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PERFORMANCE OF FEW *HEVEA* CLONES FROM RRII 100 SERIES IN LARGE SCALE TRIAL

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ABSTRACT

The Rubber Research Institute of India has evolved clones with high production potential through hybridization and selection. Among 22 clones preliminarily selected from the 1954 hand pollination series, seven clones were evaluated in a large scale trial. In the present communication, the yield performance and important characters of these clones over a period of ten years have been reported. Among the clones evaluated, RRII 105 showed highest yield. However, girth increment on tapping was low for this clone.

INTRODUCTION

At the Rubber Research Institute of India, breeding and tree improvement in *Hevea* was initiated during 1954. The methodology involved the hybridization between a number of popular clones then available in India, followed by selection from the progenies and testing the selected materials (Nair, and Panikkar, 1966; Nair and George, 1968; Nair and Jacob, 1968; Nair, George and Saraswathy Amma, 1975). Four hundred and thirty nine clones belonging to 14 different families were established from the 1954 batch of progenies. Based on yield and other secondary characters during the initial years of tapping, 22 clones were selected from the population (Nair and George, 1968). Seven clones from these were multiplied and a large scale trial was laid out in 1966 at the Central Experiment Station of RRII (Anonymous, 1980). The performance of these clones, belonging to the RRII 100 series, over a period of ten years are evaluated in this paper.

MATERIALS AND METHODS

In the trial, seven selections of RRII clones with Tjir 1 as control were planted in completely randomised design with 40 replications (single tree-single plot). The clones were RRII 101, 102, 105, 106, 109, 110, and RRII 111, the origins of which are given in Table I. The trees were opened for tapping in 1973 when they attained the standard girth. At the time of opening, 34 to 38 trees in each clone had attained tappability, except for RRII 101 where in only 27 trees had reached tappability. Yield recording was done by cup coagulation on two normal tapping days in a month beginning from the first year of exploitation of trees. The tapping system followed was s/2 d/2. The

trees were given tapping rest during February till 1980. Since then no tapping rest was given. The trees were rain guarded during the rainy months. Tree girth at 125 cm from bud union was recorded annually. Data on wind damage, incidence of brown bast etc. were recorded periodically. Data on the mean annual yield, girth at opening and at ten years after tapping and girth increment over 10 years were statistically analysed.

RESULTS AND DISCUSSION

Yield

Table I shows the mean yield per tap for the first five years, sixth to tenth year and the average for ten years. Analyses of data showed that the differences among clones are highly significant. Considering the yield figures for the first five years, RRII 105 showed highest yield of 65.57 g/t/t. The next highest yielder was RRII 111 with 40.16g. This was followed by RRII 110 (36.31g). The control clone Tjir 1 yielded on an average 30.93g. All the other clones were inferior to the control in yield. However, the yield for RRII 109 was near to that of control. (30.10g). The lowest yielders were RRII 101 and RRII 106 with 17.06g and 17.73g respectively.

Yield data for next five years also showed that RRII 105 was superior to all other clones with a mean of 68.19 g. The next better clones were RRII 109 (49.79 g) and RRII 110 (39.74 g) in that order. The clone RRII 111 yielded 38.67 g which was less than the previous five years mean yield. The control yielded 31.12 g. The general mean was 37.77 g and RRII 101 and RRII 106 continued to be the lowest yielders.

The mean yield over ten years of exploitation showed RRII 105 to be the highest yielder (66.71 g). RRII 109 and RRII 111 did not show much difference in yield between themselves, the yield being 39.93 g and 39.53 g respectively. RRII 110 showed a mean yield of 37.95 g. The control clone Tjir 1 yielded only 31.08 g.

As is evident from Table I, among all the clones evaluated, RRII 105 maintained its superiority for yield for a period of ten years. The present result is in conformity with the findings of George, Nair and Panikkar (1980).

Girth

The differences among clones are highly significant. Table II depicts girth at opening, girth at tenth year of tapping, and girth increment over ten years. The girth at opening was highest for RRII 111 (68.88 cm) followed by RRII 110 (63.59 cm) while that for the control Tjir 1, it was 59.64 cm. RRII 105, which was the highest yielder, showed a girth of 59.47 cm at opening. The general mean was 58.95 cm. There was not much difference in girth between RRII 106 (56.41 cm) and RRII 109 (57.70 cm). The lowest girth was recorded for RRII 102 (49.26 cm).

