CHAPTER II

CARDAMOM AND ITS CULTIVATION

The cardamom plant ........ 24
Cardamom cultivation ........ 25
Pests and disease management ........ 28
Beekeeping in cardamom plantations ........ 29
Harvesting ........ 30
Research on cardamom culture ........ 31
Factors influencing productivity and production ........ 33

Plates
2.1 A view of a cardamom plantation ........ 24 A
2.2 A primary nursery of cardamom ........ 24 B
2.3 A secondary nursery of cardamom – spraying plant protection chemicals ........ 26 A
2.4 Planting the cardamom seedling in the field ........ 27 A
2.5 Mysore variety of cardamom plant ........ 27 B
2.6 Malabar variety of cardamom plant ........ 28 A
2.7 Manuring for cardamom plant ........ 28 B
2.8 Dusting plant protection chemicals against pests and diseases ........ 28 C
2.9 Harvesting of cardamom from Vazhukka variety of cardamom plant ........ 31 A
CHAPTER - II

CARDAMOM AND ITS CULTIVATION

As mentioned in the earlier chapter, the true cardamom of commerce is the dried fruit of the plant *Elettaria cardamomum* Maton. The whole fruit 8 to 16 millimeters in size, is a green three sided oval capsule containing 15 to 20 dark, hard, angular seeds. The cardamom seeds have a characteristic warm, slightly pungent and highly aromatic flavour, faintly reminiscent of camphor. Decorticated cardamom capsules consist of husked, dried seeds. The essential oil occurs in the large parenchyma cells underlying the epidermis of the seed coat. In recent times, cardamom oils and oleoresins are also extracted from cardamom capsules or seeds and are used like cardamom capsules, seeds and powder.

Native to the moist, ever-green forests of south India, cardamoms were collected from wild plants in early days. Now it is cultivated mainly in India, Guatemala, Tanzania, Sri Lanka and, to a very small extent

For a detailed discussion of the commercial varieties and grades of cardamom see, Chapter V.

The cardamom plant

The *Elettaria cardamomum* Maton belongs to the natural order *Scitaminae*, family *Zingiberaceae* under monocotyledons. It is a perennial plant having an underground stem with aerial shoots. Two varieties of cardamom plants are identified, and they are *Elettaria cardamomum* Maton variety Major, made up of wild indigenous types and *Elettaria cardamomum* Maton variety Minor, comprising of cultivated types like 'mysore', 'malabar', and 'vazhukka'.

A mature cardamom plant may measure about two to four meters in height. It is a shallow rooted plant. Flowers are borne on panicles which emerge directly from the swollen base of the aerial shoot. The peak period of emergence of panicle is from November to February. Flowering normally commences from April and extends up to October, June to August being the peak flowering period. After fruit set, about 100 days are required for the seeds to attain maturity.

Cardamom plants of cultivar 'malabar' type are medium sized, and attain two to three metres of height. The panicles are prostrate, and the fruits are
PLATE 2.2

A PRIMARY NURSERY OF CARDAMOM
round to egg shaped. This type is mostly cultivated in Karnataka, and to a lesser extent in Kerala and Tamilnadu.

Plants belonging to cultivar 'mysore' type are robust and attain three to four metres of height. The panicles are erect; and the capsules bold and longish. This type is mostly cultivated in Kerala.

Cultivar 'vazhukka' is a natural hybrid of the 'malabar' and 'mysore' types; and consequently, the plants belong to this type exhibit various characteristics intermediate to the above two types. The plants are robust like the 'mysore' and the panicles are semi-erect in nature. Cardamom capsules of this type are bold and roundish. It is extensively cultivated in Kerala and Tamilnadu.

Cardamom Cultivation

Cardamom is grown in areas where the annual rainfall ranges from 1500-4000 mm, in a temperature range of 10°-35°C and an altitude of 600-1200 metres above msl. Cardamom is generally grown in forest loamy soils. The soils of these tracts are generally acidic in nature.

---

2 The following discussion on cardamom cultivation is based on: Cardamom Board, Cardamom - Package of Practices, (Cochin, 1984).
with pH value of about 5.0 to 6.5. Adequate drainage is quite essential for successful maintenance of the crop.

Cardamom is propagated by the vegetative method, i.e., by suckers (rhizomes) as well as by using seedlings. The suckers are generally used for gap-filling to replace the degenerated and diseased plants. Propagation by raising seedlings from seeds, and later transplanting them in the main field is the most commonly followed practice. Vegetative propagation is simple and reliable and permits the multiplication of any selected clump or type. Plants by vegetative propagation commence bearing earlier than the seedlings transplanted. Vegetative propagation is advantageous in areas where 'katte' disease is not a problem.

