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Studies on Effect of Propagation Environment for Softwood Grafting in Guava (*Psidium guajava* L.) cv. Sardar

B. Manga*, P. Jholgiker, G.S.K. Swamy, G. Prabhuling and N. Sandhyarani

Department of Fruit science, KRCCH, Arabhavi, University of Horticultural Sciences, Bagalkot, Karnataka, India
**Corresponding author*

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A B S T R A C T

An experiment was conducted to study the on effect of different propagation environment for softwood grafting in guava cv. Sardar at the Department of Fruit Science, Kittur Rani Channamma College of Horticulture, Arabhavi, University of Horticultural Sciences, Bagalkot during the period of October 2012 to January 2013. There was significant difference for graft success and growth of grafts among different propagation environments. Significantly high graft success and survival percentage was noticed in mist house eco system (62.00 and 97.40 %, respectively) followed by shade house (48.00 and 95.00 % respectively). While minimum graft success and survival percentage was recorded under poly tunnel (10 and 41.67 %, respectively). Growth parameters like maximum number of sprouts (4.62) highest length of sprout (6.30 cm) and maximum number of leaves (21.60) were registered in grafts placed under mist house eco system.

Introduction

Guava is considered as one of the exquisite and nutritionally valuable fruit crops. It excels most other fruit crops in productivity, hardiness, adaptability and nutritive value. Besides its high nutritive value, it bears heavy crop every year and gives good economic returns involving very little input (Singh, 2007). Most of guava plantations in India are seedling origin. Traditionally, it is mostly propagated from seed (Zamir *et al.*, 2003). However, plants raised from seeds are not true to type and eventually take longer time to reach to bearing stage. They are also propagated by layering, however it is combursome and has limitation for large scale and rapid multiplication. Softwood grafting, which is successfully practiced in fruit crops like mango, sapota cashew, jack fruit with good response can also be practice in guava. This method is easy, convenient in handling, involves simple skill and takes short period. The most important feature of the method is that, it allows higher rate of multiplication of plants and resultant plants will be vigorous. The propagation environment for grafting is one of the most important factors which plays a key role in success of grafting. The year round fluctuation in temperature, relative humidity and sunlight results in varying degree of success in softwood grafting in

guava. Identification of right type of propagation structure with ideal micro climate conditions suitable for softwood grafting will help in rapid multiplication and production of healthy planting material.

Limited work has been done and reported in guava with respect to improvement in graft success by using controlled conditions / propagation environment. There is a need to identify right type of propagation environment for higher propagation efficiency. Therefore, the present investigation was undertaken.

Materials and Methods

An experiment, on studies on effect of propagation environment for softwood grafting in guava (*Psidium guajava L.*) cv. Sardar was carried out during the period from October 2012 to December 2012, at the Department of Fruit Science, Kittur Rani Channamma College of Horticulture, Arabhavi, University of Horticultural Sciences, Bagalkot, Karnataka state. The experiment was conducted to find out the influence of propagation environment on success of softwood grafting in guava. The experiment was laid out in Randomized Block Design with 5 treatments and 5 replications. Softwood wedge grafting was performed in the month of October. Two fifty grafts were prepared at the rate of fifty grafts in each treatment and placed under different environments *viz.,* open condition, shade house, poly house, mist house and poly tunnel.

Root stocks were raised in poly bags from fresh seeds of guava cv. 'Sardar' extracted from ripe fruits for approximately 6 to 8 months till they attained a stem diameter of 0.5 to 1.0 cm. The scion shoots (15 to 18 cm long) of pencil size thickness with 3 to 4 healthy buds were used for grafting. Selected scion shoots were pre-cured ten days prior to detachment. Softwood wedge grafting was performed in the month of October as per procedure suggested by Amin (1974). The prepared grafts were covered from top by polytube cap. This cap was retained on the graft for one month or till sprouting was observed on the graft. The observation were recorded on graft-take *i.e.* per cent graft success and survival percentage. The growth parameters such as number of sprouts, per cent sprouting, average length of sprout and average number of leaves were recorded at 30, 60 and 90 days after grafting. The data was statistical analysed by following procedure as suggested by Panse and Sukhatme (1978).

Results and Discussion

The data pertaining to the studies on effect of different propagation environment on graft take in softwood grafting of guava cv. Sardar demonstrated varying degree of success (Table 1). Interpretation of data indicated maximum per cent graft success (62.00 %) was recorded in graft kept under mist house eco system followed by shade house (48.00 %) and lowest grafting success was recorded in poly tunnel (10.00 %) at 90 days after grafting respectively.

Results of data reveal significant differences for graft survival in different propagation environment. The significantly maximum graft survival (97.14 %) was recorded in grafts placed under mist followed by grafts under the shade house condition (95.00 %) at 90 DAG, which were at par with each other (Table 1). The superiority of propagation with the help of mist house has been well documented by Muniswami (1979) in cashew, Raghavendra *et al.,* (2011) in wood apple and Rajashekar (1999) in sapota. The beneficial effects of high graft success for softwood grafting under mist house could be attributed

to availability of high humidity (Fig. 2) stretched for longer period which prevents desiccation of the tissues at scion and stock interface also favours rapid callus tissues development leading to better graft union formation.

Similar findings were also reported by Jose and Valsalakumari (1991) in Jack. Least graft success and survival was noticed in the polytunnel. This may be attributed to buildup of higher temperature under poly tunnel during graft healing period which might have lead to faster desiccation of fragile callus cells as these parenchymatous cells are thin walled with no provision for resisting higher temperature (Fig. 1).

