THE CULTIVATION OF THE MANGO IN THE DRY ZONE OF CEYLON

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INTRODUCTION.

THE mango has been grown in Ceylon since ancient times, and it is a highly popular fruit. It is usually grown in dwelling compounds and seldom on an orchard scale. The tree has the greatest possibilities of development in the dry zone where it can be grown with little or no irrigation. Dry climate is most suited to the mango especially during the time of flowering when rains affect the setting of fruits. At present, great interest is being taken in the cultivation of the mango, and an increasing number of mango grafts of good variety are planted yearly.

ALTITUDE AND RAINFALL.

The dry zone areas in Ceylon never rise above 1,000 feet and comprise mostly lands below 300 feet. The mango is a tree of the plains. According to Macmillan (6), the tree thrives from sea level to about 3,000 feet or higher. Woodrow (12) writes " Grand specimens of the tree occur on the hill ranges of India about 1,000 to 3,000 feet altitude ". De (1) considers that " above the altitude of 4,000 feet the mango can seldom grow or thrive under ordinary conditions ".

The average rainfall in the dry zone areas ranges from 25 to 75 inches. During the south-west monsoon, (from May to September) the average rainfall is between 10 to 20 inches. The dry zone areas receive most of the annual rainfall, during the months, October to December. An annual rainfall from 25 to 75 inches falling in the months, September to December, when the mango is not in bearing would be most suitable. In Ceylon, the main bearing season of most of the better class mango varieties is in the first half of the year.

The mango flowers during the months, January to March, and the fruits mature during May to July. The pollen grains in the single stamen of the flower are easily washed away by rain. One striking instance was noticed at the Farm School, Jaffna, in the year 1938. The Dilpassand tree No. 2 began to flower profusely during the last week of January, 1938. It was expected that there would be a large number of fruits set on the tree ; but as the flowers opened in the first week of February rain fell and washed off most of the pollen, with the result that only a few fruits were produced on the tree. Popenoe (11) writes : " It is believed throughout India that damp weather at the time of flowering is one of the commonest causes of crop failure. The mango flower possesses one pollen-bearing stamen and the structure of the former is such that this, as well as the stigma, which must receive the pollen, are exposed to the weather and the slightest dampness in the air above the

degree of humidity washes away the pollen and prevents fertilization. This seems to be one of the principal reasons why the mango fails to bear heavily in excessively moist climates". Rain is injurious not only during the time of flowering but also when the tender fruits develop. Rain makes the fruits watery and insipid. The absence of rain during the bearing season would be an ideal condition.

In the dry zones, there are many regions where there is only a small amount of rainfall distributed throughout the bearing season. The regions possessing the ideal conditions for the cultivation of mango are given below in their order of merit :—

(1) Jaffna Peninsula.
(2) Rest of the Northern Province.
(3) A portion of North-Western Province (see table below).
(4) A portion of Southern Province (see table below).
(5) North-Central Province.
(6) Eastern Province.

Given below is a table showing the total rainfall and the amount of rain which falls during the mango bearing season at a few places in the regions enumerated above :—

1.—Jaffna Peninsula.

	Name of Place.	Total rainfall.	Amount during bearing season.	Suitability.
1.	Jaffna Town	49 ..	10·45 ..	Excellent
2.	Point Pedro	45 ..	8·97 ..	,,
3.	Kankesanturai	46 ..	8·33 ..	,,
4.	Vaddukoddai	51 ..	9·44 ..	,,
5.	Kayts	46 ..	8·47 ..	,,
6.	Chavakachcheri	56 ..	10·37 ..	,,
7.	Pallai	52 ..	9·94 ..	,,
8.	Elephant Pass	48 ..	10·14 ..	,,
9.	Delft	42 ..	9·25 ..	,,
10.	Tinnevely	63 ..	22·10 ..	Very fair

2.—Rest of the Northern Province.

1.	Paranthan	52 ..	12·37 ..	Excellent
2.	Mankulam	58 ..	16·62 ..	Good
3.	Vavuniya	58 ..	22·56 ..	Very fair
4.	Mullaitivu	53 ..	13·54 ..	Excellent
5.	Mannar	39 ..	12·41 ..	,,
6.	Mantota	40 ..	13·96 ..	,,
7.	Murunkan	42 ..	14·03 ..	,,
8.	Nochchikadai	35 ..	12·12 ..	,,

3.—A portion of North-Western Province.