For getting quality seedlings of cardamom, the nursery has to be managed carefully and scientifically. Two stages of nursery, viz., primary and secondary, are involved in raising seedlings. When the seedlings become ten months old, they are transplanted to a second nursery, where, the seedlings are maintained for another eight months before planting in the field.
PLATE 2.3

A SECONDARY NURSERY OF CARDAMOM - SPRAYING PLANT PROTECTION CHEMICALS
PLATE 2.4

PLANTING THE CARDAMOM SEEDLING
IN THE FIELD
PLATE 2.5

MYSORE VARIETY OF CARDAMOM PLANT
may be irrigated once in 15 to 20 days. It is very important to follow the regular schedule of irrigation at frequent intervals to supplement the soil moisture, which would help in the initiation of panicles, flowering and setting of fruits etc.

Pests and disease management

More than 40 species of insects and mites are reported to be pests of cardamom. Among them, 'thrips', 'hairy caterpillars', 'shoot and capsule borers', 'root borers', 'shootflies' and 'white flies' are commonly found in all the cardamom growing tracts of South India. Of these pests, 'thrips' are the most destructive and persistent ones in cardamom plants. These insects lacerate the surface tissues of tender capsules causing injuries, which develop as corky encrustations on pods. The cardamom capsules appear stunted, malformed and shrivelled. The seeds from such capsules are poor in aroma and flavour. Among other pests, 'shoot, capsule and root borers' are more damageous species. Proper use of pesticides in time would reduce the damages of cardamom pests.

Cardamom plants are also susceptible to a number of diseases caused by virus, fungi and bacteria. The major diseases which cause considerable economic losses
PLATE 2.6

MALABAR VARIETY OF CARDAMOM PLANT
PLATE 2.7

MANURING FOR CARDAMOM PLANT
DUSTING PLANT PROTECTION CHEMICAL AGAINST PESTS AND DISEASES
'Katte' or 'mosic' or 'marble', 'clump rot or rhizome rot' and 'chenthal'. Among these, 'katte' and rot diseases are the dreaded ones. 'Katte' is a virus disease and is prevalent in all the cardamom growing areas in India. No measures to treat this disease have been found so far. The only remedy is to identify the diseased plants and destroy them completely to avoid the spread of the disease. The loss of crop due to 'katte' disease is maximum in India compared to any other disease or pest. The productivity and production of cardamom plantations in India are also largely affected due to large scale incidence of 'katte' in cardamom plantations. As 'katte' affected plants continue to give some yield for some more time, the growers are reluctant to uproot and destroy the disease affected plants. The rot diseases also cause considerable damages to the plantations. These are caused by fungi and are associated with high rainfall conditions. Rot diseases can be controlled by taking proper propylactic measures before the onset of monsoon and in between dry spells during monsoon. 'Chenthal' disease is not a serious problem in cardamom plantations.

Beekeeping in cardamom plantations

Though self-compatible, cardamom is a cross pollinated crop, as self pollination is prevented in the
flower due to slight protrusion of the stigma above the stamen. Studies at Cardamom Research Station, Mudegere (Karnataka) and the Indian Cardamom Research Institute, Myladumpara (Kerala) have revealed that the honey bees are the principal pollinators of cardamom flowers. It was found that significant increase in fruit setting and its quality could be obtained in bee pollinated flowers. Hence bee-keeping is recommended in cardamom plantations for improving the productivity and quality of cardamom. Field studies have shown that four beehives per hectare of plantation would be sufficient to get sufficient number of bee pollinators. As maximum forage activity of bees are found in the morning hours of the day, it has been suggested that pesticide applications may be regulated accordingly to reduce damage to the bees. Bee-keeping not only enhances the productivity and quality of cardamom, but also brings in additional income to the growers from the honey collected in the beehives.

**Harvesting**

Cardamom plants normally start bearing capsules from third year of planting. However, economic yields are obtained from the fourth year onwards. In most of the areas, the peak period of harvest is September, October and November. The crop is harvested
at an interval of 15 to 20 days in Karnataka and 30 days in Kerala and Tamilnadu. Mature capsules are to be harvested just before the full ripeness for obtaining green colour on curing, for preventing splitting of capsules, for avoiding squirrel damage and for higher percentage of recovery.

Details of curing cardamom are discussed in Chapter V.

