Sons, New York.

LICY, J., PANIKAR, A.O.N., PREMAKUMARI, D., SARASWATHY AMMA, C. K., NAZEER, M. A. and SETHURAJ, M. R. 1996. Genetic parameters and heterosis in rubber *(Hevea brasiliensis)* IV. Early versus mature performance of hybrid clones. XIIth Plantation Crops Symposium, Kottayam, Kerala. 27-29 November 1996.

RUBBER BOARD, 1997. Rubber and its cultivation. Published by the Rubber Board, Kottayam, Kerala. pp.83.

TAN, H. 1987. Current status of *Hevea* breeding. In : Improvement of vegetatively propagated plants (EDS.) Campbell A. I., Abbot A. J., Atkin R. K., Academic Press, London. pp.416.

TAN, H. and SUBRAMANIAM, S. 1976. A five parental diallel cross analysis for certain characters of young *Hevea* seedlings. Proc. Int. Rubb. Conference, Kuala Lumpur, 2: 13-26.

Rubber Research Institute of India
Kottayam-686 009, Kerala, India.

KAVITHA K. MYDIN
C. K. SARASWATHY AMMA
M. A. NAZEER