

Original Research Article

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Study the Survivability of Grafts in Different Varieties of Guava (*Psidium guajava* L.) by Softwood Grafting under Different Growing Conditions

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ABSTRACT

Keywords

Grafts, Survivability, Softwood grafting, Open, Shade and mist house.

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A field experiment was conducted to “study the survivability of grafts in different varieties of guava (*Psidium guajava* L.) at different growing conditions showed the highest graft survivability (68.96 %, 60.36 % and 48.11 %) was found in mist house followed by shade house at 30, 60 and 90 days respectively after softwood grafting. Among the varieties the highest graft survivability (73.39 %, 61.92 % and 54.61 %) was registered in Sardar at 30, 60 and 90 days respectively after softwood grafting. However, Interaction effect showed the highest graft survivability (85.76 %) in Sardar under mist house followed by shade house.

Introduction

Guava (*Psidium guajava* L.) popularly known as apple of tropics and is native to the tropical America stretching from Mexico to Peru. Although, it is native to tropical America, it is widely distributed throughout the tropical and subtropical regions of the world. At present, major guava producing countries are South Asian countries, the Hawaiian Islands, Cuba and India (Kumar *et al.*, 2011). Guava has been well adopted to India and considered the fruit of masses in terms of availability, nutritional value and price structure in comparison to other fruits (Dinesh and Vasugi, 2010). Guava was introduced to India during 17th century. It thrives well under a wide range of edaphic and climatic

conditions. It is a popular fruit crop due to its prolific bearing and good remuneration. Guava plants have been propagated through seeds since long time. Propagation from seeds results in considerable variation in the size, shape and quality of fruits. Vegetative propagation in guava results in true-to-type crop with short juvenile phase. Commercially, guava is propagated by air layering though considered to be most inexpensive method for vegetative propagation, the method did not prove very successful in case of guava due to production of poor quality roots and hence poor field survival (Shashikumar *et al.*, 2012). As a solution to these problems, softwood grafting is easy to handle and quite efficient

as well as grafts can be prepared within a year, thus reducing cost of raising grafts considerably. Softwood grafting gives an excellent response by higher graft success and survival percentage of quality grafts with the least possibility of mortality which helps in better and uniform orchard establishment (Ram and Pathak, 2006).

Provision of shade during and after grafting was found to have beneficial effect on success of grafting. Light is essential source for triggering photosynthetic activity and there by better nourishment of grafts. The rate of photosynthetic activity varies with the level of shade (Swamy, 1993). So, keeping these points in mind, the present investigation was carried out to assess Studies on the survivability of grafts in different varieties of guava by soft wood grafting under different growing conditions.

Materials and Methods

An experiment was conducted at Division of Fruit Science, University of Horticultural Sciences, Bagalkot, Karnataka (India) during the year 2015-2016 in a Split plot design. Ten months Sardar (Lucknow-49) rootstocks were raised for soft wood grafting. A total of 480 healthy guava seedlings were used for this experiment.

The softwood grafting of guava was done using Sardar, Allahabad safed, Lalit and Arkakiran were as scions at different growing conditions i.e. Open condition, Shade house, Mist house followed by shade house, Mist house followed by open condition. Observations were recorded on ten grafts in each replication at 30, 60 and 90 days after grafting. The data were subjected to statistical analysis as per the procedure outlined by Panse and Sukhatme (1985) and the treatment means were compared by critical difference values computed at 5% level of significance.

Results and Discussion

Graft survivability (%)

The data on graft survival percentage presented in Table 1 showed that the highest graft survival (68.96 %, 60.36 % and 48.11 %) was found in mist house followed by shade house at 30, 60 and 90 days respectively after softwood grafting (Table 1). However, the lowest graft survival (48.83 %, 43.02 % and 39.57 %) was noticed in open condition at 30, 60 and 90 days respectively after softwood grafting. The highest survivability under mist house condition might be due to optimum temperature suitable for new parenchymatous callus proliferation between rootstock and scion and also good callus formation due to higher humidity (Hartmann *et al.*, 1997). The similar results were reported by Desai and Patil (1984) and Sivudu *et al.*, (2014) in mango, Shinde *et al.*, (2010) in jamun. The highest graft survival (73.39 %, 61.92 % and 54.61 %) was registered in Sardar at 30, 60 and 90 days respectively after softwood grafting. Whereas, the lowest graft survival (47.82 %, 44.66 % and 35.08 %) was registered in Lalit at 30, 60 and 90 days respectively after softwood grafting. Singh *et al.*, (2007) also reported that significantly higher success of grafts (64.56-94.33%) in green house compared to open field condition (51.30-78.63%) in Sardar and Allahabad Safed (Fig. 1, 2 and 3).

Interaction effect showed the highest graft survival (85.76 %) in Sardar under mist house followed by shade house and the lowest graft survival (39.97 %) was found in Lalit under open condition at 30 days after grafting. Similar results were obtained by Visen *et al.*, (2010) in guava wherein he got maximum success of grafts (81.71%) in Allahabad Safed and Sardar (Lucknow-49) during September to December under greenhouse and minimum in open field conditions.

