TEA SELECTION

III—THE VEGETATIVE PROPAGATION OF SELECTED BUSHES

The early investigations into the vegetative propagation of tea at St. Coombs covered most of the known methods of propagating plants by vegetative means, during the course of which much useful experience was gained. It is not proposed to go into detail concerning the various methods used, since only the use of small cuttings fulfils all the requirements necessary to render vegetative propagation of tea an economic proposition under Ceylon's conditions.

These requirements may be summarised as follows :—

(i) Only small portions of plant material must be necessary, to permit of large numbers of progeny being obtained from a single mother bush.

(ii) Young portions of the parent plant must be suitable, in order that successive crops of material suitable for propagation may be obtained in a short time.

(iii) The method must not involve the growth of the selected scion upon a seedling stock in the case of plants intended for commercial plucking, to obviate the problem of stock growth.

(iv) To be of more than restricted use to the industry, the method must be capable of adaptation to routine estate conditions.

The use of small cuttings, each bearing a single leaf, derived from young shoots of the mother bush would obviously satisfy the first three conditions. It has, in addition, been shown during the war that provided the use of the method is restricted to suitable clones *i.e.*, those which will form roots relatively easily, there is no reason why the method should not be used under estate conditions. As emphasised in an earlier article, the method being dependent on the rooting of cuttings, the clones which are found to be poor rooters must be discarded as part of the preliminary selection, however desirable their other characteristics may be. There is no point in wasting time, space, and money on a "shy-rooter" where the object is to obtain rapid and cheap multiplication of the stock by means of cuttings. The point has been again stressed, because while the principles of selection for yield and, later, quality are easily grasped, the need for selecting sufficient mother bushes to allow of the rigorous discarding of shy-rooters is frequently overlooked.

The preceding article on this subject dealt with methods of selection of mother bushes and with the simplifications it has been found possible to introduce as the result of experience. The subsequent treatment of the selected bushes should be related to the nursery programme and, in order to explain this, it is necessary to anticipate a little and state that the best time for placing cuttings in the nursery is at the commencement of the main rainy season, whether it be the South-West or North-East Monsoon. If ample time exists between the selection of the mother bush and the anticipated date of planting the nursery beds, the mother bushes should be pruned back and allowed to grow unchecked until the red bark at the base of

the rested "tipping shoots" is beginning to split and consequently to develop small greyish streaks. The period of time required for this to occur under local conditions will be known approximately. It will be found to vary considerably with elevation and to lie between two and six months after tipping would normally have been carried out. The type of shoot obtained in this way bears large leaves with long internodes and provides particularly easy material to work with. When time is shorter, the bush may be rested as it stands, the existing flush being allowed to run up and their vigorous growth encouraged by thinning out unnecessary lateral shoots within the bush. This will shorten the time considerably but, if the time available is very short, cuttings may even be taken from the lateral branches of the bearing bush. The latter material is not particularly suitable, being often over-ripe, and having very short internodes, with the result that cuttings have little depth in the nursery bed.

The preparation of the nursery involves nothing elaborate. If the soil is poor, the incorporation of *large* bulks of leafy material, which may be thoroughly mixed with tea fluff, if available, to hasten its rapid and even breakdown, should be carried out in ample time. The amount of material added should be generous, for it is essentially a horticultural operation which is being embarked upon. It should be incorporated well down and thoroughly mixed with the soil. To achieve this, mamoty work is preferable to forking. The soil should be again worked over prior to planting to ensure thorough mixing, but it is bad practice to manure the beds with tea fluff or cattle bulk just before planting the cuttings. The nursery should be well drained, but with water nearby, as for any other tea nursery. The beds should not be high, it being better to deepen the paths later if necessary rather than to plant cuttings upon a bed whose surface is raised six inches or more, the edges of which suffer in dry weather from lateral drying out and in wet weather from wash. No special drainage layer below the bed is necessary under normal conditions, but here local knowledge must be the guide. It is apparent from the above that there *is* nothing abnormal required in the preparation of the nursery, but three points may be emphasised in passing :—

(i) It is as necessary to avoid alkaline areas of soil as it is in the case of tea seed nurseries ;

(ii) Cuttings will not succeed in open nursery beds if planted in "hungry" or gravelly soil, with a low moisture-retaining capacity. The roots of a cutting are for some-time concentrated in the upper three inches of soil and such conditions would allow of no margin of safety to cover the inevitable accidents of weather or occasionally inefficient watering, against which the seedling is better protected than the young cutting.

(iii) Direct drip on to the beds from overhanging shade must be avoided.

Assuming, then, that the type of propagation bed has been prepared which we would expect to see used for the purpose in our own garden (and by this is expected no more than *should* normally be achieved for ordinary seed nurseries if the best results are to be obtained) planting up can be proceeded with. Points requiring detailed consideration in any large scale work are : transport of the clonal material to the nursery, the making of cuttings, planting, shading, watering, labelling, weeding, and manuring.

