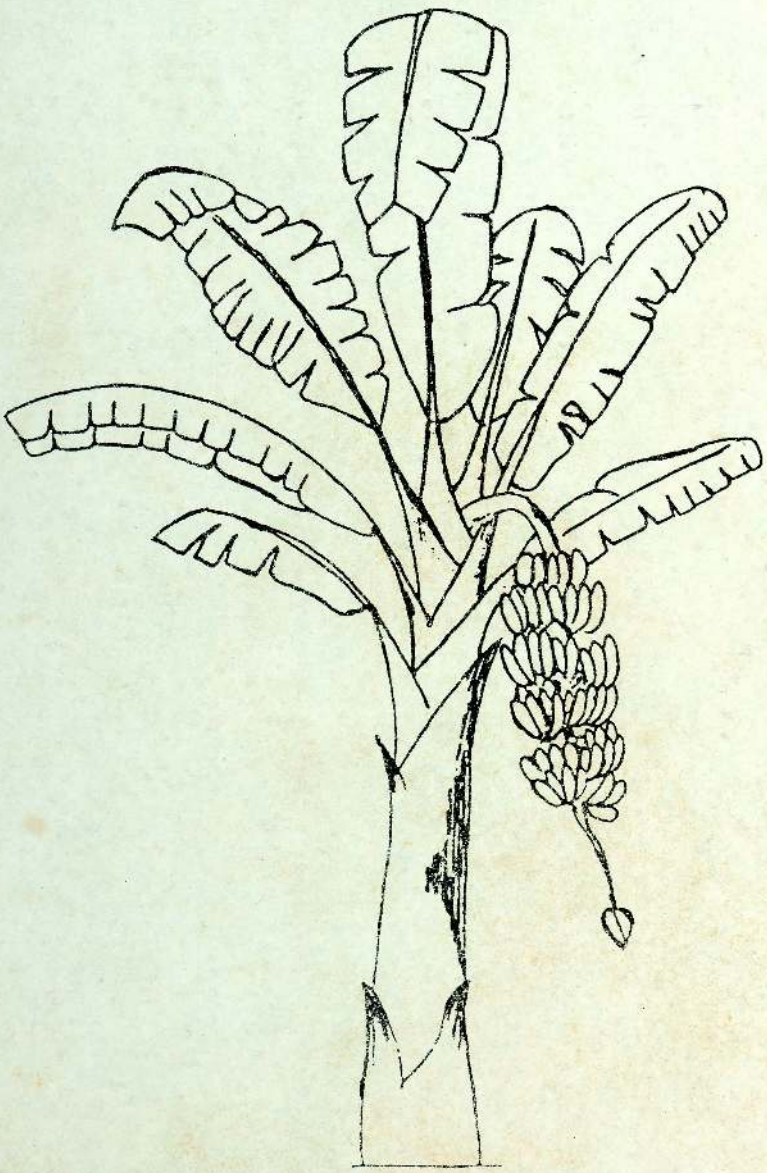
POST HARVEST PROCEDURES FOR EXPORT OF BANANAS



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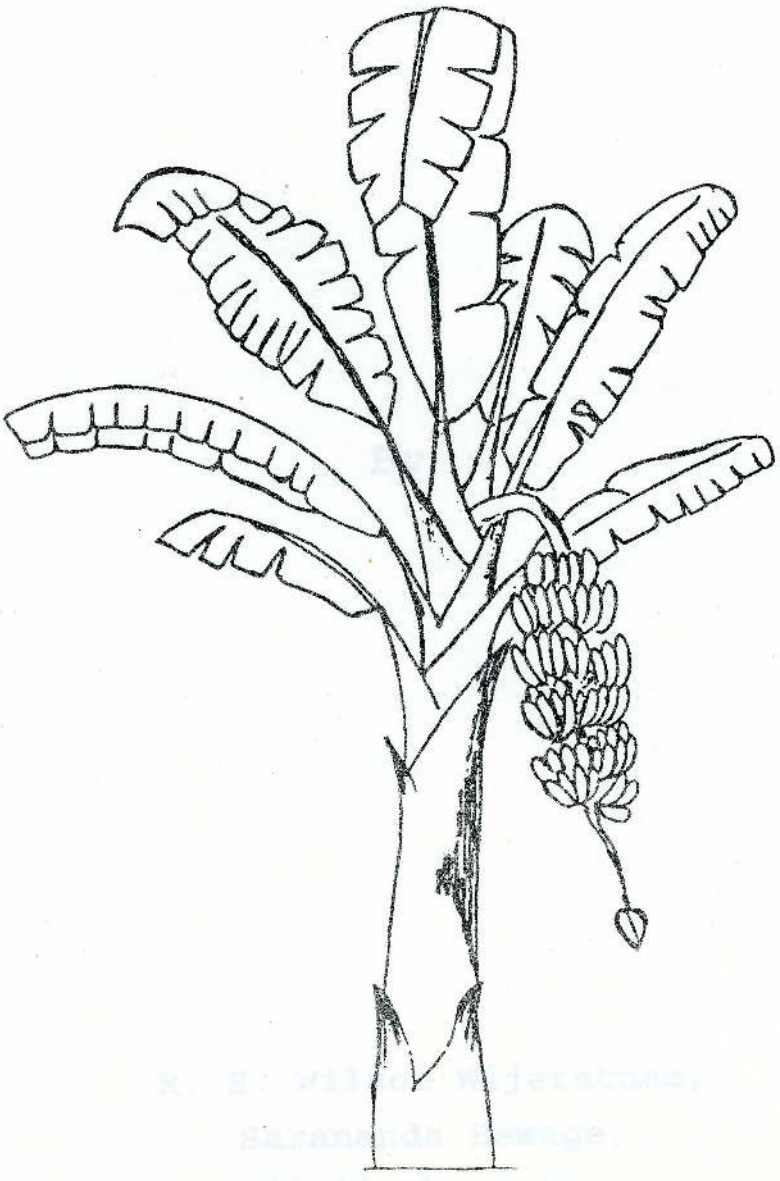

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POST HARVEST PROCEDURES FOR EXPORT OF BANANAS

By :

R. S. Wilson Wijeratnam,
Sarananda Hewage,
Nimali Abeyratne.

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CONTENTS

1. INTRODUCTION

The banana belongs to the genus Musa of the family Musaceae. It is a large herb with a pseudostem built up from leaf sheaths with its true stem, the rhizome, hidden under ground. The banana fruit is a berry containing many ovules but no seeds and the fruit develops by means of parthenocarpy ie. without fertilization. It is a dessert fruit which is a good source of Vitamin A, B_1, B_2, and C.

Many varieties of Bananas are grown in Sri Lanka. 'Embul' or 'Honderawala' Musa acuminata, AAB group, Cavendish sub group is the main variety grown in Sri Lanka as it tolerates diverse agro ecological regions and is also resistant to many common diseases such as Shigatoka and Bunchy top. It is cultivated in many parts of Sri Lanka but performs well in the dry zone under irrigation. The Embul Banana, which has a distinct flavour and fruit size, is a high export potential commodity. Bananas are harvested at full maturity for local consumption. However, bananas intended for export must be harvested at mature green stages depending on the destination and duration of the journey to the intended market.

Bananas could be successfully air freighted in good condition to foreign markets within a day or two. But for large export volumes, sea shipments would be more economical. Sea freight duration is around 21 days to Europe and the consignment will not reach the destination in acceptable quality if harvested at the mature ripe stage and transported at ambient temperature. The Post Harvest Technology Group of CISIR has adapted available technology for this purpose. Thus fruits harvested at the appropriate stage of maturity may be shipped under modified atmospheric conditions and at low temperature for successful sea transportation of quality Embul Bananas.

2. POST HARVEST PROCEDURES FOR EXPORT OF BANANAS

1. Bananas intended for sea and air transportation should be harvested at 11 and 13 weeks after flowering respectively. It is necessary to employ 02 experienced personnel for proper harvesting of bunches so as to prevent the fruit being damaged.

2. Harvested bananas should be transported to the packing shed immediately and exposure to sunlight should be minimized. During transportation precautionary measures should be taken to minimize any mechanical damage.

