Latex Timber Clones For Small Growers In India

Vinoth Thomas, J.Rajeswari Meenattoor and C.K.Saraswathyamma

Botany Division, Rubber Research Institute of India,

Kottayam 686 009, Kerala, India

Abstract

The increased awareness against deforestation, scarcity of timber from forest and cultivated land, high price of timber etc. have prompted a search for an alternative source for timber. Rubber cultivated over six lakh hectares in India is a potential source to be exploited in this regard. Unfortunately many of the high yielding rubber clones have low timber value. In India about 88% of the total area under rubber is in the small growers sector and the major share of this is planted with clone RRII 105. Though RRII 105 is a prolific yielder, high TPD incidence and the average bole volume are a matter of concern.

To identify latex- timber clones, a study has been initiated with five popular clones of *Hevea brasiliensis viz.*, RRII 105, RRII 203, RRII 208, RRIM 600 and GT 1 planted at five agro climatically different locations *viz.*, Chittar (Pathanamthitta Dist.), Kulathupuzha (Quilon Dist.), Ranny (Pathanamthitta Dist.),(Balussery (Calicut Dist.), and Mundakkayam (Kottayam Dist.) within the traditional rubber growing tract in Kerala. The trees on maturity were tapped following 1/2S d/2 system and the yield was recorded for a period of fifteen years.

RRII 105 exhibited the highest yield (kg/ha) with location wise variation, followed by RRII 208 and RRII 203. RRII 203 and RRII 208 possessed straight prominent trunk with high girth increment and the estimation of it's bole volume indicated higher values. The incidence of TPD in RRII 203 was lower than that of RRII 105. Even though RRII 203 and RRII 208 are found to be potential latex timber clones in terms of latex yield and timber yield, high incidence of diseases such as shoot rot, abnormal leaf fall, pink and tapping panel dryness makes RRII 208 unfit to be recommended to the growers as a latex timber clone. RRII 203 performed better with regard to yield of latex and timber and low incidence of diseases particularly TPD under 1/2S d/2 system which make it an ideal latex timber clone for Indian small rubber growers.

Key words: Bole volume, *Hevea brasiliensis,* Latex Timber Clones, Latex yield, RRII 203

Running title: Latex timber clones for small growers in India

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Introduction

Rubber plantation industry has come to age in India the beginning of which was made during 1902. About a million small growers account for 88% of the production and area under rubber in the country and they form the backbone of this industry. The crop is cultivated in an area of about 570 000 hectares in the diversified agroclimatic regions in the country with a total production of about 650 000 tonnes and an average productivity of 1592 kg/ha. India is now the third largest producer and also has the distinction of having the highest productivity. This spectacular achievement is a result of a host of factors the predominant one being the rapid strides made in the crop improvement and crop management.

Crop improvement in *Hevea* was initiated by the Rubber Research Institute of India in 1954 and the early emphasis was given mainly to evolve planting materials of high latex yield potential. This objective was achieved to a great extent by the 1970s with the release of the clone RRII 105 which is still the highest yielding clone in India. Currently the Rubber Board has clones in RRII 100, 200,300 and 400 series in its recommendation of planting materials in different categories along with introduced clones from other countries. With the changing priorities in an era of globalization at our doorstep it has become highly essential that the rubber plantation industry also equip itself with ways and means to ensure a sustainable and competitive farming system. As economic viability of holdings has become more relevant attempts have to be made to tap ancillary sources of income from the rubber plantations. In this context timber from rubber plantations assumes more importance since it is an assured source of additional income.

Even though latex is the main produce from rubber tree, timber was always available from the plantations. But as a result of the relatively high price for latex and lack of proper wood processing techniques, until recently timber from rubber plantations were used for low value products only. As a part of the attempts to broad base the income source from rubber plantation, it has become necessary that we utilize this huge source of timber from rubber plantations, which will add to the income of the grower substantially besides various benefits. Every year an approximate area of about 5000-6000 hectares come under replanting which makes available about 1.2 million cubic meters of timber from rubber plantations alone. Rubber wood has gained importance as a vital source of

raw material for wood industry followed by the availability of reliable methods of preservations and processing techniques. If the small growers are able to fetch an economic yield from latex along with a higher yield of wood from the trees, it will add to the total income available from the plantations. This has led to the reprioritization of crop improvement programmes where the concept of latex timber clones assumes greater importance. It is in this context that we have attempted the present study, which is an effort to identify clones, which could be categorized as latex timber clones and recommended to the small growers in India. Present study is an analysis of the possibility of identifying a clone as latex timber clone with the available data on latex and timber.

