

ANALYSIS OF CLONAL COMPOSITION IN RUBBER PLANTATIONS

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Nearly 44% of the total rubber plantations in Sri Lanka falls into the category of large estates. These are basically under the management of private companies. Even the ownership of these estates is now being handed over to the companies and hence they will function as completely private estates. The smallholder sector too, which accounts for about 33% of the rubber extent is owned and managed by the private sector. The proper selection of clones plays a vital role not only in the determination of future rubber yields but also in minimizing the risk involved in this type of long-term investment like rubber cultivation. This paper investigates the clonal composition in rubber plantations with reference to both estate and smallholder sectors.

Historical review

During the period of 1986, there were several good high yielding clones recommended by the Rubber Research Institute of Sri Lanka (RRISL) namely; RRIC 100, 102, 121 and 103 for large scale plantations. In 1986, when the *Corynespora* leaf disease affected to the clone RRIC 103, nearly 90% of the rubber plantation in Sri Lanka was covered with imported traditional clone, PB 86. This clone was imported from Malaysia several decades ago and its potential maximum yield was only about 1200 kg/ha, although it was resistant to certain diseases. This was one of the major reasons as to why the average productivity of rubber lands in Sri Lanka was low as 600-650 kg/ha. With the wide spread of *Corynespora* leaf disease in 1986, badly affecting the newly introduced clone RRIC 103, a special task force was formed by the Ministry to combat the situation. This task force who studied the disease situation carefully in collaboration with Plant Pathologists of both local and international research institutes arrived at certain decisions, such as; (a) To completely eradicate the sensitive clone RRIC 103. (b) A relief payment to be paid to the owners of the affected rubber lands (out of a special grant given by the World Bank) and (c) To plant a basket of clones consisting of at least 3-4 clones on equal ratio, instead of having a monoclonal plantation. The latter was a jointly arrived decision with other

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rubber producing countries. This is due to the fact that if by any chance a particular pathogen affecting a single clone is mutated, then the whole plantation in that particular country will be devastated. However, if there are 3-4 clones planted in equal proportions, even if one clone is affected by a certain specific pathogen, the balance plantation comprising of other clones will be left unaffected.

The smallholder sector

A policy decision was taken in late 1980s at the ministry level to plant RRIC 100, 102, and 121 clones in equal proportion in the smallholder sector. At the normal rate of replanting *i.e.* 3-4% of the total extent annually, it was believed that by the turn of the century, the percentage of low yielding clone PB 86 will be reduced to 40% and this would increase the productivity of smallholdings. The efforts taken by the RRISL and the Rubber Development Department (RDD) in this regard was successful. By the end of 1995, the PB 86 population in the country was reduced to a 60%. Yet, the balance was planted mainly with RRIC 100, and a small percentage of RRIC 121.

In 1995, another decision was taken to discourage smallholders to plant the clone RRIC 100, the population of which was nearly 60% of the immature planting, and instead to issue them with, RRIC 102 clone to bring the balance between clones to the expected level with in the next 3-5 years. The clone RRIC 102 is also a very good latex yielder although the latex of the clone is slightly yellowish in colour. This yellowish latex, when blended with latex of other clones, there is absolutely no difficulty to produce high quality latex crepe and sole crepe No. 1X and No. 1 grades, respectively.

A further, policy decision was taken not to issue the low yielding PB 86 clone for planting in smallholding or in estates after 1994. Another reason to band PB 86 was its susceptibility to diseases such as *Corynespora* and *Cilyndro Claidium*. It is therefore clear that the efforts taken by the RRISL to control the clone population in smallholder sector at desired levels has paid rich dividends.

The Estate sector

In addition to clones RRIC 100, 102 and 121, the clones PB 28/59 and PB 217 are also recommended under "group 1", to plant in large scale in the estate sector (together with "group 2" and "group 3" clones in limited extents). Hence, in a properly managed estate, it is expected to have 20-25% of extent in each of the above five clones depending on the climatic conditions. The RRISL appreciate the point that there is a need to increase the number of clones in "group 1", recommended for large scale planting. However, according to the international agreement followed in all

natural rubber producing countries it is not possible to promote clones from lower groups to "group 1" without having commercial scale field results for atleast 15 years. Even the proven high yielding clones in other countries have to be subjected to the same long-term trial process as they may not perform in the same manner under local conditions.

The only limitation in the case of PB 28/59 and PB 217 is that, they are susceptible to leaf diseases under high humidity conditions and hence not suitable to plant them in estates receiving an annual rainfall of over 3750 mm. But in slightly drier regions like Kurunegala, Matale, Monaragala, and some part of Kegalle (bordering Kurunegala) where the annual rainfall is bellow 3750 mm., these two clones have performed extremely well giving yields as high as or very close to the yields produced by clone RRIC 100. Further, clones PB 28/59 and PB 217 are tapped once in every three days (S_2d_3) and hence there is tremendous saving of tapper requirement when these two are planted in addition to the other recommended clones.

