



EPICOTYL GRAFTING AN EFFICIENT AND FAST GROWING PROPAGATION METHOD OF MANGO



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OVERVIEW

The brochure is a useful training tool for Mango growers, amateur Gardeners as well as students of agriculture and horticulture. This brochure will guide about epicotyl or stone grafting in mango, first time practiced in Sindh province of Pakistan. All steps of epicotyl grafting are covered with full pictorial view in the brochure. This study was part of the Model Fruit Nursery established under the Small Grant Research Projects initiated by Dr. Fateh Muhammad Marri, Vice Chancellor, Sindh Agriculture University Tandojam during the year 2021. The establishment of the Model Fruit Nursery under the Small Grant Research Projects is one of the projects that had two phases. One is to produce clean mango nursery rootstocks and another is to collect germplasm of various elite fruits. The first phase to produce clean mango seedling rootstocks has been completed successfully and these rootstocks were grafted by top grafting. In the second cycle of mango grafting epicotyl or stone grafting was first time introduced in the project and observed successful, efficient and faster multiplication at very young age of the seedling. Somehow it requires further exploration for field establishment of epicotyl grafted plants. The success rate of epicotyl grafting is reported 75-80% at world level

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What is Epicotyl Grafting

Mango is propagated by different grafting methods. Veneer grafting method is being practiced as traditional method in Sindh province of Pakistan. Among the various methods of grafting, epicotyl grafting is becoming the rising trend and is mostly practiced in mango propagation at world level. It is very efficient and low-cost method of grafting. This does not only saves time of the grower to wait upto one year old rootstocks, but it also saves labour, fertilizer and other related input investments. In mango stone-plants, the seedling-stem above the cotyledon is epicotyl. This is the region where grafting operation is performed. The stone portion contains cotyledon, while the tender stem consists epicotyl region .

At the very young age of the seedlings, grower may know success or failure of the grafted seedlings, one can produce grafted seedlings within a very short duration say within one month after germination of mango stone. It is really a break through among the mango growers to produce grafted seedlings at a very young stage of the seedlings.

During this study, epicotyl grafting was practiced on rootstock of various ages started from few days to two months old. Usually in grafting, age of the rootstock and proper method of grafting has vital importance in the success of stionic establishment of the grafts. This can be practiced in shade house conditions as seedlings are very young and can be protected from strong winds ,too much low and high temperature. it is also crucial to place seedlings in shade house after grafting in order to prevent young grafted plants from low temperature and insect pests.

Season of epicotyl grafting

It would be better to plant mango stones as soon as possible after harvesting during the month of May to June and grafted seedlings may be properly established upto October, usually the young seedlings of mango may be affected due to low temperature of Nov-Jan that's why avoid grafting practice in Autumn and winter.

Steps of Epicotyl / Stone Grafting

- **Raising of Rootstocks**
- **Selection of scion**
- **Application of epicotyl grafting**

1. RAISING OF ROOTSTOCK

- I) To raise seedling rootstocks, mango stones should be collected from local (desi) mango fruits.
- ii) Stones should be collected from ripened fruits and dried properly at room temperature. Before sowing, stones are treated with a fungicide and planted in May to June
- iii) The stones are planted in the mixture of bagasse, cocopeat and canal silt at ratio of 65:5:30.
- iv) After seed germination seedlings are allowed to grow at least 20 to 30 days old of at least height upto 6 to 12 inches. (Figure 1.1). It is also important to achieve 4 to 6 mm diameter for better and efficient grafting. The rootstock is also haded back upto 3 to 4 inches for grafting (Figure 1.2).

2. SELECTION OF SCION

- I) The scion should be selected from a terminal non flowered shoot of one year old branch of healthy disease free tree (Figure-2.1).
- ii) The leaves of the scion are headed back and it is desirable to keep a part of the petiole intact on the selected terminal shoot.
- iii) Selected scion may be 1.5-2 inches long. however, it depends on the height of the seedling rootstocks (Figure-2.2).
- iv) Diameter of the scion should be same or slightly thin than the diameter of rootstock (Figure-2.2).

Figure: 1.1

30 days old rootstock



Figure: 1.2

Length & Diameter of Headed back rootstock.



Figure: 2.1

Scion Selection



Figure: 2.2

Scion length (inch) & Diameter (mm)



3. APPLICATION OF EPICOTYL GRAFTING

- I. The leaves of the rootstocks are headed back leaving 3-4 inches long stem (Figure 3.1).
- ii. A 1-2 inches longitudinal cut is made running down through the middle of the stem (Figure 3.2).
- iii. A wedge shaped cut starting on both sides is made on the lower parts of the scion (Figure 3.3).
- iv. The scion is then inserted in the cleft of the rootstock in a way that cambium of both part should be united firmly (Figure 3.4).
- v. The union portion tied immediately with polyethylene strip. (Figure 3.5 to 3.6).
- vi. When the scion sprouts and leave become green it indicates the success of epicotyl grafting (Figure 3.7 to 3.10).
- Vii. The established grafted seedlings are placed shade house for hardening process. Well established and vigorous seedlings may be shifted to field during feb-march (Figure 3.11).