Table.1 Graft Survivability

Graft survivability (%)															
Treatments	30 days					60 days					90 days				
	V ₁	V ₂	V ₃	V ₄	Mean	V ₁	V ₂	V ₃	V ₄	Mean	V ₁	V ₂	V ₃	V ₄	Mean
M ₁	57.69	51.75	39.97	45.90	48.83	51.49	45.48	34.79	40.30	43.02	50.94	41.21	29.98	36.15	39.57
M ₂	64.54	57.57	46.07	51.39	54.89	57.63	52.09	40.90	45.75	49.09	53.85	46.24	32.73	39.27	43.02
M ₃	85.76	73.79	52.63	63.65	68.96	69.45	62.56	51.53	57.91	60.36	57.36	51.34	39.97	43.76	48.11
M ₄	85.56	73.76	52.61	63.04	68.74	69.10	62.44	51.41	57.74	60.17	56.27	49.22	37.65	42.70	46.46
Mean	73.39	64.22	47.82	56.00		61.92	55.64	44.66	50.42		54.61	47.00	35.08	40.47	
For comparing the means of	SEm±		CD at 5%			SEm±		CD at 5%			SEm±		CD at 5%		
M	0.62		2.16			0.67		2.32			0.51		1.75		
S	0.38		1.11			0.41		1.21			0.33		0.97		
M x S	0.76		2.22			0.83		NS			0.66		NS		

M₁-Open condition
 V₁- Sardar (Lucknow-49)
 M- Main treatments
 NS- Non significant

M₂-Shade house
 V₂-Allahabad Safed
 S-Sub treatments

M₃-Mist house followed by shade house
 V₃-Lalit
 M x S-Interaction

M₄-Mist house followed by open condition
 V₄-Arka Kiran

Fig.1 Graft survivability as influenced by different growing conditions and varieties at 30 days after soft wood grafting

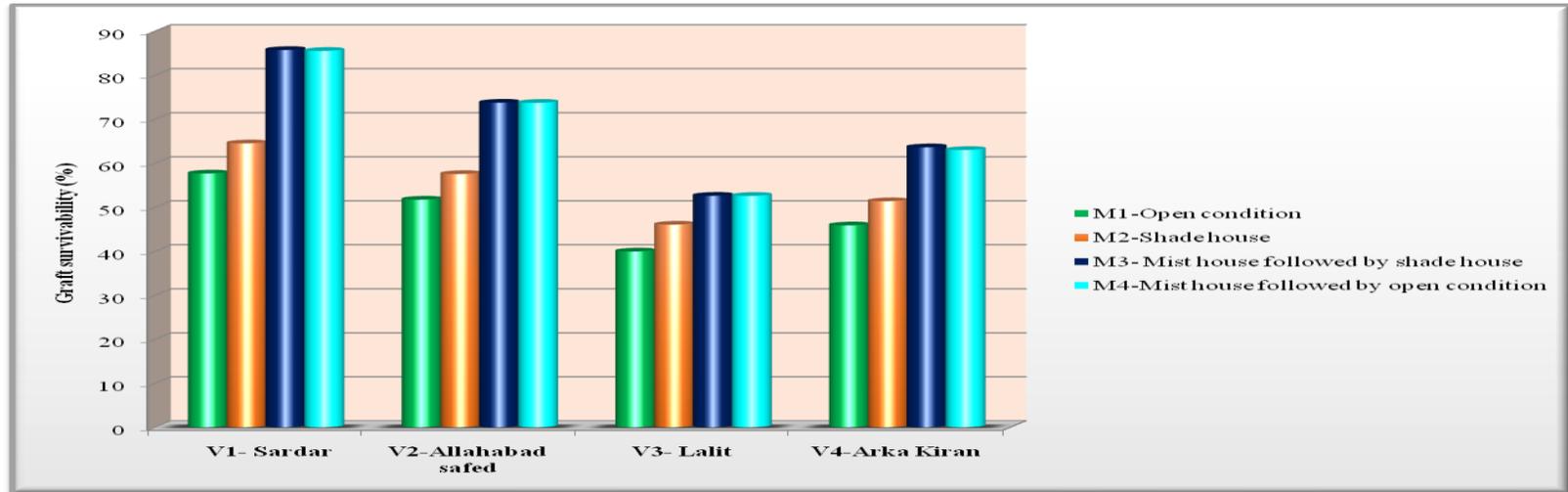


Fig.2 Graft survivability as influenced by different growing conditions and varieties at 60 days after soft wood grafting

