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NEW TEA CLONES

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Tea (*Camellia sinensis* (L.) O. Kuntze) was first introduced into Sri Lanka in 1839, but the first commercial planting of tea was undertaken by James Taylor only in 1867, on nineteen acres of land on Loolecondera Estate, Hewaheta. Today, one hundred and twenty five years later, nearly two hundred thousand hectares of land is under tea cultivation and nearly one quarter of the total foreign exchange earned from exports comes from tea.

The tea market today, is facing intense competition from various tea producing countries in different parts of the world. This is compelling producers to increase the productivity of their tea lands at reduced costs of production, in order to compete successfully in the World Tea Market. It is only in this way that the Tea Industry could remain viable. Increased production must be generated from higher yields from existing crop land.

In many crops the use of selected cultivars or varieties, have contributed to vast increases in the productivity of that crop. Sometimes the increases in productivity have been due to the use of higher yielding cultivars or due to the use of, varieties resistant to some specific pest, or disease, or a variety able to overcome some climatic limitation such as drought, since susceptibilities of a crop to environmental hazards, cause considerable crop losses, with the resultant lowering of productivity.

Since the beginning of the era of tea cultivation until half-way into the present century, seed was the traditional source of new tea plants. However, significant increases in productivity or yield per hectare, have been obtained in tea, with selected clones. A clone is a population of plants obtained by the vegetative propagation of a single bush, raised from seed. All plants of a clone are identical, since they all have the same genetic constitution as that of the plant from which they were derived. The advantages of a clone accrue from this uniformity.

The tea plant requires cross pollination for the setting of viable seed. Seedlings raised from such seed do not resemble the parent plants and also differ from each other in yield, quality characteristics and in resistance or susceptibility to pests, disease or drought. It is this variability within populations or stands of seed tea, that provide the motive and the opportunity for improving tea cultivation, by the selection and application of outstanding bushes, as clones.

Since propagation by cuttings offers an easy and efficient method of large-scale multiplication, the growing of clones has become a practical possibility. For the last three decades tea plantations have been trying to improve the productivity of their tea areas, by replanting low yielding or debilitated seed tea stands with selected clones. The TRI `2000' series clones and a few other clones, developed by the TRI, and some clones developed by commercial estates, by vegetative propagation of outstanding bushes from within seed tea populations, have been used to produce a good quality tea, or because of their ability to resist the damaging effects of certain pests/diseases and /or drought. As the land area under genetically uniform clones increased, the limitations of some of the clones particularly the very high yielding `2000' series clones became apparent.

The advantages in using selected tea clones is that yield increases obtainable are likely to be considerably higher than those obtainable with selected seedling populations. The yield of the latter is a sum-total to which a relatively large number of individuals contribute relatively little. This is because seed is obtained by cross pollination and seedling bushes within a population therefore differ in their ability to yield, ability to produce a good tea, and, in their degree of resistance or susceptibility to pests, disease, drought or cold.

In contrast clones may show variability in yield under adverse conditions of climate and soil, and as monocultures of a single clone, are more of a risk with respect to

pest or disease attack. These environmental hazards can be overcome, firstly, by choosing clones that have been found to yield well under the particular environmental conditions requiring resistance to cold, drought, pest or disease and secondly, by planting several clones preferably of different ancestories. The latter strategy alleviates unforeseen risks such as the occurrence of a new disease or pest, or the spread of an hitherto unimportant one, to which any single clone may be highly susceptible.

In order to meet the needs of the Tea Industry the TRI has developed several new clones in the recent past. The plantations will now have more clones to choose from, when selecting clones for replanting. All the clones may not do well everywhere but some of the newer clones may perform better than established ones in some areas.

The TRI `3000' series clones were the first clones to emerge from the tea breeding programme initiated in 1962. The clones were first released for experimental planting in the up-country, in 1976. Cuttings of these clones have been issued to estates over the last ten years, but it is only in the last few years that estates have taken an interest in these clones.

The clones are potentially capable of yielding from 2500-4000 kg per hectare per year depending on location although some clones may even give much higher yields in certain locations. Many of those found suitable for planting at elevations above 1200 metres above mean sea level show high tolerance to the up-country eelworm

Pratylenchus loosi. Those best suited for mid elevations (600-1000 metres above mean sea level in the wet and semi dry zone regions) are potentially very high yielding under mid-country conditions. Some of these are also more drought tolerant than established clones, and also show moderate tolerance to the Shot-hole Borer beetle, which is an important pest of tea at mid-elevations. The`3000' series clones adapted to elevations below 600 metres are capable of giving consistently high yields since they combine high yield potential with tolerance to the important pests and diseases, that damage tea in the low-country causing significant reductions in yield.

A new series of clones - the TRI `4000' series - has also been developed through breeding. Cuttings of these clones have been issued to certain estates for large scale trials to assess their yields under estate conditions, and their suitability to particular environments requiring resistance to cold, drought, pest or disease. Some of the clones tested in the up-country and mid-country regions are higher yielding than the `3000' series clones and more drought tolerant. Yields of over 3500 kg per hectare have been obtained at estate level in the mid-country wet zone regions in the first pruning cycle. The clones best suited to mid elevations also offer good resistance to the mid-country pest of tea. Some of the`4000' series have been tested on estates in the Uva in 1/4 acre blocks and have yielded nearly 4000 kg /ha/year in the first cycle. Several hundred other clones developed by breeding experiments are presently under test. They

would form the next series of clones to be released for planting.

Recommendations of clones for different planting districts are made on the results of regional adaptability trials conducted at Talawakele, Passara, Kandy, Ratnapura, Kottawa and Deniyaya. These locations only broadly represent the major tea planting districts of Sri Lanka. Experience has shown that tea clones are sensitive to much narrower ranges of soil and climate and these factors together with bush management factors will have varying effects on the growth and yielding capacity of clones, Certain clones though susceptible to certain damaging pests in certain locations may thrive in some other locations because of natural adaptation (physiological fitness), to that environment, and therfore may be able to withstand or tolerate the pest to which it is susceptible. Tea plantations must therefore initially evaluate newly released clones on a small scale on their plantations and select only those most suited to the estate conditions for large scale plantings. Replanting with several clones is also suggested to increase genetic diversity and to ensure stability of estate yields over the years in the long term.