

THE SUCCESS STORY DOWN THE AGES: THE ROLE OF RUBBER BREEDERS IN SRI LANKA

P Seneviratne, K B A Karunasekera, K K Liyanage, K W Rupatunge, A K Gamage and H P Peiris

Hevea brasiliensis, commonly known as “rubber” originated in the rain forests of Amazon river basin in Brazil, South America. No other plant product had the property of removing pencil marks when rubbed on, and this was one of the main reasons that the rubber tree received the attention of many people of various calibre even in 1870’s. It appeared that the Brazilian government then had no intention to give this wonderful plant to the rest in the world but however, according to the legend, some seed lots had been smuggled from time to time to South East Asian countries by those who were interested on this indispensable industrial raw material.

However, having realized the very short viability period of rubber seeds, finally an Englishman, Sir Henry Wickham succeeded in transporting some rubber seeds to Kew gardens in England, and germinating them in a green house with the blessings of the Director of Kew gardens, Sir Joan Hooker. The legend says that all 1919 seedlings germinated were transported to then Ceylon in a container called “Wardian box” (Fig. 1) which originated the rubber industry in South East Asia. It was in 1876 and during this 133 years the contribution made by the scientists in the Far East towards the improvement of this wonderful trees is fascinating to hear.

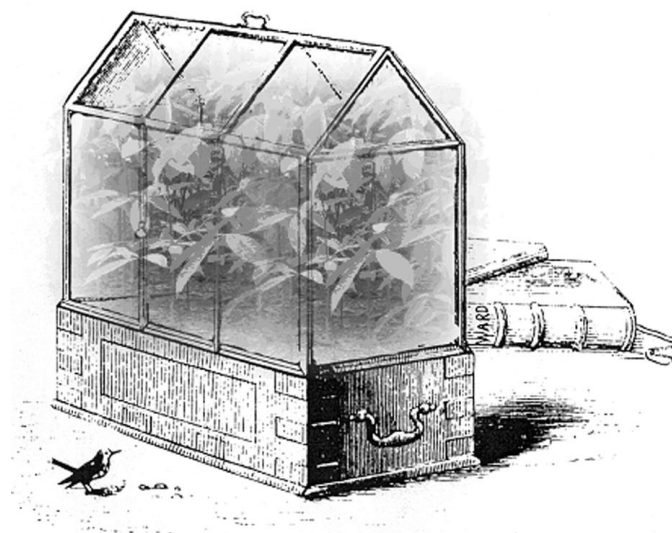


Fig. 1. “Wardian box”

Selection

It is believed that it was only a coincidence that Sir Henry Wickham collected the seeds of *Hevea brasiliensis* leaving all other very low yielding rubber species behind. Had he collected any of the eight other species, which are not yielding an economically viable amount of latex, the rubber industry in the South East Asia would not have been successful as it is today or had been delayed by many years.

First rubber tree in Sri Lanka

The first set of rubber seedlings had been planted in Henerathgoda Botanical Gardens and there is no record on further shipments of plants during that period. Therefore, the seeds produced by those trees have been used to establish the plantations in early days.

The seedling plantations then yielded only about 100-200 kg/year/ha which could satisfy the farmers those days. However, it was soon realized that the yield variation among individuals in the seedling plantations was far too high for economical sustainability; unpredictable yields was the most concerning factor. In order to overcome this, the need of the vegetative propagation method was emphasized. As a result, in 1917 the bud grafting technique was introduced for rubber, by Dutch Scientists.

Rubber clones

There were some seedlings in the fields which gave comparatively high yields. With the introduction of bud grafting, the branches of such trees were used to harvest buds and clonal populations were produced. Some local introductions were Millakande 1/1/, 3/2, Wagga 6278, Hilcroft 528. However, the remarkable high yields given by some trees aroused the interest of plant breeders who perfected techniques of artificial crossing or hybridization of selected parental clones (Fig. 2).



Fig. 2. Artificial cross pollination

Seedlings produced by artificial crossing were screened and outstanding individuals were selected and registered as clones. This process of hand pollination and production of new varieties is a tedious operation; success rate is 3-4% and the process further depends on weather and disease conditions. Flowering is a seasonal phenomena and there are many critical stages from flowering to seed fall, rain and disease incidences are the most important.

Having realized the potential yield and other improvements that can be achieved through cross pollination, the enthusiastic breeders devoted their lives for which of course the industry received a good return.

World recognition

In 1979 there was an international clone evaluation trial organized by IRRDB and Sri Lanka also presented some RRIC clones developed by the RRISL. In this long term trial the Sri Lankan clone RRIC 100 won the first place for its outstanding performance (Fig. 3). This was a memorable achievement for the patientful rubber breeders of RRISL and obviously an honour to the country. This wonderful clone has now been used by the rubber breeders of other countries in their cross pollination programmes. The RRII 400 series clones in India have been produced using our prestigious RRIC 100 clone as a parent. This clone is highly appreciated by the Planters world wide.



