



Propagation Dynamics of Guava: A Comparative Study of Conventional and Modified Grafting Methods

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Guava (*Psidium guajava* L.) is an important fruit crop in India and ranks fourth in value after mango, banana and citrus. It belongs to the family Myrtaceae under the order Myrtales, which includes more than 80 genera and around 3,000 species found mainly in tropical and subtropical regions. At present, guava is cultivated on about 0.295 million hectares with an annual production of 4.20 million metric tonnes and both area and production continue to increase steadily. Uttar Pradesh is the leading guava-producing state and is well known for high-quality varieties such as Allahabad Safeda and Lucknow-49 (Sardar). Other major producing states include Madhya Pradesh, Bihar, Andhra Pradesh, Tamil Nadu and Punjab. Guava is widely valued for its high nutritional quality, pleasant flavour and suitability to a range of climatic conditions. It is rich in vitamin C, pectin, calcium and phosphorus, which contribute to its popularity and health benefits. Because of its affordability and nutrient content, it is often referred to as the “poor man’s apple” or the “apple of the tropics.” The fruit is commonly used for preparing jams, jellies, juices and other processed products. In addition, the leaves, bark and immature fruits play an important role in traditional medicine, particularly in treating diarrhoea, dysentery and other digestive disorders. Its high pectin content also helps in lowering cholesterol levels, thereby reducing the risk of cardiovascular diseases.

Preparation of Rootstock and Scion

Scion material was collected from healthy mother plants using one-season-old terminal shoots measuring 14–18 cm in length and of pencil thickness (0.4–1.0 cm). Shoots bearing 3–5 healthy, active buds and free from pests and diseases were selected. Prior to detachment, selected scions were defoliated on the mother plant and the apical growing point was removed approximately one week earlier. This practice promoted swelling of dormant buds and ensured that the scion was physiologically active and ready to sprout at the time of grafting.

Different Grafting Techniques Used for Guava

Scions of previous-season growth with pencil-thick diameter were selected from healthy mother plants and defoliated one week prior to grafting. After 7–8 days, the scions were detached for use. Rootstocks aged 8–10 months and of similar thickness were chosen. Each rootstock was beheaded at approximately 15 cm above the base using a sharp, clean knife. A vertical split of 4–5 cm was then made at the cut end, forming a wedge-shaped cleft. The basal end of each scion was trimmed on both sides to form a 4–5 cm tapered wedge. This tapered portion was inserted firmly into the rootstock cleft to ensure proper cambial contact. The graft union was tightly wrapped with polythene strips measuring 2.5 cm in width and about 30 cm in length. Immediately after grafting, the scion was covered with a polythene cap to maintain humidity. Following sprouting, the polythene cap was gradually removed. The grafted plants were maintained in a greenhouse, watered daily and provided with routine

care. Any shoots emerging from the rootstock were removed promptly. Irrigation, weeding and plant protection practices were carried out at regular intervals to ensure healthy graft establishment.

Saddle Grafting

Saddle grafting is considered the inverse of the cleft grafting technique. In this method, one-year-old seedling rootstocks were headed back with a horizontal cut at a height of 8–9 cm to remove the upper portion. A slanting cut was then made on both sides of the rootstock, forming an inverted wedge. Scions of equal diameter were selected for grafting. A vertical cross-cut of approximately 3 cm was made at the basal end of each scion. The scion was then positioned so that the vertical cut fitted securely onto the inverted wedge of the rootstock, ensuring proper contact between the cambial layers of both components. The graft union was tightly wrapped with a 1.5 cm wide, 200-gauge transparent polythene strip to prevent moisture entry and to stabilise the graft.

Modified Wedge Grafting

The selection of scion and rootstock was the same as described for wedge grafting, with modifications made only in the cutting technique for both components. The rootstock was beheaded at approximately 15 cm above the base using a sharp, clean knife. A vertical cut of 4–5 cm depth was then made, splitting the stem into a 'V'-shaped cleft such that one side constituted about three-quarters of the thickness and the other about one-quarter. The thinner side of the cleft was further trimmed by removing one-third of its portion with a grafting knife. At the basal end of the selected scion, a 4–5 cm slanting cut was made on one side and a shorter 2–3 cm slanting cut on the opposite side. The scion was carefully inserted into the cleft of the rootstock, ensuring proper alignment and secure contact between the cambial layers. The graft union was then tightly wrapped with polythene strips measuring 2.5 cm in width and 30 cm in length. All subsequent maintenance practices were followed as described in the previous method.

Softwood Grafting

For softwood grafting, rootstocks aged 5–8 months with a stem thickness of 0.45–0.55 mm were selected. The rootstock was prepared by making a vertical cleft resembling a 'V' or fork at the apical end. Scions were prepared by cutting the basal portion into a gently sloping wedge approximately 5 cm long, removing bark and a small portion of wood from the opposite side while retaining bark on the remaining two sides to maintain structural integrity. The wedge-shaped scion was then carefully inserted into the 'V'-shaped cleft of the rootstock, ensuring proper cambial contact between both components.

Tieing Operation

After inserting the wedge-shaped scion into the cleft of the rootstock, care was taken to ensure close and proper contact between the two components. The graft union was firmly tied using a stretchable transparent polythene strip, 1.5 cm in width and approximately 40 cm in length, with a thickness of 200 gauge. Additional wrapping was applied slightly above and below the graft joint to provide stability and prevent displacement. The scion was then covered with a small polythene sleeve to maintain humidity around the graft union and to protect the scion from desiccation.

Nursery Management

To ensure maximum graft success, grafted plants were watered daily, except those maintained in the mist chamber. In the nursery, a monthly drench with 0.1% Bordeaux mixture was applied to prevent root rot and related fungal diseases. A prophylactic spray of monocrotophos at 1.5 ml per litre was used to manage sucking pests and leaf-eating caterpillars. Any sprouts emerging below the graft union were removed regularly to promote healthy scion growth. The polythene strip at the graft joint was removed 90 days after grafting to prevent girdling and ensure proper development of the graft union.

Conclusion

This highlights the effectiveness of different grafting techniques for improving propagation success in guava. Proper selection and preparation of scion and rootstock play a crucial role in achieving successful graft union. Among the methods evaluated, variations in cutting style, alignment and tying influence cambial contact and subsequent sprouting. Good nursery management, including pest control and moisture regulation, is essential for healthy graft establishment.