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IMPROVED CLONES FOR MORE PRODUCTIVITY

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The yield of a crop can be increased by improving the environment in which the crop is grown. The factors which influence the crop's environment mainly include include inputs such as water, fertilizer and the control of weeds, pests and diseases. Adoption of any good agronomic practice such as mulching, ground cover management, correct tapping procedures etc. further improves the plant's environment and thereby contributes for increased crop production. The other very important factor which contributes for a high yield of a crop is the crop variety or in the case of rubber, the clone. The clone indicates the plant's genetic constitution and determines it's inherent ability to produce within the environment provided. In other words, from the same effort of management a higher performance is always obtained from a genetically improved clone than from a genetically inferior clone. It is therefore clearly seen that the productivity of the rubber lands could be maximised only by optimum utilization of these two factors *i.e.*; provision of a better environment for crop growth and the use of genetically improved clones.

Through decades of plant breeding effort RRISL has introduced several rubber clones inherited with improved vigour and yield. Among them is the most popular RRIC 100 which is even recognised as a good challenger to the best clones ever developed by other rubber growing countries. RRIC 100 is presently recommended for large scale planting in Sri Lanka along with four other clones viz. RRIC 102, RRIC 121, PB 28/59 and PB 217. The other two RRIC clones recommended in this category *i.e.* RRIC 121 and especially, RRIC 102 have not yet drawn the due attention from the growers even though the performance of these clones are equal or in most cases superior to RRIC 100. Both these clones show a higher post tapping vigour compared to RRIC 100. Although the first distribution of budwood of RRIC 100 and RRIC 102 for planting has been done in as far back as 1970s it has taken about 20 years before these clones achieved an appreciable level of acceptance by the rubber gorowers. For RRIC 121 it has taken about 15 years. This long time lag in the adoption of new clones in the rubber industry is clearly a disadvantage since it delays the realisation of the benefits of new clones to the natural rubber industry. One minor reason for RRIC 102 to lag behind the RRIC 100 was its light yellowish latex. But this is not a disadvantage for the manufacture of crepe rubber from the fractionated latex. Table 1 shows the yield data of RRIC 100, RRIC 102 and RRIC 121 collected from a block of a commercial estate. Comparison of the potential yields (PYD) (Yield that could have been obtained if the tapping stand is

Table 1. *Per hectare yield of RRIC 102, RRIC 100 and RRIC 121 from a commercial block of planting*

RRIC 102

YEAR	1	2	3	4	5	6	7	8	9	10	11
INT.	67	100	100	100	100	100	100	100	100	100	
YD.	107	749	1318	1295	1671	2076	1943	1880	1902	1870	1740
STD.	389	389	389	352	350	330	330	329	328	328	328
PYD	123	866	1524	1665	2148	2830	2649	2571	2609	2565	2387

RRIC 100

YEAR	1	2	3	4	5	6	7	8	9	10	11
INT	67	67	67	100	100	100	100	100	100	100	
YD.	113	300	786	1167	1174	1124	1331	1774	1443	1471	1471
STD.	367	367	367	367	312	306	300	300	290	292	292
PYD.	138	367	963	1430	1693	1652	1996	2661	2239	2260	2260

RRIC 121

YEAR	1	2	3	4	5	6	7	8
INT.	67	67	67	100	100	100	100	100
YD.	43	473	870	1312	1574	1618	1659	1519
STD.	260	260	260	260	260	253	254	254
PYD.	74	818	1505	2270	2742	2877	2939	2691

INT = Tapping intensity YD = Actual yield STD = Stand/ha PYD= Potential yield, Actual YD/STDx450 (Assuming 450 trees/ha)

450 trees per ha) shows that RRIC 102 and RRIC 121 have given higher yields than RRIC 100. This is only a small example to suggest, one could plant RRIC 102 and RRIC 121, without hesitation, in place of RRIC 100. Use of rubber clones other than RRIC 100 has now become important since a vast amount of the rubber lands in Sri Lanka has already been replanted with this clone. Domination of the rubber plantation by a very few clones, as it is now happening with respect to the spread of RRIC 100 in Sri Lanka, is very alarming because it will narrow down the much needed genetic diversity on estates. This type of monoclonal planting could enhance the development of virulent races and strains of pathogenic organisms for the available few clones on estates resulting a severe set back to the natural rubber industry.