Fig. 3. RRIC 100 tree

Unbroken records

Sri Lankan planters are gifted with many other clones of similar performance such as RRIC 102 and RRIC 121. The ability to girth after tapping and high yield of RRIC 121 have not been reached by any of the rubber clones that have been produced so far in any part of the world. Though the main objective of the breeders is to identify clones giving high yields, the secondary characteristics such as the growth vigour or growth rate, tolerance to important foliar diseases, resistance to wind and the timber volume are also considered in clone evaluation and selection programmes.

Among the dual purpose clones that are giving both high latex yield and timber volume, the following are recommended for Plantation sector today.

RRIC 100 series clone	Foreign clones	RRIC 200 series clones	RRISL 2000 series clones
RRIC 121 RRIC 130	PB 235 PB 260	RRISL 205	RRISL2000 RRISL 2001 RRISL 2002 RRISL 2003 RRISL 2004 RRISL 2005

However, as a result of continuous cross pollination and selection, the clones that are recommended by RRISL for plantations are regularly replaced with better clones taking in to consideration of their yields as well as disease tolerance. The clones that have been used by Sri Lankan plantations over the period of 132 years is shown in the figure below along with their potential yields (Fig. 4).

Correct usage of new clones

The current list of recommended clones consists of about 40 clones out of which 27 clones have been bred and selected by the Plant breeders of the RRISL led by that great breeder late Mr. D.M. Fernando (1947-1984). His excellent work was continued by Prof. N E M Jayasekera and Prof. D P S T G Attanayake in subsequent years in 1980s & 1990s. But when the clonal composition of the country is analyzed it is observed that about 90% of the extent is occupied only by 2-3 clones. This is not only a very unproductive method of planting but also a very unhealthy situation as far as vulnerability to foliar diseases is concerned.

In order to achieve the fullest benefit of having high yielding clones, all new clones should be planted in the budwood nurseries as they are recommended and released by the RRISL. As the life span of budwood nurseries is 10 years, about 10% of the nursery should be replanted every year preferably with new clones.

If the recommended clones are used judiciously, along with other agro-management practices, the productivity of the rubber plantations in the country could be increased substantially. Yet, the breeders expectations would never be satisfied

and they humbly believe in a better century for the rubber tree as a cultivated crop, with more than three tons from every hectare of rubber planted in Sri Lanka.

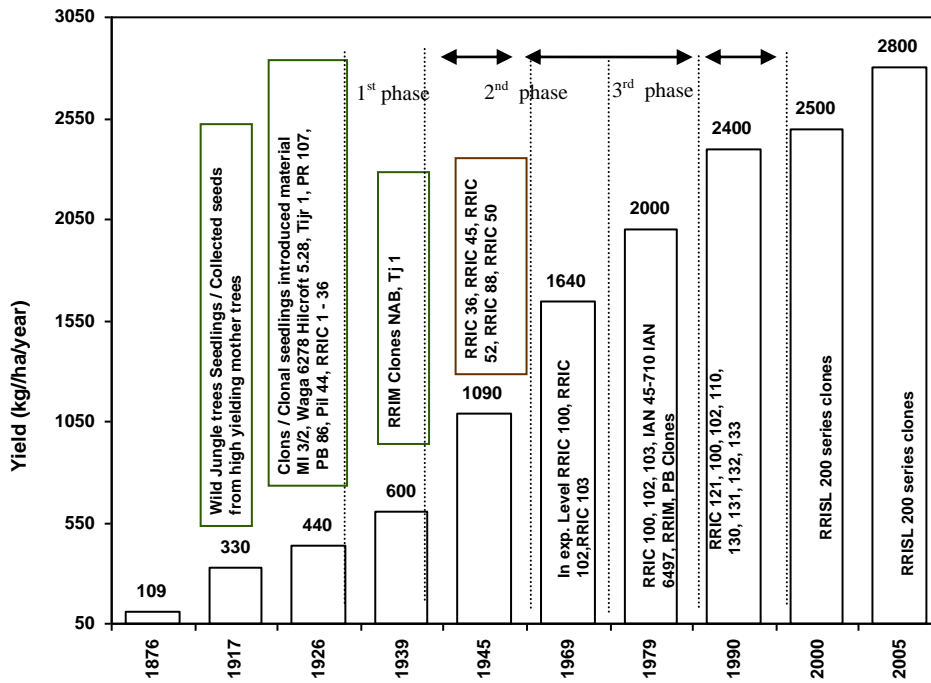


Fig.4. Rubber clones used by Sri Lankan Planters over the years