Bulletin of the Rubber Research Institute of Sri Lanka, (2001) 43, 6-10

GROWER- SCIENTIST COLLABORATION IN CLONAL DEVELOPMENT
(An Important Consideration of the Present Time)

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The primary objective of rubber breeding is the development of genetically superior clones to the existing ones. The benefits of the new clones can only be realized when they are grown commercially, on large scale. For the large scale acceptance of new clones for planting, the rubber growers require not only the proven experimental evidence but also the confirmed commercial experience.

The rubber breeding programme of the Rubber Research Institute (RRI) has been designed to obtain the information on the above two requirements, *i.e.* experimental performance and commercial scale experience on new clones. The experimental evidence for the genetic superiority of the new clones is obtained from the Small Scale Clone Trials (SSCTs) and their commercial scale performance is then assessed by a series of Large Scale Clone Trials (LSCTs). One drawback in this system, realized recently is that, both Small and Large Scale clone trials are conducted solely by the breeders where the planters involvement is usually confined only to providing land for experimentation. Number of replications and the size of the small and large scale trials depend mainly on availability of budwood and resources of the institute. In the past, Large Scale Testing of clones involved several trials of different plot sizes, *i.e.* 30 tree plots thereafter 150 tree plots (Senanayake & Wijewantha, 1968) and in some cases plot size of one taping task (Figure 1 pathway - A). But in practice, the maintenance and the continuation of such a large number of trials resulting from the yearly additions of new trials, for a long period has posed difficulties for the breeders. Hence often at present, a new clone identified from a Small Scale Clone Trial (SSCT) will be subjected only to a one step Large Scale Clone Trial (LSCT) of the size of one tapping task replicated in different rubber growing regions (Figure 1 pathway - B). After continuing such a LSCT for 10 -12 years promising clones are then recommended for commercial planting up to 2 ha in extent per estate. By following the current procedure (pathway - B) it takes a minimum of 22 years for a planter, at least to be informed of a new clone developed by the breeder. It is only at this point, the dissemination of budwood, propagation of the clone, acquiring knowledge and sharing of the information of the new clones begin, for commercialisation. In this scheme of new clone introduction, it is clear that the planter's role has become none other than playing as an end-user of the clones developed by the breeders. This situation has naturally resulted in very little attention being given to new clones by the planters. The rate of adoption of new clones in plantations is therefore slow, thus depriving the rubber growers of achieving the early economic returns possible with improved clones.

Estate/RRI collaborative clone trials (ECTs)

Considering the current situation on resource allocation, the need for the introduction of many new clones within a shortest possible time and to help accelerate the planting of new high yielding clones by the industry it has now become a necessity to improve the current rubber breeding programme. This could be best done with the collaboration of the growers in the rubber breeding activities through a RRI/Planter collaborative research programme. When the preliminary experimental evidence are obtained from the Small Scale Clone Trials (SSCTs), the Large Scale Testing of the promising new clones could be done in collaboration with the estate managers as Estate-RRI collaborative Clone Trials, acronym ECTs. The plot size of the ECTs will usually be about two tapping tasks but can be extended to a maximum of 2 ha in extent. In this way, the planters being the partners in testing promising new clones in ECTs will be able to obtain the first hand information on the characteristics and commercial behaviour of the new clones. The new system will enable the planters to develop confidence and to gather experience on promising new clones at least 8 years ahead when compared with the present scheme of clone introduction (Figure 1, pathway C - I). The ECTs serve two other purposes. Firstly, based on the performance of clones in ECTs the planter will be able to identify and select the new clones best suited for his land and management conditions for large scale planting. Secondly, spread of new clones in ECTs will help in early dissemination of budwood countrywide, should there be a need for large scale propagation of these clones. At present there are about 25 new clones (Group III clones in the clone recommendation - year 2000) that could be incorporated in ECTs. For estates over 500 ha it is advisable to set aside about 3 % of the land area for ECTs. At the establishment of these trials, providing the planting materials in the form of budded plants or as budwood material, selection of land and supervising the planting will be carried out by the RRI-breeders. Regularly, these ECTs will be jointly monitored by the planters and breeders for general observation on clone performance, and record keeping. Also, the RRI will attend to any specific problems on diseases, fertilizer requirements and other agronomic aspects. The breeder-planter research collaboration developed through ECTs will not only motivate the scientists by way of exposing to the ideas of the planter but would also help in human resource development in the plantations. The other advantage of this participatory approach in clone development process will be that the planters being the partners in testing of new clones will have a chance to see for themselves of the performance of new promising clones which would eventually lead to a high rate of adoption of the genetically improved clones. It is an encouraging sign for the rubber breeders to see that this programme is now well underway with the help of plantation companies and details of some are given on Table 1.