Since 1970 there has been a reduction of the number of clones recommended for planting. A large number of potentially good clones that have been registered under RRIC 100 series such as RRIC 104, RRIC 105, RRIC 108, RRIC 118, RRIC 122 up to RRIC 129 had to be abandoned due to their susceptibility to the *Corynespora* leaf disease. Further, a large number of test-entries had to be discarded due to this disease. For example, out of 69 clones selected from 1974 Hand Pollination programme, 30 were found susceptible and had to be removed from the breeding trials. Not only the clones at various stages of selection , but also clones with proven track records such as RRIC 103 and RRIC 110 had to be withdrawn from the recommendation for the same reason. As a result the effort of many years of the breeding and selection work was lost to this deadly disease causing a dearth of new clones available for planting.

In the most recent clone recommendation (Table 2) for the estate sector, the number of clones has been increased to 26. Two Sri Lankan clones, RRIC 117, RRIC 130 and one Prang Besar clone, PB 235 have been upgraded to group II of the recommendation. In this category each clone could be planted up to a maximum of 25 ha. But it is advisable to limit the area under any clone of this category up to a maximum of 10% of the total extent of the land spanning over a number of years of replanting. Among the group II clones PB 235 has been identified as a dual purpose clone suitable for the production of latex and timber. It is also noteworthy to mention a word of caution about the clone RRIC 130. This high yielding clone should be tapped at 67% intensity until intensification due to its susceptibility to Tapping Panel Dryness (TPD). Further RRIC 130 should not be planted in locations where the incidence of wind damage is high.

Group III planting materials include three clones, RRIC 131, RRIC 133 and PB 260 where each clone could be planted up to 10 ha of an estate. Field trials carried out in Sri Lanka shows that the introduced clone, PB 260 is as vigourous as RRIC 121 and RRIC 100. This clone is considered to be a very high yielding clone in Malaysia and Indonesia. But PB 260 is very susceptible to Tapping Panel Dryness in Malaysia. The clone RRIC 133 which is recommended under this group has

evolved as suitable clone for both latex and timber production. It is a very vigourous clone with strong, straight trunk having ideal characteristics for timber production. It has yielded an average per hectare yield of 2452 kg during the first 10 years in RRISL trials.

Table 2. *Clone recommendation for estate sector*

Group I for large scale planting

Ia. For areas having an annual rainfall of less than 3750 mm (150") and an elevation of less than 300 m (1000').

RRIC 100, RRIC 102, PB 28/59, PB 217, RRIC 121

Ib. For areas having an annual rainfall of more than 3750 mm and an elevation of less than 300 m.

RRIC 100, RRIC 102, RRIC 121

Ic. For areas with an elevation of more than 300 m irrespective of rainfall.

RRIC 102

Group II to be planted up to 25 ha.

RRIC 117, RRIC 130, PB 235

Group III to be planted up to 10 ha.

RRIC 131, RRIC 133, PB 260

Group IV to be planted up to 3 tapping tasks or 2 ha.

BPM 24, RRIM 717, PB 255, PR 255, PR 305, RRII 105, RRISL 200, RRISL 201, RRISL 202, RRISL 203,RRISL 217, RRISL 218, RRISL 219, GPS I, GPS 2.

In this article a special interest is attached to draw the attention of the rubber growers in the usage of the clones recommended under group IV. This group of clone consists of new clones bred by RRISL and relatively new clones introduced from

other rubber growing countries. With regard to the group IV new RRISL clones, no information on commercial yield and growth performances are available, therefore a certain element of risk is involved in the planting of these clones. But the estate sector is encouraged to plant as many clones as possible from this category in a limited scale *i.e.* each clone up to a maximum of 3 tapping tasks. Planting of a wide range of the approved clones in this category in each and every estate serves two purposes. First, they will serve as good observation plots to assess the adaptability of these clones to the prevailing local conditions of a particular estate thereby allowing the planter to select the clones best suited for his land. This is important since the clones vary in their requirements for optimum performance. Second, spread of nuclei of new clones countrywide helps early dissemination of budwood if some of these clones prove successful. The latter will reduce the time lag in the acceptance of the new clones by the growers allowing to reap the benefits of new clones quickly to the country. At present there are 15 new clones recommended under this category. These clones alone can cover 30 ha of the replanting area and therefore it is timely and advisable to set aside a sizable area for testing of these new clones in your estate. The table 3 gives a guideline with regard to the extent that can be spared for this purpose.

Table 3. *Proposed extent as observation plots of Group IV clones*

Estate size	Area under group IV clones
Below 200 ha	10 ha
200 - 400 ha	10 - 20 ha
Above 500 ha	20 - 40 ha