It is not necessary to make the cuttings in the field at the site of the mother bush. Shoots sufficient to produce the required number of cuttings are better severed from the mother bush, placed in a bucket containing a couple of inches of water, and carried therein to the nursery. On wet, drizzling days transport may be made in baskets. In order to avoid muddles, it is best to ensure that leaf from only one mother bush at a time arrives at the nursery. The selection of those portions of the shoots suitable for cuttings is achieved by discarding, as work proceeds, the soft sappy tips and hardened bases of the shoots and also, if material is ample, those portions of the shoots having short internodes and crowded leaves. The cuttings as made should be allowed to fall into a flat bowl or dish of water, from which they are taken for planting in the bed. A satisfactory method of handling the shoots is as follows : Take a shoot, and with a *really* sharp thin bladed pen knife, or budding knife, cut off the soft flexible tip of the shoot. Then, holding the shoot close to and below the second leaf from the top, which should be pointing towards the body, cut the stem immediately above the second leaf and its subtended bud with a lateral motion of the knife. (A cut made directly towards the body is liable to slash the second leaf). The process is then repeated, turning each second leaf from the top towards the body, until the whole shoot has been cut up, or until an area of the stem is reached on which fissuring of the reddened outer tissues has begun.

The cuttings, taken as required from the water, are inserted just clear of one another in rows across the bed, the stems being "firmed" into the soil with the fingers at such an angle that the leaf lies along and close to the surface of the soil. A cooly working at the side inserts fern as each row is completed, the ferning being fairly dense. As each batch is completed a sprinkling of water may be given to dampen the fern and settle the cuttings. It is scarcely necessary to say that overcast days after or during rainy weather should be chosen for the work.

A frequent enquiry is whether pandals are preferable to ferning. Fern is preferred for two reasons — firstly, a pandal must be very wide, if not inconveniently low, to prevent morning and afternoon sun reaching the cuttings and, secondly, the fern preserves a still atmosphere around the cuttings which is easily kept moist. Watering depends upon circumstances but the general principle is to keep the fern moistened by light sprinkles for the first ten days or so and thereafter to rely upon soakings every three or four days as necessary rather than upon daily general watering which may be insufficient to do more than wet the top half inch of soil. If fairly dense, the ferning breaks up the water applied from the rose of a can sufficiently to prevent any trouble arising from puddling of the upper layer of soil.

Labelling of the cuttings, as of the mother bushes, is of great importance and again a plan of the bed is of great value in repairing the mischief that podians and others cause upon occasion. It is desirable to leave at least one foot between the cuttings of each clone and to insert previously prepared permanent labels as each batch is completed. The stick or post should be sufficiently durable to last at least one year.

Weeding must be carried out through the fern, the latter being thickened up again as work proceeds. It is not safe to expose shaded cuttings to even a few minutes of bright sunlight by removing the shade completely, scorch being caused by such treatment. In practice, no real difficulty arises from this. Between four and six months after planting, when the majority of the cuttings have developed bunches of rootlets, shading may be very gradually

thinned during cloudy or rainy weather, by ceasing to thicken up after weeding or to replace the natural wastage of the fern. About this time, good soakings with manure water, prepared by soaking sacks of cow-dung in a barrel of water, will have a good effect. It is useless putting the plants out in the field during or before adverse weather, and if the weather during the second six months of their growth in the nursery is dry, every effort by watering and manuring should be made to keep them growing so that well-grown young plants of up to a foot or more in height are available at the end of the period. If they are left in the nursery for a year, having been planted at the beginning of a wet season, suitable weather for establishment when put out in the field is likely.

In the first beds of cuttings from mother bushes selected for further examination marked differences in the stand of rooted plants will be found. If the average stand in the first trial amounts to, say, sixty per cent of the original cuttings, clones giving less than thirty to forty per cent may be discarded. The only case in which further trial of an apparently poor rooter is worth while is where there is obvious reason for failure, *e.g.*, one bed as a whole has done badly due to poaching by shade tree roots, poor soil, etc. In such a case, the worst rooters in that bed only should be discarded.

In general, it has been found at St. Coombs that good rooters in the nursery establish well in the field, but it is very desirable to ensure that sufficient cuttings of each clone are available for supplying the multiplication plots later in the season. It is usually possible to make a very good guess as to which will prove the best clones from the uniformity of stand, spread and vigour of the young plants in the multiplication plots after a year or so's growth. There is no reason at all why material from the mother bushes of such clones should not be propagated for use as supplies pending further test, for the numbers available in the early stages will be relatively small, and whatever their quality, it is unlikely on the average to be worse than the average of seedlings, and their ease of establishment and subsequent yield is likely to be greater. In other words, the progeny of such bushes will be better on the average than the seedlings that would otherwise be used.

POSTSCRIPT

Recent experience has suggested that one cause of poor rooting in the nurseries is damage to the base of the stem inflicted during planting. If the labourer works in the most convenient position, he squats on the bed facing his work with the result that the soil becomes much consolidated before the cuttings are inserted. If cuttings are thrust into such soil, the soft outer tissues are forced away from the central stem and injured, the end of the cutting presenting a frayed appearance. The remedy is for the soil in front of the labourer to be loosened with a handfork before the cuttings are inserted. Thereafter, the soil is firmed immediately around the stem by a heavy pressure of the fingers as already described. This procedure can be quickly carried out, and imposes little delay in planting.