Table.1 Effect of different propagation environment on graft-take and its growth at 90 DAG in softwood grafting of guava cv. Sardar

Propagation environment	Per cent graft success	Number of sprouts	Per cent sprouting	Average length of sprout (cm)	Average number of leaves	Survival percentage
Open conditions	40.00 (39.23)*	3.88	48.00 (43.85)	4.76	20.00	74.07 (59.41)
Shade house	48.00 (43.85)	3.08	50.70 (45.40)	4.82	18.00	95.00 (77.08)
Poly house	20.00 (26.56)	4.40	76.80 (61.21)	6.12	20.40	40.67 (39.65)
Mist house	62.00 (51.94)	4.62	66.50 (54.63)	6.30	21.60	97.14 (80.23)
Poly tunnel	10.00 (18.44)	2.40	55.00 (47.87)	5.60	11.60	41.67 (40.23)
SEm±	3.00	0.11	4.98	0.40	1.45	6.45
CD @ 5%	8.99	0.32	14.92	1.19	4.36	19.33
CV (%)	18.63	6.55	18.74	16.01	17.74	20.67

DAG – Days after grafting

* Values in parenthesis are angular transformation data

Fig.1 Monthly average temperature (^{o}C) recorded in propagation structures at 8.00 am and 2.00 pm during the period of investigation

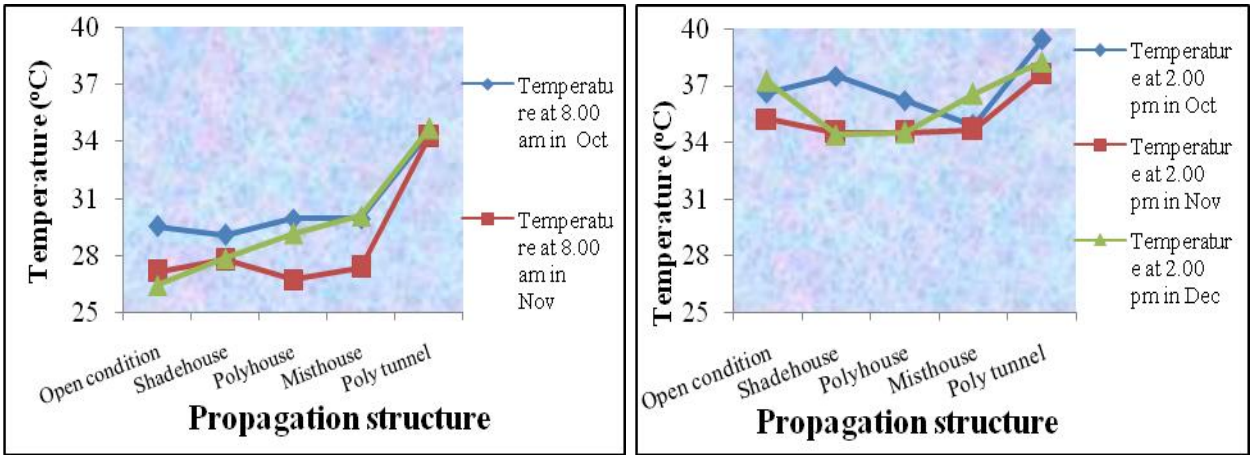
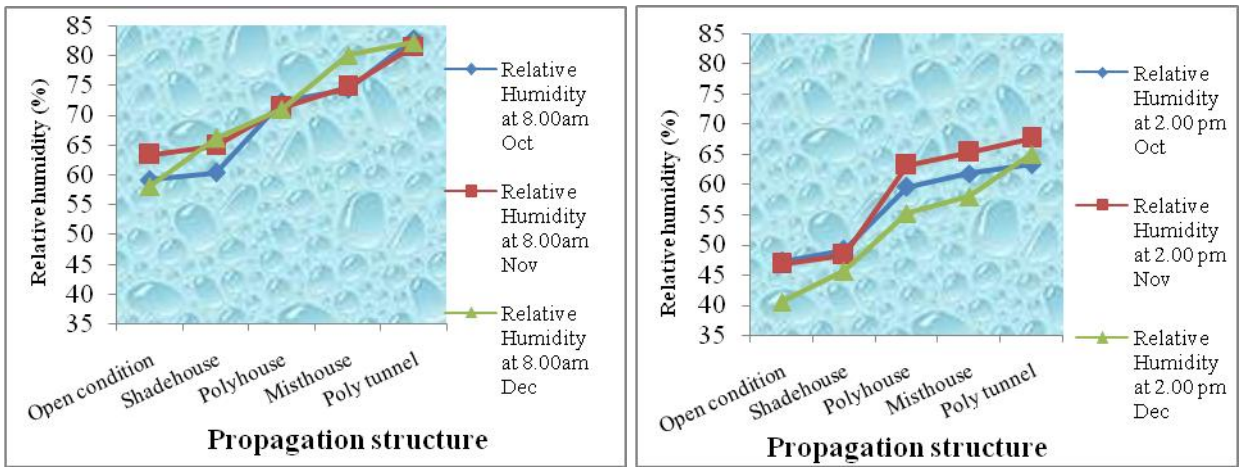


Fig.2 Monthly average relative humidity (%) recorded in propagation structures at 8.00 am and 2.00 pm during the period of investigation



The success of graft union and its health can also be judged on the basis of production of number of sprouts, per cent sprouting, length of sprout and number of leaves (Table 1). In the present investigation the higher rate of success of graft union under mist house condition was evidenced by the higher values for growth parameters. This might be due to the high relative humidity (Fig. 2) and slightly inclined temperature prevailing in mist house ecosystem (Fig. 1).

Similar findings have also been reported by Jose and Valsakumari (1991) and Dhanraj (1996) in jackfruit. This trend was also observed by Kumar and Khan (1988) and Swami *et al.*, (1990) in cashew, Mulla *et al.*, (2011) in Jamun and Rajashekar (1999) in sapota.

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