*SHADE TREES FOR TEA

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The value of shade trees in the long-term agricultural policy of a tea estate is widely recognised but it is important that their functions should be equally appreciated before embarking on a rotational system of planting.

To name some of these:—

1. They of course provide shade beneficial to growth in tropical countries.
2. They benefit the permanent crop, in this case tea, provided a balance between protection to the tea and absorption of the soil moisture is maintained.
3. The protection afforded by shade reduces high temperatures destructive of organic matter in the soil.
4. They provide large quantities of green manure, either in the form of loppings or leaf-fall, for maintaining humus and soil fertility.
5. They assist sub-soil aeration by penetrating intractable soils.
6. They protect the tea from sun scorch and hail.
7. They provide a valuable litter for checking loss of soil moisture and erosion. For example, Albizzias much more than dadaps soften the impact of heavy rain by converting it into a fine spray.

There are, however, dangers inherent in the indiscriminate use, or perhaps it should be termed abuse, of shade trees as certain species introduce root disease, or, if improperly handled, accentuate a fungus disease such as blister blight or cause, in the case of *Acacia decurrens*, a leaf disease such as Cercosporella. If left uncontrolled or allowed to grow too large, shade trees also compete with the permanent crop for moisture and nutrients.

Recent experiments in Assam appear to indicate a lower response from nitrogenous fertilisers under heavy shade. Indeed, it is claimed that certain types of tea give little, if any, response under heavy shade, and that results from different types, to nitrogen applied under heavy shade, vary. These experiments are probably of too short duration to provide the final answer.

Experience shows that although well regulated shade is beneficial, excessive shade provided by uncontrolled or too closely spaced trees may be, and generally is, harmful. In the past there has been much evidence in Ceylon of the restrictive effect on crop of excessive shade and lack of response to fertilisers caused by a close stand of old grevilleas or tree legumes although soil structure has been improved and humus built up.

All this emphasizes the need for choice of the right type of tree and correct management. Generally speaking, it may be said that the tree legume that thrives

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best in any given locality is the most suitable provided it is correctly treated. Periodical lopping controls growth and ensures an adequate foliage for green manure purposes as opposed to excessive wood growth in the case of unlopped trees.

Correct spacing and rotational replanting are of vital importance as affecting crop quality and the incidence of fungoid and leaf diseases. It is necessary therefore to adhere to a long-term planting policy.

During the war closer planting of tree legumes was adopted on some estates to compensate partly for the shortage of fertilisers, but when the latter were again available in plentiful supply the stand of trees was reduced to normal. Where however this was delayed for various reasons the original stand of trees became overmature causing excessive shade and limited response from heavier doses of fertilisers owing to competition with the tea. The quality of the teas also suffered.

To quote one example. On an estate in a North East district, where prior to the war the stand of tree legumes was at 24 ft. by 21ft. spacing (*i.e.*, every 6th row of tea and 6th bush in the row, at 4 ft. × 3½ planting for tea), and of grevilleas at 48 ft. by 42 ft. spacing (*i.e.*, every 12th row of tea and 12th bush in the row), it was decided, owing to rationing of fertilisers, to plant tree legumes at 16 ft. by 14 ft. spacing. Even with frequent control this stand appeared at times to affect quality adversely, although not crop as the trees were young. When ample fertilisers were again available it was decided to revert to the pre-war stand of trees, but a delay in carrying out instructions resulted in trees in many fields becoming over-mature and competing with the tea for moisture and nutrients applied in larger doses. Overshading also accentuated attacks of blister blight causing a further decline in crop and vigour of the bushes. Immediately this was rectified both crop and quality improved. This example serves to emphasise the need for care in planting and vigilant control subsequently.

Various species of tree legumes require different treatment to ensure the best results. For example, there is a tendency to lop, or pollard, Albizzias on the same system as is employed for dadaps and gliricidias.

Apart from other functions it may be said that the green manure value of the Albizzia lies mainly in the constant leaf-fall, not in the loppings, and it is advisable therefore to maintain as large a "head" as possible by initial pollarding of the main stem when the tree has grown to a considerable size and thereafter by occasional pollarding of gormandisers only, not by regular lopping. If over-shading occurs heads can be thinned out not reduced in size. Admittedly Albizzias do not stand up well to wind and here closer planting and smaller heads are advisable.

Where winds are severe Acacias give the best results provided they are controlled by "hair-cutting" at fairly close intervals, and foliage is removed by this method at the beginning of the monsoon to minimise danger of attacks of Cercosporella. Much damage is done on estates by indiscriminate, premature and careless lopping of shade trees, often to the extent of causing actual casualties.

It seems unnecessary to emphasise the need for establishing a uniform stand of trees and for early replacement of failures, yet an irregular stand is more often the rule than the exception on estates. In this connection. Dr. Haworth's article in the *Tea Quarterly* of December 1952, would repay close study.

As one authority, Dr. T. Eden, has pointed out, "the continued fertility of soil in tea districts of old standing in Ceylon is rightly attributable to the presence of shade trees properly used, controlled and replaced at reasonably close intervals."

Tree Legumes & Grevilleas (Rotational Replanting)— Pro Forma Statement

Notes: G = Grevilleas, A = Albizzias, D = Dadaps } Original planting in bold type

Tea spacing, 4 ft. by 3½ ft.

Entries in *italics* show lines to be replanted.

Renewal Periods (which may be modified for local conditions).

Grevilleas say 12 years, establish new stand 6 years after original planting.

Albizzias say 8 years, establish new stand 4 years after original planting.

Dadaps say 8 years, establish new stand 4 years after original planting.

Tea Rows

Bushes in Rows	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33
1	**G**								*G*								**G**								*C*								**G**
2							**A**								*A*								**A**								*A*		
3																																	
4												**D**								*D*								**D**					
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6																																	
7																																	
8							**A**								*A*								**A**								*A*		
9	**G**								*G*								**G**								*G*								**G**
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The diagram following this article sets out one system of spacing and rotational replanting suitable for estates at a normal elevation in a South West district up country. There are, of course, other systems.

The system illustrated aims at rows of shade trees in various stages of maturity. Thinning out is best done by the removal of rows, not individual trees which become over-mature in the rows. Felling and removal immediately prior to pruning should be preceded by ringbarking, except under special circumstances.

In North East districts, subject to long dry spells, slightly closer spacing is advisable, and the advantage of having alternate rows of Albizzias and Dadaps is that during drought periods the latter tend to suffer defoliation whereas the former do not. A light, nicely diffused shade has advantages during dry spells.

Some species of tree legumes are notoriously moisture robbers and effective control during droughts is important. The subject of bush legumes and cover crops generally is not dealt with in this article although these make an important contribution to green manuring, soil improvement and conservation in any long-term cultivation policy.