AGRICULTURAL SERIES.

DEPARTMENT OF AGRICULTURE, S.S. & F.M.S.

Agricultural Leaflet No. 10.

COFFEE.

(*COFFEA* SPP.)

—:o:—

Published by the Department of Agriculture, Straits Settlements and Federated Malay States, Kuala Lumpur, F.M. S. and Printed by Caxton Press Ltd., Kuala Lumpur.

COFFEE.

(Coffea spp.*)*

Description.—There are three distinct types of coffee cultivated. Liberica coffee is specially suited to the coastal alluvial clays but will grow inland on clay loams if laterite gravel is absent. Robusta is suitable for cultivation inland on the plains and on the hills at low elevations. Arabica coffee thrives best at high altitudes and has recently been planted at Cameron Highlands, Pahang, at 4,000 feet above sea level.

Liberica—A sturdy bush or small tree with large fruits, which produces a coffee in particular demand by Asiatics. The pulp layer of the fruit is thick, the proportion of fresh fruit to prepared beans being usually about 10 to 1. Excelsa is a similar coffee and may be grown inland on a variety of soils and at higher elevations.

Robusta—A more slender bush with smaller berries produced in dense clusters. There is much variation in the size of the fruit. The bush is hardy and matures early and for this reason is used as a catch crop with permanent forms of cultivation. The percentage of fresh berries to prepared beans is about 5 to 1.

Arabica—This coffee produces a bean of superior quality, but is liable to damage from leaf disease (*Hemileia vastatrix*). The proportion of fresh fruit to prepared beans is 5.5 to 1.

Propagation.—The number of seeds per pound of the three types is approximately as follows:—Liberica, 800; Arabica, 1,200; Robusta, 1,600. Coffee is raised from seed sown in shaded nursery beds of prepared soil. When planting small areas basket plants are recommended. Germination commences at six weeks from sowing and may continue for a month or more. The seedlings should be gradually exposed to full sun and are ready for transplanting when they have four pairs of leaves *i.e.* about three months after germination.

Planting.—The following planting distances are recommended:—

Liberica	12 ft. x 12 ft. = 302	bushes per acre.
Robusta	10 ft. x 10 ft. = 435	„ „
Arabica	8 ft. x 8 ft. = 680	„ „

The land having been cleared and drained, should be holed a month before planting. Holes 2 feet deep and at least 1½ feet square should be provided and a quantity of surface soil and any available organic matter placed at the bottom. Transplanting is undertaken at the commencement of the rains and a definite advantage is obtained by shading each seedling with

a cone of palm leaves. It is essential to avoid a bent taproot when planting coffee and should the taproot protrude from the transplanter the exposed portion must be cut off.

Cultivation.—Experiments at the Central Experiment Station, Serdang, show that low-growing cover crops such as Calopogonium and Centrosema retard the growth of coffee bushes. Erect legumes, *e.g.* Crotalaria and Tephrosia, may be employed as hedges to prevent soil erosion. Such legumes should be lightly pruned about every six months and the clippings added to the soil. High shade, although often recommended, so far has proved uneconomical at Serdang, since the bushes produce excessive growth and less crop under such conditions. The land should be kept clean-weeded by means of a regular weeding round. Coffee is a shallow-rooted plant and care should be taken not to disturb the surface soil unnecessarily. Sickly or stunted plants should be removed and replaced by healthy seedlings.

Pruning.—The primary object of pruning is to improve the form of the bush in order to encourage the maximum production of berries by allowing free access of light and air round the main stem. The Robusta types require more attention in this respect than other coffees. When the plants are about one year old, all suckers and superfluous stems must be removed, preferably by hand when still green. Topping is undertaken when the bushes reach 6 to 7 feet in height. The bushes are cut back to 4 feet 6 inches (Arabica) and 5 feet 6 inches (Liberica and Robusta). The cut should always be made through mature wood. This has the effect of causing the secondary and tertiary branches to develop so that thinning out becomes necessary. Normal pruning commences during the third or fourth year. All secondary branches within 6 inches of the main stem are removed and afterwards alternate secondaries on each side of the primary or lateral branches are periodically thinned. The removal of suckers from the main stem should be attended to every 6 to 8 weeks. Badly shaped bushes may be rectified by cutting back to within 9 inches from ground level and allowing one sucker to grow and form a new bush.

