

layers, which are sufficiently hardened for about a year could be used for planting in the main field.



Well developed rooting seen from the polybag indicating the right time for separation



Detached layers ready for transplanting in the polybag



Successfully established layers in polybag

What are the advantages of air layering?

- Being a vegetative propagation method, the multiplied plants resemble the mother plants unlike in case of seedling-raised plants. Superior plants in terms of aroma, regeneration after coppicing and easy peeling types could be multiplied in large number.
- The technique of air layering is less cumbersome than grafting technique and hence less skill is required for performing the activity. Any farmer can practice it after observing it a couple of times. There is no separate requirement for raising the seedlings as rootstock, which is a pre-requisite in case of grafting.
- The input requirement is less and easily available material such as soil, FYM, empty milk bags could be employed thereby reducing the cost involved.

Since considerable area under spice crops including cinnamon in Andaman and Nicobar islands is under sustenance farming, use of cost-effective technique such as air layering could prove a boon for on farm production of quality planting material of the highly valued spice crop- cinnamon.



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Air layering in Cinnamon (*Cinnamomum verum* L.) in the context of Andaman and Nicobar Islands



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Air layering in Cinnamon

Introduction

Cinnamon (*Cinnamomum verum* L.), commonly known as *Dalchini*, is one of the ancient tree spices cultivated on commercial scale in India. Both bark and leaves of this spice are aromatic due to the presence of volatile constituents- cinnamaldehyde and eugenol, apart from numerous other chemicals. Many Indian cuisines are incomplete without cinnamon and it is commonly used in the form of bark pieces, bark powder and essential oil. The agro-climatic conditions of Andaman and Nicobar Islands are well suited for cultivation of cinnamon on commercial scale. The quality of cinnamon produced in the Andaman and Nicobar Islands is considered to be the finest. Being shade loving in nature, the crop could be successfully incorporated as an intercrop in the existing coconut and arecanut plantations. Further, a few plants could also be accommodated in the backyards, which could help farmers in getting additional income from the available land. Cinnamon is dried and could be stored for long time under appropriate storage conditions. It could also be processed into value added products such as bark powder, bark oil, leaf oil, oleoresins etc. Hence, cinnamon could be a profitable option for the island farmers.



Freshly harvested and completely dried bark

What is air layering?

Air layering is popularly known as gootee and is the process of multiplication of elite plants through vegetative means. The process involves removal of circular ring of bark from a suitable shoot, followed by covering the cut portion with suitable rooting medium. Such layers after rooting are separated from the mother plants and used for planting.

Why air layering in cinnamon?

In Andaman and Nicobar Islands, cinnamon is commonly propagated through seeds. However, seed propagation is known to create considerable variability amongst the regenerants. One can easily notice the variations in leaf size, shape and colour of new flush amongst the seedling progenies. In other words, all these seedlings would not produce bark and leaf of similar quality, and their yields also vary greatly. Further, in many fields it is seen that harvesting of some seedling-raised trees is not possible due to their difficult-to-peel barks. Such trees not only increase the cost of harvesting due to increased labour requirement, but also deter the farmers from harvesting those plants thereby reducing the yields from the farm.

The foremost step towards increased productivity of cinnamon would be adoption of improved varieties with desirable characters for cultivation. Even if only a few plants of such varieties are available, farmers can easily multiply them in large number through air layering technique and use them for area expansion. Alternatively, in the absence of availability of initial planting material of improved varieties, farmers themselves can identify superior mother plants with better coppicing ability, higher bark recovery, superior aroma and easy peeling nature. Such selected plants should be used for layering operations, which will produce the plants with similar characters as that of mother plants.

How air layering is done in cinnamon?

Air layering is commonly practiced during the monsoon period in order to ensure better rooting and survival. Under island condition, layering the shoots from June up to September was found to be successful; however, the extended rainy days could also support the operation with appreciable success. For layering, healthy shoots of about 20-25 cm length and about pencil size thickness should be selected. All the leaves and branches present near the ringing area on selected shoots should be removed. Two circular cuts are given to the shoot with a sharp knife in order to facilitate removal of a ring of bark of about an inch width. After removal of bark ring, a commercial formulation of rooting hormone is applied at the

uppercut end of the ring (towards the shoot apex). Application of root hormones facilitates early and better rooting of the layers, however rooting could also be induced without using them. The ringed portion is then covered with a moist substrate such as soil + farmyard manure (1:1) or coir pith. This substrate mass should be about 6-8 cm thick and care must be taken to maintain sufficient moisture in it to avoid drying of the layers. The substrate is wrapped with a plastic or empty milk pouch (20 × 20 cm) and tied with a thread to secure the layer in position. The layer should not feel too compact or too loose, when pressed in the palm.



Selection of shoot and removal of ring of bark for application of hormones



Placing substrate, covering with polythene and tying

After about 45-60 days, the well-developed and strong roots could be seen from the polythene cover. At this stage, the layers are ready for separation. For separation, a sharp cut is given below the rooted portion and layers are removed. These are planted in polybag containing soil: sand: FYM (1:1:1) and kept in shade for further growth and hardening. The process is said to be complete, when new flush arises from the plants, which generally takes about four to six weeks period. The