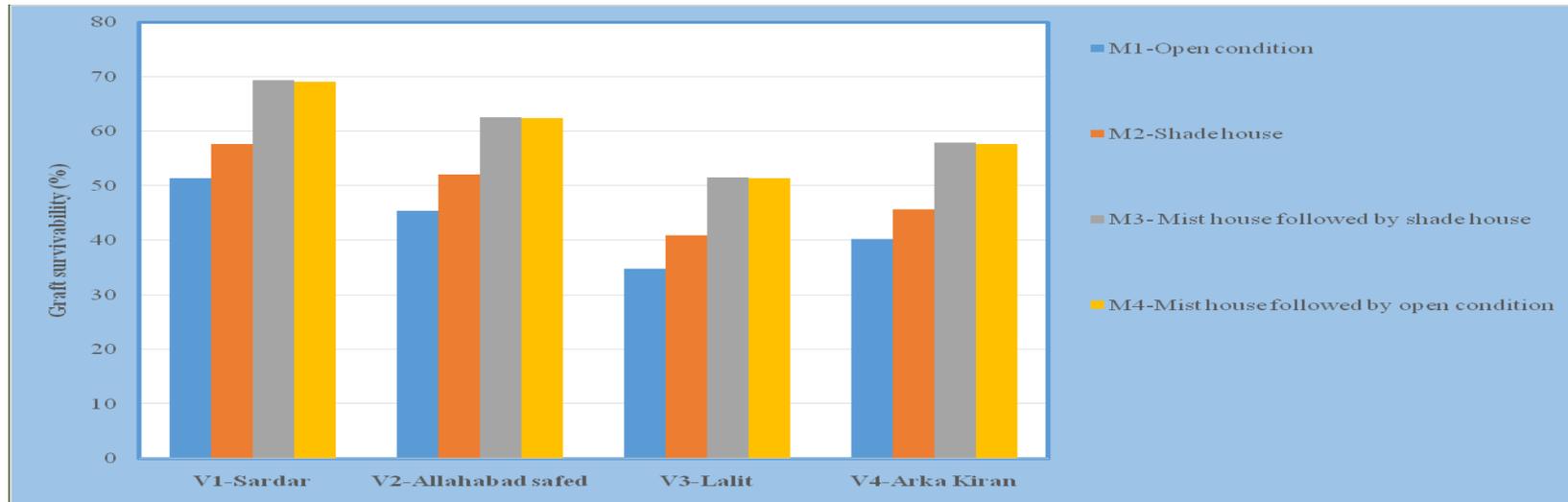
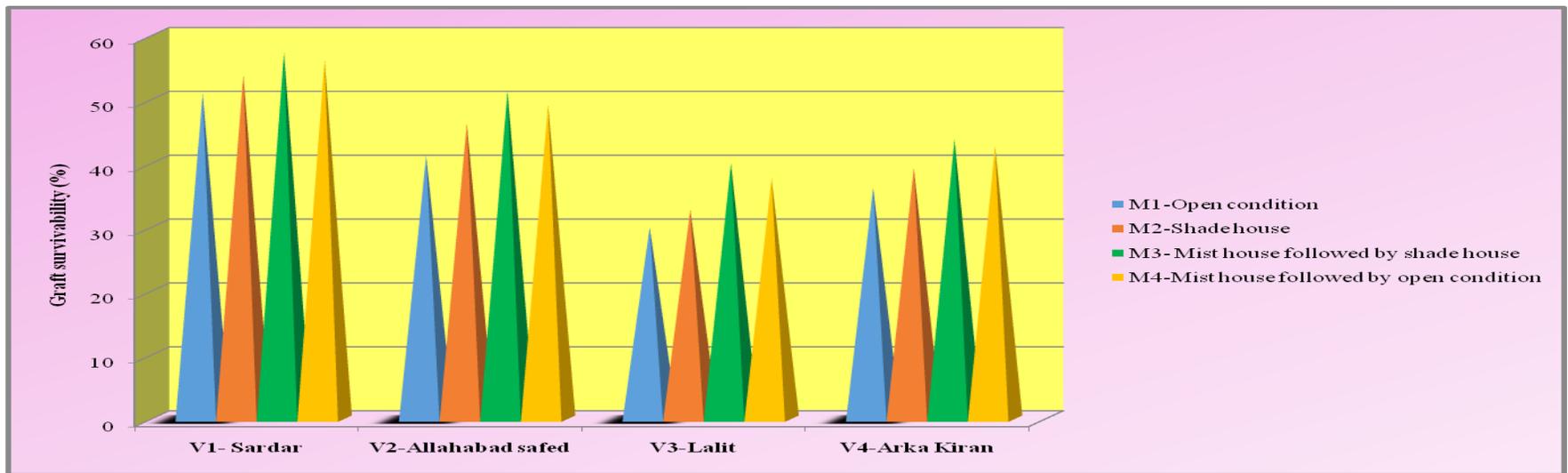


Fig.3 Graft survivability as influenced by different growing conditions and varieties at 90 days after soft wood grafting



There were no significant differences between different growing conditions and varieties at 60 and 90 days after soft wood grafting.

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