Manuring.—There is a paucity of knowledge regarding the manurial requirements of coffee under local conditions. Several experiments are in progress to obtain information on this subject. On virgin land, artificial fertilizers are not usually necessary until the first or second crop has been harvested. An annual application of nitrogen in the form of 2 ozs. sulphate of ammonia per bush results in increased growth. A dressing of 3 cwts. rock phosphate and $\frac{1}{4}$ cwt. sulphate of potash per acre together with weeds and leaves, buried in trenches between the rows, has proved beneficial at the Central Experiment Station, Serdang. Since an economical dressing of fertilizers must be aimed at, experiments are in progress to determine whether or

not a complete dressing of fertilizers is necessary. A compost of berry residues, wood ashes, grass and green manure clippings, may be dug into the soil between the bushes with advantage. This is only practicable when the planted area is small. Fertilizers and manure should be applied to the soil near the extremities of the feeding roots with as little disturbance to the roots as possible.

Harvesting.—Robusta coffee commences to flower early, often when the bushes are nine months old. The berries mature within about ten months from flowering. A small crop is obtained during the third year, but with the other types of coffee, cropping usually occurs in the fourth year. The main cropping seasons are May/June and December/January, but small crops may be harvested throughout the year. In picking coffee, only ripe berries should be collected and a frequent harvesting round is necessary to ensure that this is done. Additional labour is often required during the main cropping season. Yields are dependant upon both variety, and soil conditions. Robusta in full bearing will yield 4 to 6 piculs* of beans per acre per annum, and Liberica slightly higher. Yields averaging 7 piculs have been obtained from Liberica and with systematic manuring as much as 10 piculs. Little information regarding yields from Arabica in this country are available. In South India the crop per acre varies between 4 and 5 cwts. per annum.

Preparation.—There are two means of preparing coffee; the dry, and the wet-method. The former consists of drying the berries in the sun for 7 days and removing the dried skin and pulp by a de-husker. This method, commonly employed by Asiatics, produces a poor quality coffee and is not recommended. The preparation of coffee on a large scale requires a properly organized factory with power machinery. On small estates, machines, either turned by hand or driven by a low-powered engine, are used. The layout of the factory and machines demands considerable care to ensure continuity of the various operations, which are as follows :—pulping, fermenting, washing, drying, and hulling. A plentiful supply of fresh water is essential. The berries upon arrival at the factory are placed in a receiving tank, from which they are delivered in a stream of water to the hopper of the pulper. Various types of de-pulpers are in use. When the de-pulped berry, known as parchment, comes from the pulper it is covered with mucilage, which is removed by fermentation. During this process the parchment is washed into concrete tanks where, after the water is run off, it is covered with sacks and allowed to ferment for a period of 24 to 72 hours according to conditions. The parchment is then stirred in the tanks and covered with water. Washing consists of passing the parchment through concrete channels containing a plentiful supply of running water, until

---

*1 picul = 133⅓ lbs.

it is quite clear. Floating or other imperfect beans are strained off and classified as inferior grade coffee. Drying may be undertaken either on a cement barbecue (drying shelves which roll under cover) or in hot-air driers. The former method takes about five days to complete, and the latter 48 hours only.

The removal of the parchment covering and silver-skin is effected by a small hand or power huller of which there are a number on the market. Any remaining outer shells and silver-skin are separated by hand-sieving, or by means of a winnower. The beans are then graded according to size and bagged for market.

References.—

Articles on coffee are obtainable from the Agricultural Economist and Editor, Department of Agriculture, S.S. and F.M.S., Kuala Lumpur.

Cultivation of Coffee in Malaya. *Malayan Agricultural Journal,* Vol. XVIII, No. 10, price 50 cents.

Liberian Coffee in Malaya. *Malayan Agricultural Journal,* Vol. XIX, No. 11, price 50 cents.

Coffee in South India. *Malayan Agricultural Journal,* Vol. XIX, No. 7, price 50 cents.

The Coffee Berry Beetle Borer. *Malayan Agricultural Journal,* Vol. XXI, No. 1, price 50 cents.

The Coffee Clear Wing Hawk Moth. *Malayan Agricultural Journal,* Vol. XX, No. 10, price 50 cents.