RESEARCH ON CARDAMOM CULTURE

Basic research on cardamom cultivation is done by the Central Plantation Crops Research Institute, Kasargod, Kerala. The Institute has set up a Research Station at Appangala, Karnataka. The Kerala Agricultural University, Trichur, Kerala has a similar cardamom research station at Pampadumpara, Kerala. The University of Agricultural Sciences, Bangalore, also has a cardamom research station at Mudegere, Karnataka. The Cardamom Board, Cochin has set up its Indian Cardamom Research Institute at Myladumpara, Kerala with Regional Research Stations at Saklespur, Karnataka and Thadiankuddissi, Tamilnadu. These are the main institutions undertaking research on cardamom cultivation. While the Research Institute of Cardamom Board started research activities
on cardamom culture only in 1969, the other institutions have been at work for the last several years.

Field investigations and studies reveal that findings of all these institutions are mainly confined to certain agronomical practices and pests and disease control. Much progress has not been made on the fundamental aspects of cardamom plant and its cultivation. Though 'katte' is a major virus disease affecting the entire cardamom plantations in India, no disease resistant plant has yet been developed by any of these research stations. So also is the case in the matter of other diseases and pests.

Genetic engineering and tissue culture have made tremendous progress in the agricultural sector as a whole in India and abroad. But, no significant advancement has been made so far in these areas in relation to cardamom either in India or in Guatemala.

The cultural research programmes on cardamom should be activated as in the case of coffee and rubber by the respective commodity boards, and the fruits of research activities should be made available to the growers for improving the productivity and production of cardamom in the country. An immediate step which could
be taken up in this context is the propagation of high yielding plants by the tissue culture method on a massive scale so that productivity and production can be improved in the shortest possible time.

**FACTORS INFLUENCING PRODUCTIVITY AND PRODUCTION**

Growers' experience has shown that the most important single factor that influences productivity and production is weather. The fall in productivity and production in the lean years of production, especially 1982-83 and 1983-84, can be definitely attributed to the severe drought in the cardamom plantation areas. As stated earlier, cardamom is a shallow rooted plant and hence its successful growth heavily depends upon well distributed rainfall all through the year for atleast 180 to 220 days. Guatemala, which has a productivity of over 250 kgs per hectare is reported to have a well distributed rainfall all through the year. In Guatemala practically no shade trees are also put up."

"The entire cardamom estates look like viewing tea estates without any blockage of view by shade trees. From the details of rainfall in Guatemala, it could be observed that there was no intense rainfall during July-September nor there was any dry weather of the magnitude seen in India".\(^3\)

---

Cardamom is mainly cultivated in the Idukki district of Kerala which is a drought prone area. At least in two out of five years drought causes severe loss of crop, as could be seen from the year-wise production statistics given elsewhere.

"The drought usually becomes so serious, and practically all the small streams in the plantation area go dry annually for a period of three to four months, ruling out the possibility of using sprinklers for irrigation". 4

The Cardamom Board advocates mulching and protection of plants by growing suitable shade trees. The Board also has a scheme for supplying sprinkler irrigation equipment on hire-purchase basis. But as quoted earlier, due to non-availability of water in the small streams during summer months, the response to the scheme for supply of sprinkler irrigation units is very poor from the growers. A scheme for tapping and utilizing water from the bigger streams and the smaller rivers in the area have been taken up by the Board for implementation during VII Plan period.

As in the case of drought, excessive rains in the plantation areas play havoc in the production of cardamom in the country. Though excessive rains have

4Ibid., p.11.
caused considerable damage to the industry twice during the last 20 years in 1969 and 1985, the damages have never been so intense as those of drought. Excess rain leads to large scale soil erosion in the slopy cardamom plantations. Excessive rains also bring in rhizome and fruit rot diseases to the plant. Rot diseases could be brought under control, if proper prophylactic measures are taken in time. The soil conservation measures are very costly in cardamom plantations because of the lie of the land in most of the cases. Of late, soil erosion has become a big problem in the plantation areas because of the large scale felling of trees and denudation of forests.

Other important factors influencing the production of cardamom are, elevation from msl; lie of the land and angle of sunshine; frost, wind and hail; nature of soil; shade and nature of shade trees; number of plants per hectare or density of plant population; varieties of plants used depending upon the elevational and climatic requirements; manuring patterns; pests and disease control; harvesting patterns; and above all, the management practices.

As these factors do not have much relevance to this study, they are not discussed in detail. However, one point which requires to be emphasized is that, of all,
drought has the maximum adverse impact on the production and productivity of cardamom in the country.

A close look at the developmental expenditure pattern of the Cardamom Board for the last 15 years reveals that the amount utilized so far for overcoming drought damages has been far from satisfactory. This is examined in detail in Chapter XI.