From the yield figures reported from commercial estates, the clone PB 28/59 has given extremely attractive yields as high as 1800-2000 Kg/ha/year. However, according to the available statistics (Table 1) it is evident that the estate sector does not contains a proper mixture of high yielding clones which is not only important to obtain high yields, but, even more important is to protect the rubber plantation against the potential danger of any disease causing pathogen affecting a particular clone planted in very high proportions. A situation of this nature could be detrimental to the rubber industry in the long-run.

Table 1. *Distribution of rubber extent in estate sector by clone type*

Clone	Immature Extent		Mature Extent		Total Extent	
	ha	%	ha	%	ha	%
RRIC 100	4268	55	8128	23	12396	29
RRIC 102	182	2	391	1	573	1
RRIC 121	1777	23	1388	4	3165	7
RRIC 110	75	1	583	2	613	1
PB 86	144	2	17585	50	17729	41
Others	1266	17	7382	20	8648	20
Total	7712	100	35412	100	43124	100

According to Table 1, it is evident that RRIC 100, and 121, account for 78% of the immature extent of which RRIC 100 consist of approximately 80%. The high

yielding clones recommended for slightly drier climatic conditions namely PB 28/59 and PB 217 have not been planted (except for few blocks) in the estate sector. Even the proven high yielding clone RRIC 102 has been ignored possibly due to slight yellowish colour of its latex. This is a serious situation where immediate action has to be taken by the relevant authorities to rectify the situation. In this regard, both RRISL and the estate sector should work together to overcome this problem and arrangements should be made in the next 3-5 years to plant only RRIC 102 in the high rainfall areas and both PB 28/59 and PB 217 in the relatively drier areas.

The planters should not be reluctant to plant RRIC 102. Although the colour of latex of this clone is slightly yellowish, it is suitable for making any top quality grade of crepe rubber by the normal process without removing of excess yellow fraction. This has been proved beyond doubts by RRISL scientists by conducting experiments in estates planted with RRIC 102. In fact, these estates have been producing top quality latex crepe without any discolouration.

The clone RR11 105, planted in most parts of India can be considered as a clone almost identical to RRIC 102. This particular clone has been planted in 90% of the rubber extent of India, without following international recommendation of planting several clones in equal proportions. The colour of latex of this clone RR11 105 is even more yellowish than the latex of RRIC 102. Yet, the Indian's produce good quality latex crepe in small amounts without any difficulty using latex of nearly 100% of this clone RR11 105. The No. 1X grade for latex crepe can easily be obtained even by using 100% latex from clone RRIC 102, if 10-15% yellow fraction is removed and recommended amount of bleaching agent is added. It is important to add the correct dosage of Sodium bisulphite as early as the latex is arrived in the factory to maintain the pure white colour of the latex crepe or sole crepe being produced. The slight grayish brown discolouration is caused by the action of the enzyme due to non or incorrect use of Sodium bisulphite and this should not be mistaken as the poor quality of latex of any particular clone.

The clone RR11 105 planted in India under conditions very much similar to Sri Lanka is aerial sprayed with fungicides two times a year to control leaf diseases. Even under these conditions this particular clone is now reported to be affected by *Corynespora* leaf disease. The Indian authorities are very concerned about this very serious situation. Hence, under Sri Lankan conditions, without any kind of foliar spraying being done for the field plants, a high risk is involved in plantations where this clone RR11 105 has already been planted. But, it should be kept in mind that thanks to the superior quality clones bred and introduced by the RRISL, the rubber plantation in Sri Lanka is so far being not subjected to any aerial spraying which is a costly operation causing an environmental damage as well. The five clones recommended by RRISL for large scale planting are resistant to most of the fungal attacks. Therefore, the estate sector in collaboration with the RRISL should workout

an action plan to ensure that the recommended clones are planted in all estates in correct proportions.

CONCLUSION

The bi-clonal structure prevailing in immature rubber plantations is frightening and need immediate intervention. If a pathogen causing a disease specifically to RRIC 100 is mutated, nearly 50% of the immature rubber plantation in the estate sector will be devastated within a short period of time. Hence, management companies who are now the owners of the plantations should take immediate remedial measures with the assistance of the RRISL to rectify this situation by taking appropriate steps to plant the other three recommended clones viz. RRIC 102, PB 28/59 and PB 217 as well. Assuming a 3.5% replanting rate per year the existing clone structure can be corrected and brought to a satisfactory safe level in about 10 years time.