Materials and Methods

To identify latex timber clones from the existing clone evaluation experiments, a study has been initiated with five popular clones of *Hevea brasiliensis,* RRII 105, RRII 203, RRII 208,RRIM 600 and GT 1, planted at five different locations *viz.*, Chittar (Pathanamthitta Dist), Kulathupuzha (Quilon Dist.), Ranny (Pathanamthitta Dist), Balussery (Calicut Dist.) and Mundakkayam(Kottayam Dist.), in the traditional rubber growing region in Kerala. The trees were tapped on maturity adopting 1/2S d/2 system and the yield recorded for 15 years. Data on yield of latex and timber from these locations were utilized for the study. Also data available from various large scale and on farm evaluation trials were considered. Girth of the trunk at breast height (gbh) and its height up to where the trunk has 75 cm girth was measured from standing trees of 25 years age and bole volume was calculated using the formula of Sudhakara *et al.*, (2001).

Results and Discussion

Table 1 shows the mean values of yield for 10 and 15 years in different locations *viz.*, Chittar, Kulathupuzha, Ranny, Balussery and Mundakayam. RRII 105 exhibited the highest yield (kg/ha) over ten years with location wise variation ranging from 1646 to 2372 kg/ha followed by RRII 203 (1331-1399 Kg/ha). Mean yield for 15 years reveals that RRII 208 at Ranny recorded the highest yield folloed by RRII 105 and RRII 203. For all the clones under study, better yield was recorded from Ranny with respect to mean yield for 10 and 15 years. In general, all the clones showed a tendency in yield

increase with increase in age. RRII 203 and RRII 208 recorded same trend of better yield in all the locations. GT 1 was found to be low in yield in all the locations.

Bole volume of the clones from these locations is given in Table 2. In all the locations it is seen that RRII 203 is superior to RRII 105 in terms of timber yield. Maximum bole volume was recorded for RRII 208 (0.546 m^3/tree) at Ranny, where as in other locations its growth performance is not up to the mark, particularly at Balussery (0.225 m^3/tree). RRII 203 performed comparatively better in all the locations studied values ranging from 0.328 to 0.519 m^3/tree. Highest timber yield per tree was recorded from Koothattukulam estate (0.519 m^3) whereas RRII 105 recorded a value ranging from 0.244 m^3 to0.299 m^3 which shows there is not much variability in timber out put in different locations. The high bole volume of RRII 203 may be due to varying tree height and branching pattern in these locations even though the girth is found to be uniform, where as in RRII 105 it is of uniform pattern of girth, height and branching in all the locations.

In a large scale trial of 1973 planting at Ranny, RRII 203 reached tappable girth by the sixth year of planting and recorded an average yield of 55.14 g/tree/tap during the sixth year of tapping. This clone has shown moderately heavy and well-balanced branches and dense canopy (Saraswathyamma *et al.*,1990). In the same trial, RRII 203 recorded significant increase in vigour during the immaturity period in comparison to the other clones. High vigour of these clones was earlier reported by Saraswathyamma *et al.*, (1988). In a multi locational trial planted at four diverse agroclimatic regions in India *viz.*, Agarthala (Tripura), Nagrakatta (West Bengal), Bhubaneshwar (Orissa) and Kanyakumari (Tamil Nadu), this clone is reported to have exhibited good girthing in all the locations (Meenattoor *et al.*, 2000). RRII 203 was ranked among the high yielders based on mean yield over eight years in a study conducted in Tripura, a non traditional rubber growing region, where it is reported to have exhibited least depression in yield during the period from April to September when other clones show significant yield depression (Priyadarshan *et al.*,2000). In a preliminary survey conducted by Viswanathan *et al.*,(2003), it has been reported that the clones of RRII 200 series are top yielders in terms of utilizable wood volume and timber yield per tree. Both RRII 203 and RRII208 can be considered as potential latex timber clones. In the case of RRII 208, girth at