Girth increment over ten years of tapping was highest for RRII 109 (35.28 cm) followed by RRII 111 (31.32 cm). The control clone showed an increment of 22.39 cm. However for the highest yielder RRII 105, girth increment was only 15.07 cm which was the lowest among all the clones, and below the

Table I. *Mean yield of RRII clones in trial*

Clone	Parentage	Yield in gram/tree/tap ± S. E.		
		Yield for the first 5 years (1973–1977)	Yield for 6th to 10th years (1978–1982)	Yield over 10 years (1973–1982)
RRII 101	Tjir 1 × AVROS 255	17.06 ± 1.81	16.54 ± 2.87	16.85 ± 2.13
RRII 102	Tjir 1 × Gl 1	23.81 ± 1.74	25.70 ± 2.77	24.89 ± 2.06
RRII 105	Tjir 1 × Gl 1	65.57 ± 1.57	68.19 ± 2.49	66.71 ± 1.85
RRII 106	Tjir 1 × Mil 3/2	17.73 ± 1.69	23.92 ± 2.68	20.92 ± 1.99
RRII 109	Tjir 1 × Mil 3/2	30.10 ± 1.69	49.79 ± 2.68	39.93 ± 1.99
RRII 110	Tjir 1 × Hil 28	36.31 ± 1.54	39.75 ± 2.45	37.95 ± 1.82
RRII 111	Tjir 1 × Hil 28	40.16 ± 1.59	38.67 ± 2.52	39.53 ± 1.87
Tjir 1	Control	30.93 ± 1.63	31.12 ± 2.60	31.08 ± 1.93
General mean		33.84	37.77	35.82

Table I a. *C. D. Values at 5% level for yield of RRII clones for the first 5 years (1973–1977).*

Clone	RRII 101	RRII 102	RRII 105	RRII 106	RRII 109	RRII 110	RRII 111	Tjir 1
RRII 101		4.92	4.69	4.84	4.84	4.66	4.71	4.78
RRII 102			4.59	4.75	4.75	4.56	4.62	4.68
RRII 105				4.51	4.51	4.31	4.37	4.44
RRII 106					4.67	4.48	4.54	4.60
RKII 109						4.48	4.45	4.60
RRII 110							4.34	4.41
RRII 111								4.47
Tjir 1								

Table I. b. *C. D. Values at 5% level for yield of RRII clones for 6th to 10th year (1978–1982)*

Clone	RRII 101	RRII 102	RRII 105	RRII 106	RRII 109	RRII 110	RRII 111	Tjir 1
RRII 101		7.83	7.45	7.70	7.70	7.41	7.50	7.59
RRII 102			7.30	7.56	7.56	7.26	7.35	7.45
RRII 105				7.17	7.17	6.85	6.95	7.05
RRII 106					7.43	7.13	7.22	7.32
RRII 109						7.13	7.22	7.32
RRII 110							6.90	7.01
RRII 111								7.01
TJir 1								

Table I c. *C. D. Values at 5% level for yield of RRII clones over 10 years (1973–1982)*

Clone	RRII 101	RRII 102	RRII 105	RRII 106	RRII 109	RRII 110	RRII 111	Tjir 1
RRII 101		5.80	5.52	5.71	5.71	5.49	5.56	5.63
RRII 102			5.41	5.61	5.61	5.38	5.45	5.52
RRII 105				5.32	5.32	5.08	5.15	5.23
RRII 106					5.51	5.28	5.35	5.43
RRII 109						5.28	5.35	5.43
RRII 110							5.12	5.20
RRII 111								5.26
Tjir 1								

Table II. *Mean girth of RRII clones in trial*

Clone	Mean girth in cm ± S. E.		
	Girth at opening (1973)	Girth at 10th year of tapping (1982)	Girth increment over 10 years of tapping
RRII 101	52.69 ± 0.95	68.67 ± 2.19	15.98 ± 1.66
RRII 102	49.26 ± 0.92	65.69 ± 2.12	16.43 ± 1.60
RRII 105	59.47 ± 0.83	74.54 ± 1.90	15.07 ± 1.43
RRII 106	56.41 ± 0.88	74.98 ± 2.02	18.58 ± 1.52
RRII 109	57.70 ± 0.91	92.98 ± 2.08	35.28 ± 1.57
RRII 110	63.59 ± 0.82	90.80 ± 1.87	27.20 ± 1.41
RRII 111	68.38 ± 0.83	100.91 ± 1.90	31.32 ± 1.43
Tjir 1	59.64 ± 0.88	82.03 ± 2.22	22.39 ± 1.52
General Mean	58.95	81.94	22.99

Table II a. *C. D. Values at 5% level for girth of RRII clones at opening (1973)*

