THE DEVELOPMENT OF CLONAL TEA IN CEYLON

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Ceylon holds pride of place in the successful development and use of clonal tea on a plantation scale ; no other tea-growing country has comparable acreages in clones. The yield potential of clonal tea in early trials was so impressive that the Government of Ceylon introduced legislation in late 1958 to make it almost compulsory for estates to use approved clones in their new clearings.

In his opening address at a symposium held in Colombo by the TRI on the 28th November 1958, to mark the inauguration of the Government's new Tea Replanting Subsidy Scheme the then Minister of Agriculture & Food (Mr D. P. R. Gunawardena) observed that " little or no attempt has hitherto been made by estates to increase yields by replanting old tea areas with high-yielding clones ". He added that " it was only as recently as 1955 — at the TRI conference held in February of that year — that the scientists of the TRI felt confident enough to recommend replanting on estates with vegetatively-propagated high-yielding clones ". The new scheme aimed at replanting a minimum of 30,000 acres in the next five or six years with a view to obtaining an increase of at least 40 million pounds in Ceylon's annual production of tea. It made it obligatory on the part of estates to use only clonal tea in planting new clearings in order to qualify for the maximum subsidy which was payble in instalments. The requirements foi the payment of instalments were specified in the Regulations under the Tea Subsidy Act published in the Government Gazette of 7th November 1958.

Although the TRI and estate clones with high yield potential and quality had been developed and nursery techniques for large scale propagation had also been worked out successfully at the TRI through the efforts of Dr F. R. Tubbs and Mr F. H. Kehl, most planters were still sceptical about the ultimate success of VP tea on estates and were reluctant to plant large extents at the commencement of the subsidy scheme. The initial cost of replanting was considered prohibitive by some. There were also doubts about the longevity of VP tea and its ability to stand up to drought in view of the absence of tap roots. Many of these doubts have since been dispelled, and the acreage under VP tea had made rapid strides in recent years, particularly with the substantial increase in the subsidy payable from Rs 3,500/- to Rs 3,750/- per acre since 1963 and the phenomenal acre yields of over 5000 lb of made tea in the low-country and over 2500 lb at the higher elevations given by some popular clones compared to the average yield of about 850 lb of made tea per acre from seedling tea. Even with liberal application of fertilizers and effective pest and disease control the yield of seedling tea is nowhere near that of well-managed young clonal tea. The new clearings of clonal tea present a strikingly uniform appearance when in flush (Figure 1) because all the bushes of any one clone being of identical genetic make up tend to produce buds at the same time between plucking intervals, whereas with seedling tea which is highly heterozygous there is considerable variability not only in habit of growth and morphological characteristics but in the period of flush growth, some bushes being ready for plucking and others not, during the plucking rounds.

Over 85 estate and TRI clones are included in the provisional list approved on the basis of records available at the Tea Research Institute and the Tea Control Department, but the clones which are popular number not more than about 18 and consist mostly of the TRI 2020 series and other TRI clones. The total acreage

planted with clones since 1959 when the Tea Replanting Subsidy Scheme came into operation is nearly 20,000 and of this over 85% is under the popular TRI clones. The clones of the TRI 2020 series have all originated from seed collected by Dr Tubbs from a single mother tree (ASM 4/10) at Tocklai and planted at St Coombs in 1937. They consist of TRI 2021 (A2 quality), TRI 2022 (B quality), TRI 2023 (A2 quality), TRI 2024 (A2 quality), TRI 2025 (B quality), TRI 2026 (C quality) and TRI 2027 (A2 quality). The two most popular clones in the low-country are TRI 2023 and TRI 2026 which have given average yields of over 5500 lb of made tea per acre on a fairly large extent. At Millakande Estate, Bulathsinhala, TRI 2023 has given a record crop of 8000 lb of made tea from one acre receiving over 500 lb of nitrogen in 12 applications per year. Until recently the most popular clone at the higher elevations was TRI 2024 which covers over 1000 acres but most estates now prefer to plant TRI 2025 because of its high yield potential, vigour of growth and tolerance to eelworm and drought. The clone TRI 2024 is susceptible both to eelworm and *Phomopsis*, and recovery from pruning is uncertain at times. Of the other clones TRI a limited extent is under TRI 777 which is of Al quality but with average yield potential and a tendency to precocious flowering. The red pigmented clone TRI 2043 which has buds covered with silvery white hairs is becoming popular in the low-country because it produces tippy tea for which there is a demand in the Middle East Market.

The estates too have selected some very promising clones such as Drayton 1 and Tillicoultry 9 which are of Al quality and high yielding, Braughing 1 which is reasonably tolerant to the Shot-hole Borer, Welimada 1 and Balangoda DG 7 which are fairly resistant to drought, and Drayton 95 and Kirkoswald 145 which are highly tolerant to eelworms.

The use of a single clone in large clearings is inadvisable because of the risk of attack by some pest or disease to which it may eventually succumb ; a minimum of five selected clones is safer. Little is known, however, of the quality of the resulting blend of tea from multi-clonal clearings, but there is no reason why it should not be up to standard if a fair proportion of quality clones is used. Clonal tea is just as resistant to drought as seedling tea of comparable age if it is not brought into plucking within 18 months and is allowed to develop its root system satisfactorily. However, some clones such as TRI 2023 fail to produce sufficient flush for plucking during the flavour season in the ' dust bowl ' of Uva and elsewhere when it is hot, dry and windy.

Some estates have in recent years shown interest in the use of biclonal seedling tea which is believed to withstand drought better because of the presence of tap roots. Biclonal seed of TRI 2026 and TRI 2023 has been produced in isolated clearings on two estates, Landsdowne and Rambukkande near Ratnapura. Some estates in Uva have also produced open-pollinated seed from TRI clones 2024 and 2025. Neither the biclonal seed nor the open-pollinated clonal seed has so far produced progenies as high yielding as the VP progenies of the individual parents. The yield of the open-pollinated seedling progeny of TRI 2024 is only a third of the VP clonal yield in a trial at St Coombs which has been in plucking for a year. Nevertheless, biclonal seedlings of TRI 2026 and TRI 2023 appear to be relatively more vigorous and uniform in the early stages than the progenies of unselected estate seed and are used for infilling seedling tea fields in some estates in the low-country. Seedling tea is so highly heterozygous that it may take years to produce by controlled pollination, acceptable generative clones which will breed true to type. The scope for selection of vegetative clones from hybrid progenies and from the existing seedling tea which covers nearly 600,000 acres is, however, unlimited, and one could confidently look forward to the day in the near future when the perfect ' Golden Clones ' that produce the best blend of tea, would make their debut.

No other plantation crop is grown so extensively from cuttings as tea. The future of VP tea is bright, and according to the Agricultural Development Proposals (1966—1970) of the Ministry of Agriculture & Food the total acreage for which it is proposed to issue replanting permits for the next five years from 1966 to 1970 is 25,000 at the rate of 5000 acres per year. The increase in crop when all the areas replanted from 1955 to 1970 come into full bearing is expected to be over 100 million lb annually. The foreign exchange earnings from tea which at present accounts for over 62 per cent of the Ceylon's total earnings would then, it is hoped, be very considerable.