1.	Penparippu	37 ..	13·24 ..	Excellent
2.	Kalpitiya	40 ..	13·64 ..	,,
3.	Tabbowa	61 ..	20·14 ..	Very fair
4.	Puttalam	45 ..	16·71 ..	Good
5.	Madurankuli	49 ..	18·10 ..	,,
6.	Chilaw	54 ..	22·51 ..	Very fair
7.	Battulu-oya	54 ..	19·20 ..	Good
8.	Horakele	57 ..	23·12 ..	Very fair

4.—A portion of Southern Province.

Name of Place.	Total rainfall.	Amount during bearing season.	Suitability.
1. Tangalla	53 ..	18·45 ..	Good
2. Tissamaharama	40 ..	15·99 ..	„
3. Udājiriwila	65 ..	22·19 ..	Very fair
4. Liyangahatota	49 ..	20·00 ..	Good
5. Mamadola	46 ..	16·78 ..	„
6. Arachchiamma	69 ..	25·56 ..	Fair
7. Matara	73 ..	23·72 ..	Very fair
8. Hambantota	38 ..	13·95 ..	Excellent
9. Yala	44 ..	15·10 ..	„

5.—North-Central Province.

1. Madawachchi	53 ..	13·41 ..	Excellent
2. Anuradhapura	55 ..	19·81 ..	Good
3. Mihintale	59 ..	18·15 ..	„
4. Nachchaduwa	57 ..	21·43 ..	Very fair
5. Minneriya	75 ..	30·16 ..	Fair
6. Horowapatana	62 ..	21·90 ..	Very fair
7. Topawa	65 ..	29·11 ..	Fair

6.—Eastern Province.

1. Andankulam	59 ..	20·21 ..	Very fair
2. Trincomalee	63 ..	18·58 ..	Good
3. Vakeneri	72 ..	25·33 ..	Fair
4. Batticaloa	62 ..	23·45 ..	Very fair
5. Rukam	75 ..	29·06 ..	Fair
6. Kalmunai	61 ..	25·42 ..	„
7. Tirukovil	58 ..	25·40 ..	„
8. Sakuman	59 ..	25·55 ..	„

Site and Soil.

The selection of site becomes important when the mango is to be planted in an orchard scale. It is desirable that the site selected should be situated on level ground, near a railway station connected by a good road. The site selected should also be away from jungles where monkeys abound. Water should be easily available in the selected site for irrigation of young trees. Care should be taken that in the site selected the sub-soil does not contain rocky layers.

The mango is an accommodating tree. Any well-drained, sufficiently deep soil would grow healthy trees. In the Jaffna Peninsula mango trees situated on red limestone soils do best. Joachim and Kandiah (4) say of Jaffna red loams, " the soils are devoid of free Calcium Carbonate but contain fairly high exchangeable base contents. Calcium constitutes 80 per cent. of the bases. In reaction they are alkaline. Total lime, phosphoric acid and potash contents are very low. The iron content is fairly high when compared with those of the grey and brown soils ". Of the red heavy loams they say, " the soil is particularly rich in lime but its phosphoric acid and potash contents are also quite high. The clay analysis reveals an alumina content of 35 per cent., an iron oxide content of 17·7 per cent. (the deeper red colour of this soil being apparently due to this fact) ". One of the good varieties of mango in the North, the ' Chembattan ' derives its name from the type of soil on which it thrives. (Chembattan in Tamil means one who hails from red soils.) The presence of lime in the soil appears to produce in the fruit a better

flavour and sweetness. The red soils of Ceylon associated with limestone are well suited to the mango cultivation. The fruits produced on sandy soils are usually of poor quality. Woodrow (12) writes, " fruit of the highest quality may be produced on a loamy soil 3 feet in depth containing 5 to 10 per cent. of lime and peroxide, enough peroxide of iron to give the soil a reddish tinge, in addition to the usual ingredients of a fertile soil ". Burns and Prayag (1) state, ' From our observations it appears that the red soils of Dharwar derived primarily from haematetic quartzite and containing very few pieces of rock, and the red laterite soils of Belgaum, Ratnagiri, and Goa are pre-eminently suited to the mango. The mango does not thrive on soils with much hard rock, shale, or pure sand '. Kinman (5) writes, " Mango trees are often found on very light infertile sand which may be a few feet in depth and still produce flourishing growths if the sub-soil is suitable ".