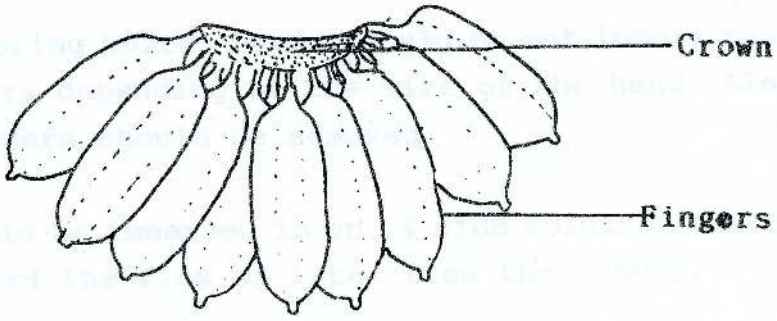

Fig. 1 : Banana hand.

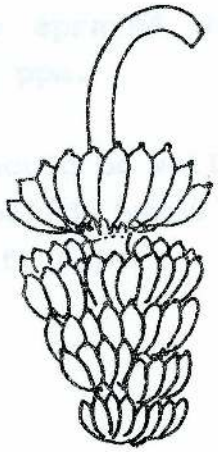

Fig. 2 : A bunch of bananas.

3. The floral remnants in the bunches should be removed before dehanding. Dehanding should be done with a dehanding knife that will give a sharp clean cut thus reducing fungal diseases.

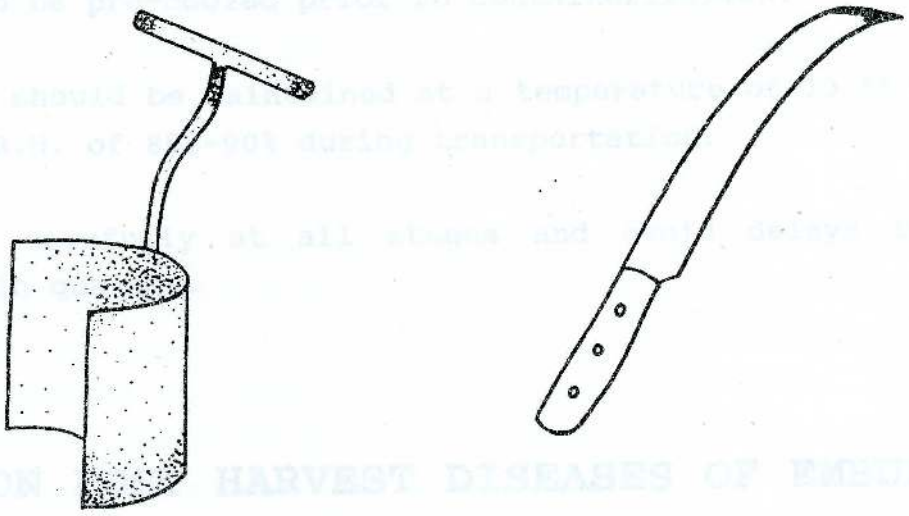

Fig. 3 : Dehanding implements.

4. Wash the bananas immediately after dehanding.

5. Using a clustering knife, hands should be cut into either 2 or 3 clusters depending on the size of the hand. Also defective fingers should be removed.

6. Clusters should be immersed in an 1% alum solution for 20 mins. to retard the flow of latex from the crowns.

7. Weigh the required quantity of bananas and label each cluster.

8. The crown should be sprayed with Thiabendazole at a concentration of 200 ppm.

9. Clusters of banana should be well packed in single layers in corrugated cardboard boxes lined with perforated polyethylene and kraft paper.

10. Palletization of banana packed cartons is important.

11. Fruits intended for sea shipment to distant destinations need to be pre-cooled prior to containerization.

12. Fruits should be maintained at a temperature of 13.5° C and a R.H. of 85%-90% during transportation.

* Handle carefully at all stages and avoid delays to maintain quality.

3. COMMON POST HARVEST DISEASES OF EMBUL BANANAS

3.1 Crown Rot

Fusarium moniliforme	Botryodiplodia theobromae
Colletotrichum musae	Verticillium theobromae

Crown rot is the most common post harvest disease in Sri Lankan Embul variety bananas. It is a disease complex caused by the pathogenic fungi Fusarium moniliforme, Botryodiplodia theobromae, Colletotrichum musae and Verticillium theobromae. White, grey or pink fungi appear on the dehanded cut surface of bananas. Infected tissues turn black and the dry rot may advance into the finger stalks, causing the fingers to drop off when handled. The causal fungi survive in the plantation and their spores are present in all parts of the developing bunch and enter via injured crown.

