



Wedge Grafting in Guava, Mango and Aonla

Introduction

With changing scenario in India, the demand of genuine planting material has increased tremendously. Presently, planting material of fruit trees are being supplied to farmers by private nurserymen and government agencies. Although, a large number of nurseries have been established and are operative, both in public and private sectors, there is an acute shortage of quality planting material. The initial planting material is the basic requirement on which the final crop depends both in quality and quantity. The scenario is changing from traditional propagation with incorporation of science and technology in nursery management and trade. In view of the high return and the potential for processing, there is a tremendous scope for bringing substantial additional area under guava, mango and aonla in India. So, a rapid and successful propagation technique is required as the area under crop is expanding and there is a demand to prepare the mango, guava and aonla saplings throughout the year.



Recently, a technique of rapid multiplication (Wedge grafting) has been developed at Central Institute for Subtropical Horticulture (CISH), Lucknow. Wedge grafting has a tremendous potential for multiplying guava, aonla and mango plants rapidly throughout the year either in greenhouse as well as in open conditions. In view of varied climatic conditions of our country, planting materials are required round the year. The technique envisaged growing of seedlings in polyethene bags, grafting, capping and hardening of grafts.

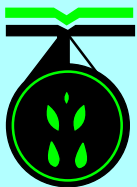


Advantages of wedge grafting

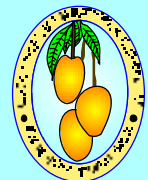
- Wedge grafting is a relatively easy method of propagation.
- Success percentage is higher than that of budding.
- The plants grafted with wedge method takes less time (9-12 days) for sprouting and plant gets ready for sale within five months from the day of grafting operation.
- The grafted plants showed very high field establishment on account of undisturbed tap root system.
- Wedge grafting has a tremendous potential for multiplying guava plants rapidly through the year either in greenhouse as well as in open field conditions.
- The major advantage of this technique is that, plants get higher success rate with the help of poly cap even at low temperature (winter months).
- After grafting, if scion dies for any reason, the split portion is beheaded and rootstock can be used for further grafting.



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Selection of Mother Plant

There are a large number of variations within the cultivar and degeneration of varieties in certain cases. Variations are also observed in productivity and quality amongst the trees of variety. It is, therefore, necessary that the best tree or tree of outstanding merit within each variety be selected, earmarked and used as mother tree for further multiplication. Selection of mother plant is to be given top priority as it decides the success of propagation including production and productivity. The performance will depend on the source of scion material, which should be taken from the tree fulfilling all the scientific criteria for best performance. These are:

- the parent plant must have been tested for its performance over a number of years.
- it must be free from transmittable diseases and healthy in condition.
- the fruit shape, size and quality must conform to the typical specification of the variety.

Establishment of Scion Block

Scion bank for the recommended varieties should be established by adopting a closer spacing in order to get continuous supply of scions.



Raising of guava, mango and aonla seedlings (rootstocks) in polybags for grafting

Use of Plastics in Nursery Management

The most important segment of horticulture largely been benefited by the use of plastics in nursery management, starts from the use of polybags for raising seedlings/rootstocks, a plastic strip to tie the graft union, a plastic cap for covering the mass multiplication of grafts and mist chamber for rooting of cuttings to hardening of tissue-cultured plants. Greenhouse has revolutionized the nursery sector in different parts of the country. It has become an integral part of nursery activities, grafting, rooting of cutting of fruit plants. With all these advantages, the efficiency of nursery has been improved tremendously. The limitations of seasons have been overcome and enabled mass multiplication of plants almost round the year.



Covering grafts with polycap for early sprouting

GUAVA

Selection of scion wood

Shoot with growing apical portion (terminal growth) which is 3 to 4 months old is ideal for this technique. The scion shoot of pencil thickness with 3 to 4 healthy buds of 15-18 cm long is used for grafting. Selected scion shoots are defoliated on the mother plant, about 5-7 days prior to detaching. At the same time, the apical growing portion of selected shoot is also beheaded.

Grafting Technique

After selection of the scion, rootstock (seedling) is headed back by retaining 15-18 cm long stem above the polyethene bag. The beheaded rootstock is split to about 4.0 - 4.5 cm deep through the centre of the stem with grafting knife. A wedge shaped cut, slanting from both the sides (4.0 - 4.5 cm long) is made on the lower side of the scion shoot. The scion stick is then inserted into the split of the stock and pressed properly so that cambium tissues of rootstock and scion stick should come in contact with each other. Care must be exercised to match the cambium layer of the stock and scion along with full length of each component. The union is then tied with the help of 150 gauge polyethene strip, 2 cm in wide and 25 - 30 cm in length. Immediately after grafting, the graft is covered by 2.5 x 18.0 cm long white polyethene cap



Wedge technique in guava

which is tied with rubber band at the lower end. The scion starts sprouting after 9 to 12 days which is visible from outside. The cap is removed after 25 days in the evening hours. The grafts are transferred in net house for hardening.