Clone	RRII 101	RRII 102	RRII 105	RRII 106	RRII 109	RRII 110	RRII 111	Tjir 1
RRII 101		2.60	2.47	2.54	2.58	2.46	2.47	2.54
RRII 102			2.43	2.49	2.53	2.41	2.43	2.49
RRII 105				2.36	2.40	2.28	2.29	2.36
RRII 106					2.47	2.35	2.36	2.43
RRII 109						2.39	2.40	2.47
RRII 110							2.28	2.35
RRII 111								2.36
Tjir 1								

Table II b. *C. D. Values at 5% level for girth of RRII clones at 10th year of tapping (1982)*

Clone	RRII 101	RRII 102	RRII 105	RRII 106	RRII 109	RRII 110	RRII 111	Tjir 1
RRII 101		5.98	5.69	5.84	5.93	5.66	5.69	5.84
RRII 102			5.58	5.73	5.82	5.54	5.58	5.73
RRII 105				5.43	5.52	5.23	5.27	5.43
RRII 106					5.68	5.39	5.43	5.59
RRII 109						5.49	5.52	5.68
RRII 110							5.23	5.39
RRII 111								5.43
Tjir 1								

Table II c. *C. D. Values at 5% level for girth increment over 10 years of tapping*

Clone	RRII 101	RRII 102	RRII 105	RRII 106	RRII 109	RRII 110	RRII 111	Tjir 1
RRII 101		4.51	4.29	4.40	4.47	4.27	4.29	4.40
RRII 102			4.21	4.32	4.39	4.18	4.21	4.32
RRII 105				4.10	4.17	3.95	3.97	4.10
RRII 106					4.28	4.07	4.10	4.21
RRII 109						4.14	4.17	4.28
RRII 110							3.95	4.07
RRII 111								4.10
Tjir 1								

general mean of 22.99 cm. Low yielding clones RRII 101, 102 and RRII 106 did not show much increase in girth compared to that of the control. This shows that high yield need not necessarily be associated with high girth increment.

Wind damage

The incidence of wind damage and brown bast for various clones at fifth and tenth years of tapping is recorded in Table III. Up to fifth year, only three clones, RRII 105, 106 and RRII 109 were affected by wind. The percentage of trees affected varied from 2.86 to 5.71. At tenth year, RRII 106 showed 8.82 per cent loss, followed by Tjir 1 control 5.88% and RRII 105 (5.71%). None of the trees from RRII 102 was affected by wind.

Brown bast

At fifth year of tapping, all clones except RRII 101 and RRII 102 were affected by a low percentage of brown bast (Table III). RRII 111 showed 10.81 per cent incidence followed by

Table III. *Incidence of wind damage and brown bast*

Clone	Wind damage (%)		Brown bast (%)	
	5th year	10th year	5th year	10th year
RRII 101	0	3.70	0	11.11
RRII 102	0	0	0	3.45
RRII 105	5.71	5.71	2.86	8.57
RRII 106	2.94	8.82	5.88	8.82
RRII 109	2.86	2.86	2.86	8.57
RRII 110	0	2.63	7.89	5.26
RRII 111	0	5.41	10.81	5.41
Tjir 1	0	5.88	2.94	8.82

RRII 110 (7.89%) RRII 106 (5.88%). The control clone was also susceptible to brown bast (2.94%). However, at the 10th year of tapping all clones exhibited brown bast in varying degrees and some of the earlier affected trees showed recovery.

Among various clones evaluated, RRII 105 is the most popular clone, which is being widely cultivated in the state. From the foregoing results, it is clear that RRII 105 maintains high yield in small and large scale trials.

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REFERENCES

ANONYMOUS, 1980. *Rubber Research Institute of India Guide to Central Experiment Station.* pp: 4.

GEORGE, P.J., NAIR.,V. K. B. and PANIKKAR, A. O. N. 1980. Yield and secondary characters of the clone RRII 105 in trial plantations. Paper presented at Int. Natl. Rubber Conf. India.

NAIR, V. K. B. and PANIKKAR, A. O. N. 1966. Progress of investigation on the improvement of rubber (*Hevea brasiliensis* Muell Arg.) in India. *Rubber Board Bull.* 8 : 201–210.

NAIR V. K. B. and GEORGE, P. J. 1968. The Indian Clones. RRII 100 series. *Rubber Board Bull.* 10 : 115–140.

NAIR, V. K. B. and JACOB, K. T. 1968. Certain aspects of *Hevea* breeding. *Rubber Board Bull.* 10: 23–28.

NAIR, V. K. B., GEORGE, P. J. and SARASWATHY AMMA, C. K. 1975. Breeding improved *Hevea* clones in India. *Proc. Int. Natl. Rubber Conf. Kuala Lumpur.* Vol. II. pp: 45–54.