Disease could be controlled by :

1. Maintaining good field and Packing shed sanitation.
2. Making sharp clean cuts using appropriate knives.
3. Frequently changing the washing water.
4. Spraying the crown with 200 ppm Thiabendazole solution.

3.2 Anthracnose

Anthracnose is another important disease in Embul bananas. Colletotrichum musae is the causative organism of Anthracnose. It initiates two types of infections. Non latent anthracnose spots that develop on ripening are circular and brown. The large lesions are caused by quiescent infection through wounds sustained during harvesting and handling.

The disease could be controlled by :

1. Maintaining strict sanitation in the plantation and pack house.
2. Harvesting fruits at correct maturity and handling carefully to prevent injury.

3.3 Speckle Disease

Numerous spots of reddish brown to black with a dark green water soaked halo of approximately 1 mm diameter appear most profusely near the tips and on the inner sides of individual fingers. Helminthosporium musae is the causative organism.

The disease could be controlled by :

1. Maintaining good field sanitation.
2. Bagging of developing bunches.
3. Application of Pre harvest fungicidal sprays.

3.4 Finger Rot

Finger rot is a very common disease in Embul bananas. Finger rot disease which is initiated at the tip of a finger or at a wound site extends to the entire finger within a few days. The entire fruit becomes soft, dark brown and the skin becomes wrinkled and the pulp is reduced to a semi liquid. Under high humidity a copious growth of dark grey mould could be observed. Botryodiplodia theobromae is the casual organism.

The disease could be controlled by :

1. Ensuring the correct maturity of fruits at harvest.
2. Preventing any injury.
3. Rapid lowering of temperature after harvest.

4. PRE HARVEST FACTORS WHICH AFFECTS POST HARVEST QUALITY

4.1 Clump Management

Planting of suckers should be done with a spacing of 3m x 3m. Leaving the mother plant and only another 2 suckers which have an age difference of 4 months, all other suckers should be uprooted regularly and destroyed. Clump management is important in controlling fruit size and yield.

4.2 Fertilizer and Irrigation

A high yield and a uniform fruit size could be obtained by proper irrigation mainly during the dry season. The following composition of NPK fertilizer is recommended by the Dept. of Agriculture.

Dry Zone	NPK	12 : 8 : 34
Wet Zone	NPK	11 : 10 : 25

4.3 Field Sanitation

a. Dried banana leaves should be removed periodically and either burnt or buried.

b. Pseudo stem is cut into pieces and spread on the plantation so as to prevent spread of banana weevil and also to recycle the nutrients.

c. Weeding should be done regularly.

d. Rhizome of the harvested plant should be uprooted wholly.

4.4 Bagging and Tagging

Bagging improves external appearance of fruit and helps the control of pests and diseases. Bagging should be carried out when the bunch emerges fully.

Tagging is done with the emergence of the 1st hand of the bunch. Tagging is important to determine the stage of maturity at harvest, and to organize harvest operations.

