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SHADE IN TEA

1. Objectives (This cancels the Circular No. 0-1, Serial No. 5/90, issued in October 1990)

1.1 Planting of shade trees has all along been associated with tea cultivation. Shade trees simulate forest conditions, which are believed to be the natural habitat of tea.

1.2 When tea is pruned, the bark of the frame that is shaded by the canopy for 3 - 5 years gets exposed. In the absence of shade, tea can be subjected to sun scorch. Over several pruning cycles, the problem of bark scorching also gets aggravated and this results in a reduction in bud break, weakening of the bush, occurrence of wood rot, decline in crop and death of the bush during drought. These features are more prevalent in Uva, some parts of the mid-country and the low-country.

1.3 Shade trees serve other purposes as well. For example, in the low-country, *Gliricidia sepium* has been found to be a suitable diversionary host to the swarming low-country live wood termite.

2. Planting, Establishment and Management

2.1 The establishment of shade should be done early during planting of the rehabilitation grass. This will ensure that there is adequate shade when the young tea is put out in the field. Shade trees should be planted in the rows where tea is proposed to be planted in order to facilitate easy movement of labour during various cultural operations. In addition, the grass surrounding each shade tree should be trimmed down in order to allow light and prevent smothering by grass.

2.2 In mature tea, where there is no shade the best time to plant shade trees are after pruning the tea. This will facilitate their easy establishment. If planted in mature tea in plucking, the branches of tea bushes surrounding the shade plant should be cut to allow adequate light. In addition, the shade plants should be protected by putting up a fence round each plant or by covering with empty fertilizer bags. Shade trees should be planted as a mixed stand of high and medium shade.

3. Establishment of Medium Shade

3.1 Calliandra calothrysus

Calliandra calothrysus is recommended for elevations up to 1500 m. It, however, thrives well in elevations between 300 - 1300 m. Calliandra should be established in the following manner:

To establish Calliandra directly in new clearings, 3 to 4 seeds should be sown at one place, on soil mound, where the planting hole is cut to a depth of 45 cm. After the seeds germinate, the seedlings should be thinned down, leaving one vigorous plant. Alternatively, seeds could be sown in poly bags and 4 - 6 months old seedlings could be planted out in the new clearing with the onset of rain.

Initial spacing should be 3.0 m x 3.6 m (10 ft x 12 ft) to enable the plants to give adequate shade for young tea. At the end of 3 years, they should be thinned down to a spacing of 6.0 m x 7.2 m (20 ft x 24 ft).

If more shoots emerge from the base of the plant, they should be thinned out to allow a maximum of three shoots to grow. This will prevent over shading of tea.

The first lopping could be carried out 18 - 24 months after planting at a height of 2.3 m (7 ft) from ground. Calliandra withstand lopping well and has good coppicing ability. Subsequent loppings should be done before the pod set.

3.2 Dadap (*Erythrina lithosperma)* and Gliricidia (*Glircidia sepium*)

Dadap and Gliricidia are dual-purpose trees, serving as medium shade as well as green manure crops. While Dadap is recommended for elevations above 600 m (2000 ft), Gliricidia could be grown below 900 m (3000 ft).

Since propagation by seeds is not practicable, both these species are to be established by planting poles of suitable size and maturity.

The poles used for planting should be obtained from a healthy mature tree and the trees lopped about 6 - 8 months before poles are cut for planting.

The poles should be 6 - 8 months old and have a girth of 5.0 - 7.5 cm (2 - 3 inch) at the time of planting. In addition, the branches should be ring-barked at least 6 - 8 weeks before they are taken at the point of cut. It has been observed that failure in establishment is invariably attributed to the use of over-mature branches. Therefore, use of any over-mature poles from fences, boundaries and senile trees should be avoided.

After lopping, the poles should be rested vertically against the mother tree, and not left horizontally on the drain or on the ground.

The poles should be planted within 48 hours after lopping. Any damage during transport will reduce the rate of success in establishment. Planting should be done with the onset of monsoon.

The height of the stump should be 1.8 - 2.0 m (6 - 7 ft) and the basal end should be buried to a depth of 30 - 40 cm (12 - 15 inch).

Prior to planting, both ends should be given a slanting cut by using a sharp knife.

Planting holes should be 30 cm (12 inch) wide and 45 - 60 cm (18 - 24") deep. 225 g (8 oz) dolomite should be mixed with soil while filling the hole. It would be advisable to incorporate 1 kg of compost into each planting hole. The poles should be planted after making an alavangoo hole. The pole should not be rammed into the planting hole, as this will cause damage to its bark. After planting, the soil should be well pressed round the pole. The top end of the pole should be covered with mud or polythene. In order to discourage the lateral sprouting, the poles should be lime washed with 20% solution of hydrated lime leaving about 30 cm at the top end of the pole

Dadap and Gliricidia withstand lopping well and have good coppicing. The first lopping should be done early to avoid the tree becoming top heavy. The first height of lop should be done at 1.8 m (6 ft) and a crown of branches should be encouraged at the point of first cut and subsequent cuts. Subsequent loppings should be done at a height of 45 - 60 cm (18 - 24") above the previous lopping.

Gliricidia could be lopped 2 - 3 times a year in most parts of the mid- and low-country while dadap could be lopped 1 - 2 times a year depending on the rate of growth. Loppings should be preferably done with the commencement of monsoon.