DRAW BACK

The survival of grafted seedlings in the open field may be critical due to very young age of the seedlings and low temperature. It would be better to shift in the field from the month of Feb-March, for the better establishment and smooth growth of the plants.

Figure. 3.1

Headed Back Rootstock



Figure. 3.2

Longitudinal Cut on Rootstock



Figure. 3.3

Wedge shape cut on the lower part of scion

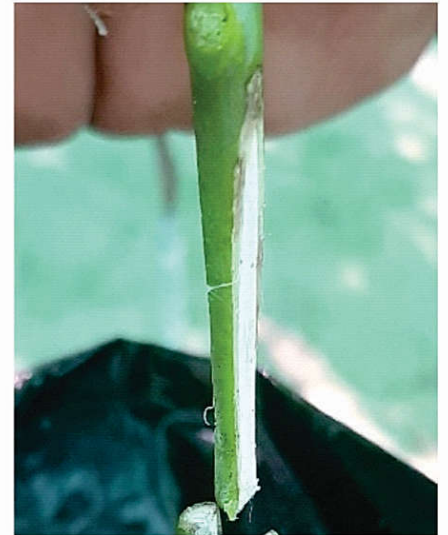


Figure. 3.4

Insertion of wedge shape cut in the rootstock



Figure. 3.5

Scion Rootstock Union



Figure. 3.6

Union tied with Polyethylene Strip



Figure. 3.7

8 Days old graft

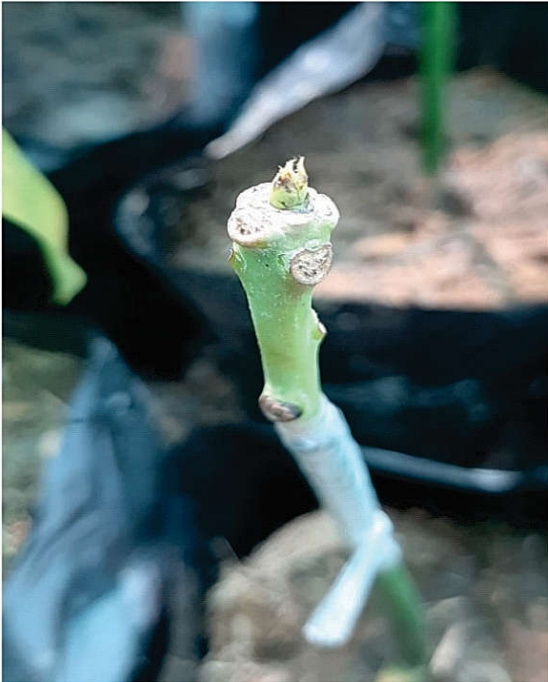


Figure. 3.8

15 Days old graft

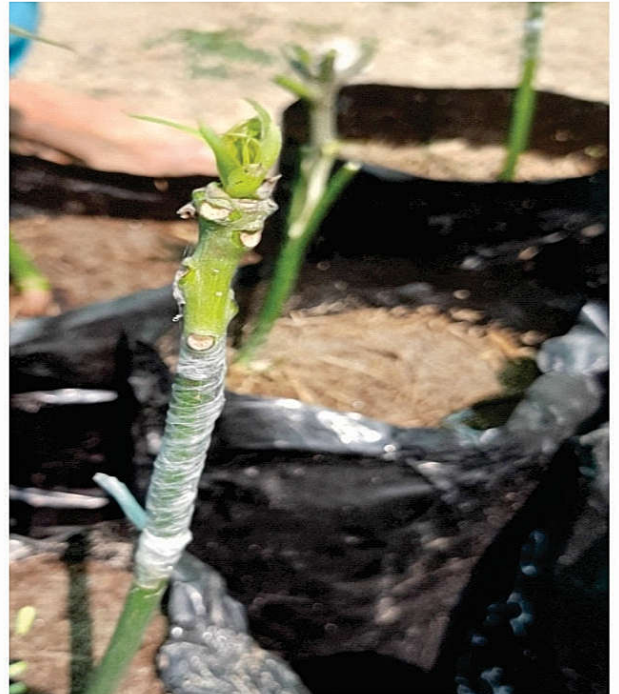


Figure. 3.9

20 Days old graft



Figure. 3.10

35 Days old graft



Figure. 3.11

Hardening in Shade House





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