MANGO

This technique can be employed using rootstock of greater diameter than the scion and can also be used for top working. Healthy and vigorous scion stick is selected with 3-4 months of age. Pre-defoliated scion gives better success in this method also. The scion (12-15 cm long) should not have yet sprouted but should have swollen buds. The height of grafting may depend on the actively

growing portion of the stock. One year old uniform and healthy seedlings of local mango is suitable for grafting by this method. Rootstocks are defoliated and left with 3-4 leaves. Two sloping cuts of 3.5 cm long are made with a very sharp knife at the bottom of the budstick giving it a wedge shape. Top of the rootstock is removed at about 20-30cm above the soil. One straight cut about 3-4cm deep in the top of the rootstock is made. The scion stick is firmly pushed into the rootstock cut. Clear plastic strip is used to firmly wrap around the graft. Do not remove the strip until the budstick begins to grow and show that graft has been successful. Remove any buds which grow below the graft union.

On younger seedlings this technique has been more successful. The technique of grafting may give very high success under favourable environmental conditions. Wedge grafting is easier to veneer grafting. More success can be achieved, if the leaves are retained below the union point on the rootstock. However, the scion should be mature. Pre-defoliated scions give better success than freshly defoliated shoots. The grafting operation is done during rainy season, however, the grafting season can be extended if temperature and humidity are made favourable in polyhouse. Precautions like removal of sprouts emerging from rootstocks are followed as in the case of other grafting methods.

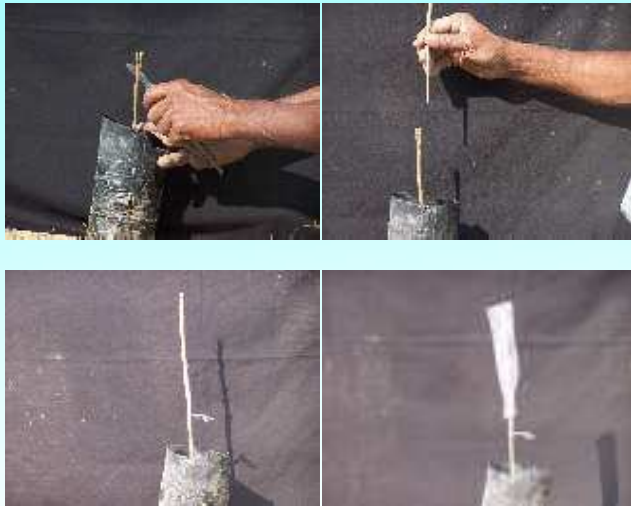


Wedge technique in mango

Before sprouting and growth of scion, leaves on rootstock play important role on grafting success. Thus while grafting, at least 3-4 leaves are retained on the stalk. If enough number of leaves appear on the scion, remove the plastic strip and all the shoots will develop below the graft union. Transplant the new plant when the leaves of the shoots are already mature.

AONLA

When the seedling diameter reaches pencil thickness, it is ready for grafting. The top of the rootstock is cut off at the height of 15-18 cm from the surface of polybag or ground. Split the beheaded rootstock vertically down the center, to a point 4 to 5 cm below the cut surface. Scion stick is collected from desired variety. The shoot with 4 to 6 healthy buds, 12 to 18 cm long pencil thick is cut from the selected mother plant. Scion stick should be cut from both side into a tapering wedge approximately 4 to 5 cm long. The tapered end is inserted into the split stem of the rootstock.



Wedge technique in aonla

The rootstock and scion are wrapped tightly with 2 cm wide and 25 to 30 cm in length polyethene strip. Immediately after grafting the scion is covered with poly cap. Within 12 to 15 days of grafting scion shoots sprout, which is visible from outside. The polycaps are carefully removed and these are kept for hardening. Early removal of poly caps results in high mortality. Winter months suitable for wedge grafting in field conditions, while round the year can be grafted in greenhouse. Field transferable grafts become ready within 6-7 months of seed sowing. This method ensures 100 per cent establishment and survival of transplants in the field on account of undisturbed root system. This method also ensures the authenticity of the planting material which has been grafted. Wedge method of propagation is the appropriate techniques for mass multiplication of aonla plants during winter.

Technology Demonstration

More than 20 demonstration trials on wedge grafting have been conducted in different location of U.P., Bihar, Maharashtra and Haryana. Apart from that number of farmers from different parts of country visits the PFDC demonstration sites regularly. These visits provide awareness to officers, farmers, malies etc, towards technique of wedge grafting. Now the technique is well adopted by nurserymen across the country.



Technology demonstration at farmer's field

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