opening and girth increment on tapping are reported to be only average. However bark characteristics are also found to be only average and with regard to disease incidence, it shows above average incidence of shoot rot and occurrence of tapping panel dryness is high. Tolerance to powdery mildew, and abnormal leaf fall diseases is very low (Saraswathyamma et al, 2000). Considering these unsatisfactory secondary characteristics RRII 208 cannot be considered for categorisation as a latex timber clone even though its timber volume and yield are above average. But in the case of RRII 203 disease tolerance is better in all respects.

Currently RRII 203 is included in Category III of the planting recommendations of the Rubber Board. RRII 203 possesses high girth at the time of opening and has high girth increment on tapping. The trunk is tall straight and robust. Thickness of virgin and renewed bark is found to be above average. Number of latex vessel rows and bark thickness are found to be comparable with that of RRII 105 (Table 3). With regard to tolerance to diseases, RRII 203 showed moderate tolerance to pink, powdery mildew and abnormal leaf fall. It has also recorded average tolerance to wind and cold. Occurrence of tapping panel dryness is also low (Saraswathyamma *et al.,* 2000). The average DRC recorded by this clone also is high, ranging from 30-40 in a 26-year plantation at Ranny.

From the data available from the present study, it can be seen that in addition to the highest yielding clone RRII 105, two clones RRII 203 and RRII 208 are better clones with both above average yield and timber output. But due to the high incidence of diseases, especially Tapping Panel Dryness, RRII 208 is less popular among planters and hence with the existing data it cannot be categorized as a latex timber clone. However in view of the latex and timber yield and secondary attributes RRII 203 can be recommended as a latex timber clone.

Conclusion

Taking into consideration the available data from large-scale trials, on farm evaluation trials in the estate sector and economic surveys, it is conclusively found that the clone RRII 203 is a clone, which can be recommended as latex timber clone to the rubber growers. The present study is a compilation of the available information on RRII 203 and a preliminary step to include this as a latex timber clone. This clone as a whole is

performing well in terms of vigour and above average yield both in the traditional rubber-growing tract as well as in the non-traditional rubber growing regions. Efforts are under way at the RRII to identify more clones fit to be categorized as latex timber clones from the existing popular clones and also a screening of the hybrid/ ortets available under evaluation is on for potential latex timber clones.

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Table.1. Latex yield of clones from different locations

Location	Mean yield (kg/ha) (310 trees)				
	RRII 105	RRII 203	RRII 208	RRIM 600	GT 1
Chittar					
10 Years	2372	1944	1893	1710	1399
15 Years	2560	1987	1978	1773	1726
Kulathupuzha					
10 Years	1646	1500	-	-	1394
15 Years	1792	1731	-	-	1595
Ranny **					
10 Years	2633	2454	2480	2229	1711
15 Years	2626	2578	2673	2341*	1799
Balussery					
10 Years	1777	-	1172	1428	-
Mundakkayam					
5 Years	1733	1837	1715	1120	1331

* Mean of 13 years
** Large scale trial

2142·38 2004·43 1985·17 1766·83 1565
6·91 6·47 6·40 5·70 5·05

Table.2. Bole volume of clones from different locations

Clone	Bole volume (m^3/tree)			
	Chittar	Kulathupuzha	Ranny	Balussery
RRII 105	0.272	0.244	0.299	0.247
RRII 203	0.519	0.328	0.429	-
RRII 208	0.470	0.311	0.546	0.225
RRIM 600	0.242	0.256	0.321	0.237
GT 1	0.318	0.246	-	0.330

Table 3. Bark characters of RRII 105, RRII 203 and RRII 208 at Ranny

Clone	Bark characters			
	Virgin bark		Renewed bark	
	Bark thickness	Latex vessel rows	Bark thickness	Latex vessel rows
RRII 105	1.18	42.00	0.88	33.60
RRII 203	1.30	38.67	0.84	28.40
RRII 208	1.15	40.00	0.74	23.20