4. Establishment of High Shade

Grevillea robusta and *Albizzia moluccana or Albizzia chinensis* are recommended as high shade tree species. *Grevillea robusta* can be planted in mid and high elevations while *Albizzia moluccana* or *Albizzia chinensis* can be planted in mid and low elevations. *Albizzia* can, however, be established as an interim high shade, even in the elevation range of 1370 - 1500 m (4500 - 5000 ft)

When interplanted with medium shade species, the high shade trees could be planted with medium shade falling mid way between two high shade trees.

The planting holes should be 0.6 m (2.0 ft) deep with a top diameter of 0.3 m (1.0 ft). Dolomite at the rate of 1.0 kg (2.0 lb) could be incorporated into each planting hole.

By the third year, high shade should finally be thinned down to a spacing of 12.0 m x 12.0 m (40 ft x 40 ft) and the medium shade to 6.0 m x 7.2 m (20 ft x 24 ft).

It is preferable to plant the shade trees in the tea row to facilitate easy movement of workers engaged in the various field operations.

Both Grevillea and Albizzia seedlings should initially be raised in poly bags and thereafter planted out in the field with the onset of monsoon.

5. Management of High Shade

Albizzia trees should be pollarded when they are over 3 years, at a height of 6.0 m (20 ft). In order to encourage good lateral growth, Grevillea trees could be pollarded at a height of 5 m (15 ft) when they are 10 years old. There after upright branches should be pollarded annually. It s necessary to leave at least 3-4 healthy branches below the point of pollarding at different directions, therefore, the height of pollarding may vary accordingly.

The average life span of Grevillea and Albizzia is 30 and 12 years respectively. When the existing Grevillea is 20 years old and Albizzia 8 years, replacements should be established.

It is advisable to plant *Albizzia moluccana/Albizzia chienensis* around large rock outcrops in the tea field. This will prevent heating up of the rock, which radiates heat and scorches the tea around and also effectively use the space occupied by the rock outcrop.

Teas planted in the southern and western slopes of field experience greater warmth than those on the eastern and northern slopes. Therefore, a denser stand of shade is recommended for southern and western slopes of a field. For this purpose, the final spacing of high shade should be 12.0 m x 6.0 m (40 ft x 20 ft) and that of medium shade 6.0 m x 7.2 m (20 ft x 24 ft).

6. Removal of old Shade Trees

In order to ensure that the dead trees do not facilitate root diseases, they should be ring-barked uprooted along with the tea prior to replanting. However, if Gravillea is under 10 years old or if its girth is below 60 cm (24 inches), it may be retained.

The ring-barked trees, especially Grevillea, be inspected periodically to check whether there is any bridging up of the gap. New shoots emerging below the point of ring barking should be removed.

Ring-barking of trees, such as Grevillea, should commence at least 2 years before felling them.

Felling of shade trees should be done after all the leaves have turned yellow and fallen. It is preferable not to allow the stumps to remain above the soil and any such stumps so remaining should be covered with earth after cutting below the soil level.

New shade trees should be planted well before the old ones are removed, so that the field is not left without shade.

Ring-barking is not necessary if the roots can be completely removed.

7. Replacement of Shade trees

Generally, in about 10 years *Albizzia* and 25 years *Grevillea* shade trees become unmanageable. Also, pollarding and uprooting of very old trees can lead to heavy damage t tea. Therefore, shade trees should be replaced every 10-25 years depending on the species. At a time when tea is being replanted young shade trees less than 10 years in age and less than 60 cm (24 inches) girth could be retained.

Shade tree species and planting distances recommended for the different tea growing regions

(a) Up country: Over 1200 m (4000 ft)

Type of shade	Shade tree species	Initial stand	Final stand
High shade	*Grevillea robusta*	6.0 m x 6.0 m (20 ft x 20 ft)	12.0 m x 12.0 m (40 ft x 40 ft)
Medium shade	*Calliandra calothrysus*	3.0 m x 3.6 m (10 ft x 12 ft)	6.0 m x 7.2 m (20 ft x 24 ft)
Medium shade	*Erythrina lithosperma* (Dadaps) suitable upto 1500 m (5000 ft)	3.0 m x 3.6 m (10 ft x 12 ft)	6.0 m x 7.2m (20 ft x 24 ft)
Medium shade	*Acacia pruinosa*	3.0 m x 3.6m (10 ft x 12 ft)	6.0 m x 7.2 m (20 ft x 24 ft)
Medium shade	*Acacia decurrens* suitable above 1370 m (4500 ft)	3.0 m x 3.6 m (10 ft x 12 ft)	6.0 m x 7.2 m (20 ft x 24 ft)

(b) Mid-country Wet Zone: 600 - 1200 m (2000 - 4000 ft)

Type of shade	Shade tree species	Initial stand	Final stand
High shade	*Grevillea robusta*	6.0 m x 6.0 m (20 ft x 20 ft)	12.0 m x 12.0 m (40 ft x 40 ft)
High shade	*Albizzia moluccana Albizzia chinensis*	6.0 m x 6.0 m (204 ft x 204 ft)	12.0 m x 12.0 m (40 ft x 40 ft)
Medium shade	*Calliandra calothrysus*	3.0 m x 3.6 m (10 ft x 12 ft)	6.0 m x 7.2 m (20 ft x 24 ft)
Medium shade	*Gliricidia sepium* (upto 900 m or 3000 ft)	3.0 m x 3.6 m (10 ft x 12 ft)	6.0 m x 7.2 m (20 ft x 24 ft)