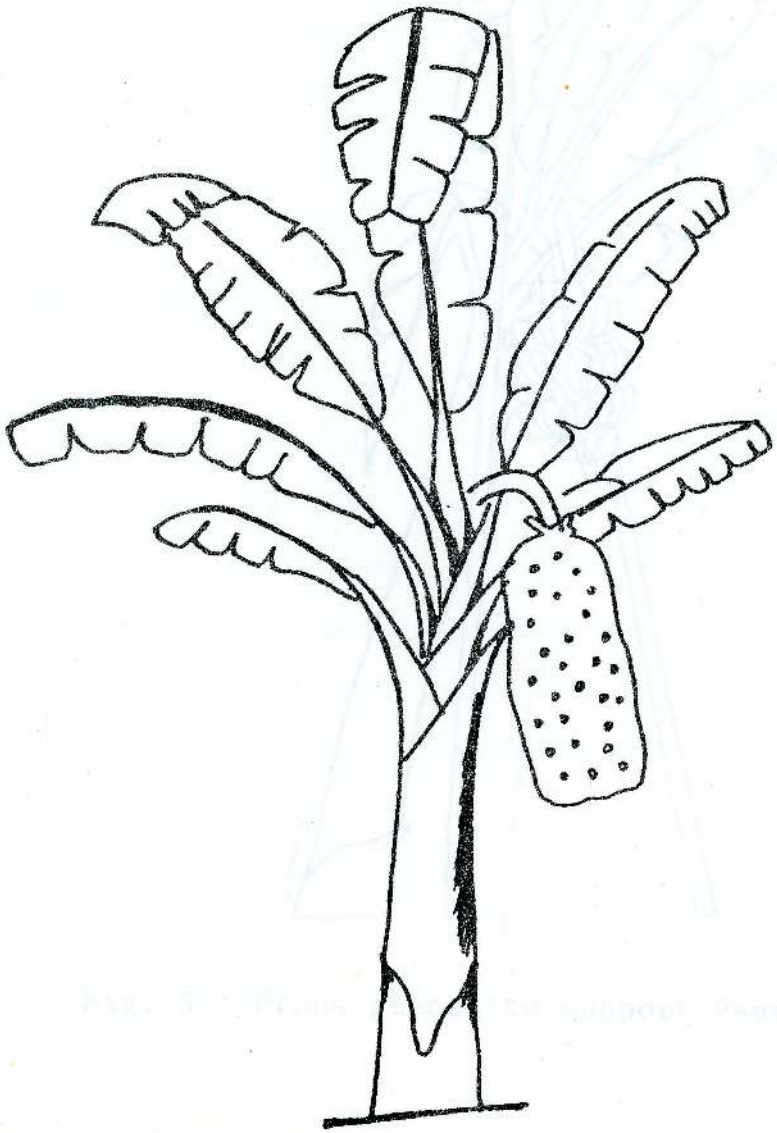

Fig. 4 : Bagging and Tagging of bunches.

4.5 Propping

Propping is very important to prevent the collapsing of the pseudostem. The pseudostem should be supported with two poles after bagging.

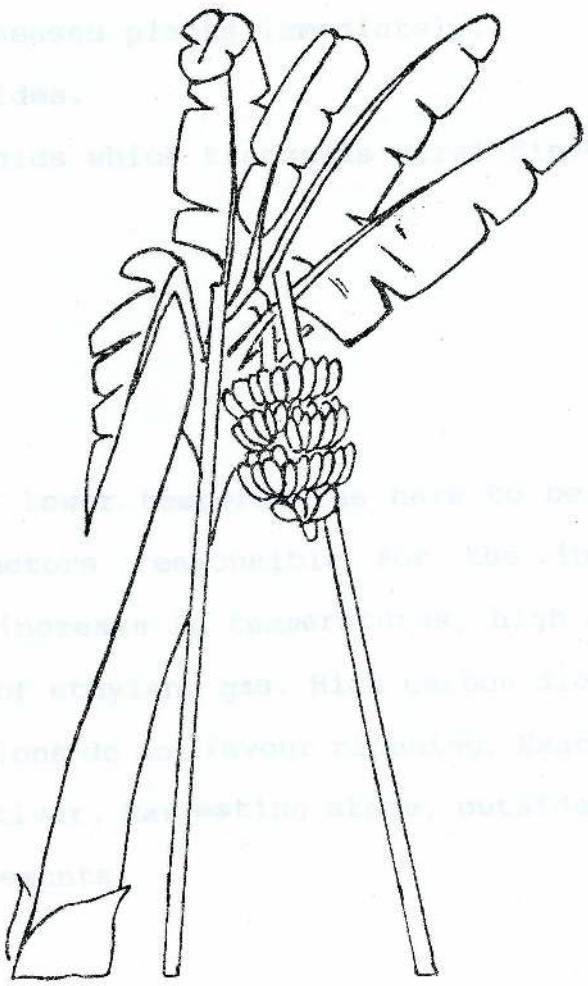

Fig. 5 : Props placed to support Pseudostem.

5. PEST AND DISEASE CONTROL

The common pests of Banana are Stem weevil and Rhizome weevil. Pest control should be carried out periodically. The main pre-harvest disease is bunchy top disease. Speckle disease is also a wide spread disease.

Pest and Diseases could be controlled by :

Destroying the diseased plants immediately.
Spraying insecticides.
Controlling of aphids which transmits viral diseases.

6. RIPENING

Bananas stored at lower temperatures have to be "triggered" for ripening. Factors responsible for the initiation of ripening include increase in temperatures, high humidity and the introduction of ethylene gas. High carbon dioxide and low oxygen concentrations do not favour ripening. Exact conditions depend on the cultivar, harvesting stage, outside temperature and market requirements.

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