PREPARATION OF LAND AND PLANTING.

If the mango is to be planted on an orchard scale, it becomes necessary to prepare the land for planting. If the orchard is to be located in virgin jungle, the jungle trees must be cut and burnt and the stumps removed if possible. The orchard should be protected from stray cattle, other animals and intruders by good barbed wire fences. The pits should be marked and dug at the desired spacing. As mango trees are irrigated during the first two or three years of planting, attention should be paid to the irrigation of the orchard. The efficiency of irrigation depends on the proper grading and levelling of the channels. The fall or the slope of the land can be easily ascertained by a trial irrigation before planting the trees. It is economical to grade the slope before planting. Ordinarily the distance of planting should be about 35 feet apart, but if the trees are of a larger variety the distance between the trees should be increased to 40 to 45 feet. Wester (1) gives 10 metres (about 33 feet) as the minimum distance at which a tree should be planted. Burns and Prayag (1) write, " As a generally suitable distance we therefore recommend 30 feet apart each way ". If the trees are planted very much closer the side branches are apt to interlace with each other. Planting 35 feet apart facilitates ploughing and other intercultivation operations. For laying out an orchard the square system is to be recommended. The square system leaves ample space in the middle for cultural operations between the rows of trees. Ploughing can be carried out in all four directions.

Pits can be marked by coir strings. Knots are made in the strings to indicate the distances which separate the trees. Two inch diameter iron rings might be attached at the knots for pegging. Knots may be pulled out of positions for digging the holes and brought back after digging precisely to the same spot. Pits four feet square and four feet deep should be dug, and the earth thrown round the pit and broken to reduce it to fine soil. The pits should be preferably left open for about three months before the rainy season for aeration and exposure to the action of the sun. If the soil is sandy the pits may be widened to include more organic manure into each pit. If the plants are to be planted immediately, only the top soil should be used filling the pit. Before filling the pit the soil should be mixed with a basketful of charcoal, a sufficient quantity of leaf-mould or dry leaves and sweepings to fill about two thirds of the pit, broken pieces of bones if available or a basketful of bone dust and a basketful of lime. The pit is then filled with the mixed

soil. Before planting it would be advisable to turn the mixture in the pit once or twice. In planting care should be taken to see that the graft union is not buried in the soil. Usually with the coming of rain, the soil in the pit sinks down owing to the looseness of soil and rotting of organic matter. It is therefore advisable to have a mound sufficiently high to allow for shrinkage of the soil on the top of the pit. A small hole should be made at the centre, on top of the bed, to receive the graft. Before planting, the pot in which the mango graft is potted should be removed gently without disturbing the roots. The grafts should be placed exactly at the spots where the knots in the coir string are found. With regard to the filling of the pit Woodrow writes, " Pits for planting may be dug 3 feet in each dimensions, the upper portion of the soil being kept apart from the remainder, and about 20 pounds weight of bones as fresh as are procurable may be placed at the bottom of each pit and the soil on the margin to a depth of 9 inches may be drawn inward burying all grass and weeds. The surface soil mixed with manure may then be placed in the pit sufficient to bear the upper roots about an inch lower than the margin of the pit ". Burns and Prayag (1) state, " We recommend mixing one hundred weight of well rotted farm yard manure with the earth to be placed in the pit plus 5 pounds of bone meal and 10 pounds wood ashes. No raw manure should be in contact with the roots."

After planting the soil round the plant should be gently pressed down as the plant is held erect. It is advisable to commence planting after the rains. The plant should be tied to a stake driven near it, so that it may not be blown about by the wind. Then the plant should be watered copiously to allow the soil in the pit to settle down.