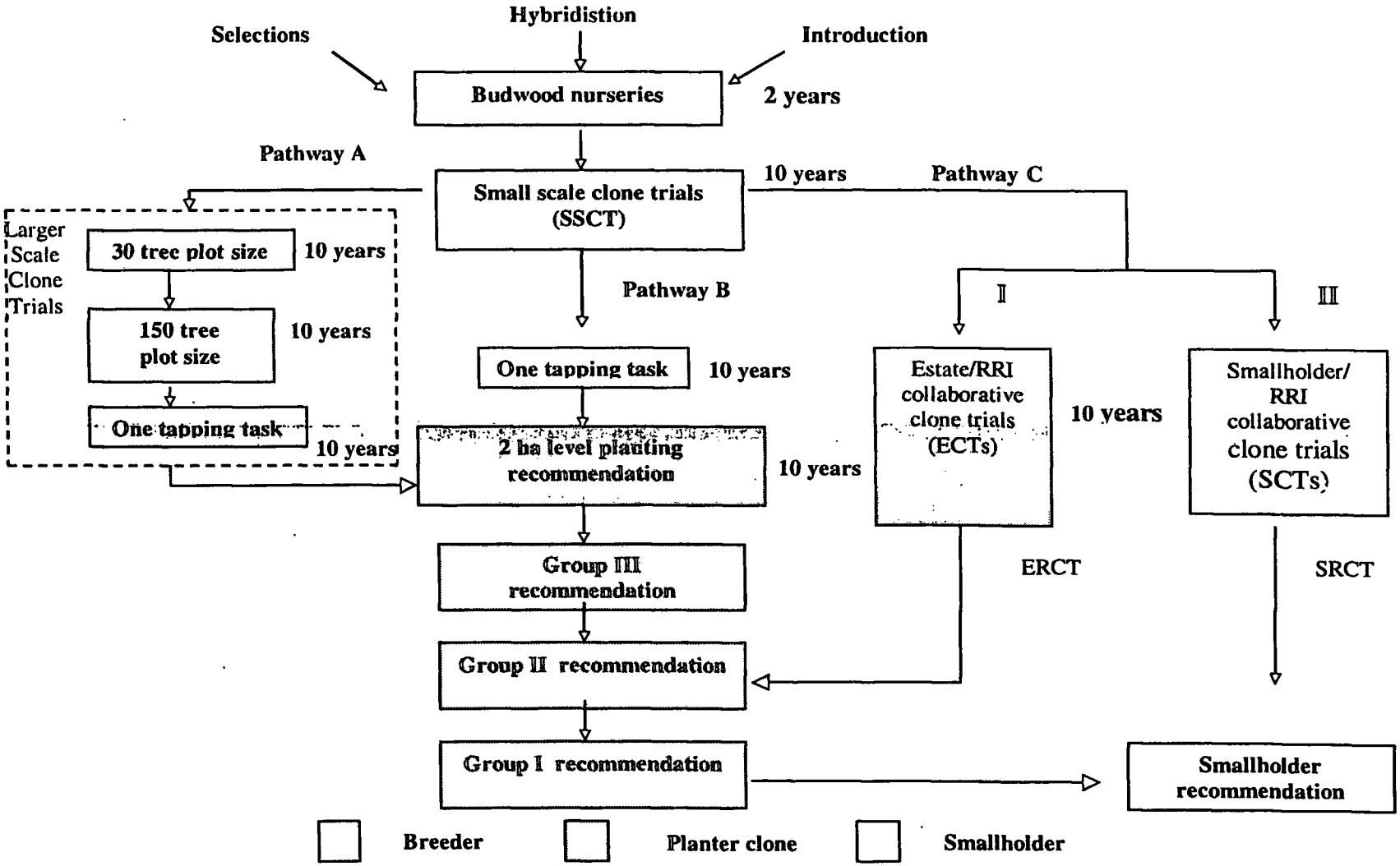

Fig. 1. Testing duration along different rubber breeding pathways showing the importance of estate, smallholder/RRI collaborative clone trials in accelerating the clone development process

Table 1. *Estate/RRI collaborative clone trials (ECTs)*

Collaborator	Plantation company	Clones	Extent (tapping tasks)	Year of planting
Moralioya estate	Malwatte Valley Plantations Ltd.	RRISL 201	1	1996
		RRISL 202	1	1996
Ganapalla estate	Kelani Valley Plantations Ltd.	RRISL 200	1	1998
		RRISL 201	1	1998
		RRISL 202	1	1998
Neuchatel estate	Horana Plantation Ltd.	RRISL 201	1	1996
		RRISL 204	1	1996
		RRISL 215	1	1996
		RRISL 204	2	1997
		RRISL 205	2	1997
		RRISL 206	2	1997
Pallegoda estate	Namunukula Plantations Ltd.	RRISL 205	1	1995
		RRISL 206	1	1995
		RRISL 218	1	1995
		RRISL 2001	1	1995
		GPS 1	1	1998
		PB 255	1	1998
		RRII 105	1	1998
		RRISL 2000	1	1998
		RRII 176	1	2000
		RRISL 226	1	2000
Vogan estate	Kotagala Plantations Ltd.	GPS 1	1	1997
		RRISL 205	1	1997
		RRISL 206	1	1997
		RRISL 217	1	1997
Salawa estate	Pussellawa Plantations Ltd.	RRISL 201	1	1999
		RRISL 206	1	1999
		RRISL 215	1	1999
		RRISL 220	1	1999
		RRISL 221	1	1999
		RRISL 226	1	1999

Small holder participation

The basic requirement in a small holder rubber clone is that the clone should bear a minimum risk to the grower. Therefore the clones for the small holders are generally selected from the estate sector group I materials which have proven their field performance in commercial scale plantings countrywide. Two main features considered in promoting group I estate clones to the small holders are the tolerance to the leaf and panel diseases and also to the Tapping Panel Dryness which is suspected to be caused by high intensity tapping with no or minimal inputs. Only three clones are available for the small holders at present and it will take at least another decade for the recent advances made by the breeders to reach the rubber small holders using the current method of selection of clones to the small holders. Another disadvantage in this procedure is that the availability of clones for small holders will depend on the adoption rate of the new clones by the estate sector as the small holder clones are selected based on the observations on the estate sector commercial plantings. Therefore an improvement to the existing system is necessary, to expand the number of clones available to the small holders. This can be brought about by a breeder-small holder link by adaptive or participatory research similar to the ECTs described above. The progressive small holders could be identified and the promising new clones with favourable characteristics to the small farmers could be planted as small holder/RRI clone trials (SRTs) under small holder conditions. The sustainable clones evolved in these SRTs can then be promoted for planting (Figure 1 pathway C - II). The risk involved in planting of new clones in SRTs can be minimised by close monitoring of these trials by the RRI and by the involvement of the Rubber Development Department. RRI and the Rubber Development Department has already taken steps to embark on this programme in order to expedite the development of clones for the small holders.

ACKNOWLEDGEMENT

Authors would like to thank Dr N. Yogaratnam and Dr Asoka Nugawela for reading the manuscript for comments.

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