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Short communication

Performance of wedge grafting in guava under different growing conditions

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ABSTRACT

The experiment was conducted to find out the efficacy of wedge grafting on three guava cultivars during different months of year. Wedge grafting was tried in four months, *viz*. July (M_1), August (M_2), September (M_3) and October (M_4) on three varieties, namely Allahabad Safeda, Lucknow-49 and Allahabad Surkha under two different conditions, namely, polyhouse, and open field conditions. Wedge grafting in the month of July gave better result in polyhouse (77.17%) as well as in open field condition (66.43%). Polyhouse gave better response than open field conditions with respect to number of days taken to sprout, graft survival, number of leaves and length of sprouted shoot.

Key words: Guava, wedge grafting, polyhouse, open conditions.

Guava (*Psidium guajava* L.) is a highly cross pollinated crop. Consequently, being heterozygous in nature, it does not breed true-to-type plants through seeds. The greatest handicapped in guava plantation are discriminate multiplication of plant from unreliable sources by nurserymen. The initial planting material is the basic requirement on which the final crop depends both in quality and quantity (Singh *et al*., 5). In view of high return and potential for processing, there is a tremendous scope for bringing substantial area under guava crop in India. Therefore, a rapid and successful propagation technique is required, as the area under crop is expanding and there is great demand for guava saplings throughout the year. Though guava is propagated through air-layering, stooling, grafting and inarching, these methods are still not viable due to varying rate of success, absence of tap root and cumbersome process. Keeping in view of these facts, the present investigation was carried out to find out the response of wedge grafting on guava cultivars to ensure availability of superior planting material of guava for its large scale cultivation.

The present investigation was carried out during 2009 at the Horticultural Research Garden of the Institute of Agricultural Sciences, Banaras Hindu University, Varanasi. Wedge grafting was performed on Allahabad Safeda (V_1), Luckknow-49 (V_2) and Allahabad Surkha (V_3) during four months, *viz*., July (M_1), August (M_2), September (M_3) and October (M_4) under polyhouse as well as in open field conditions. The experiment is laid out in Factorial Randomized Block Design with four replications. The grafting was done on 6 to 8-month-old seedling rootstock, which has attained a stem diameter of 0.5-1.0 cm. The scion shoots of 15 to 18 cm long of pencil thickness (0.5 to 1.0 cm) with 3 to 4 healthy buds were selected for grafting. Selected scions were defoliated on the mother plant, about one week prior to detachment. At the same time apical growing portion of selected shoots was also beheaded, which helped in forcing the dormant grafts to swell. In this way, the grafts on the scion were ready to start sprouting at the time of grafting. The scion stick was inserted into the split of the stock and pressed properly so that cambium tissue of rootstock and scion could come into contact with each other. The observations were recorded on success of grafting such as number of days taken by graft to sprout, per cent of graft sprouting, per cent of graft survival, length of sprouted shoot and number of leaves per shoot after 30 days of grafting.

Minimum number of days taken for graft sprouting was observed in Allahabad Safeda (12.27 days) under polyhouse conditions, while maximum number of days taken for graft sprouting was recorded in Allahabad Surkha (19.73) in open field conditions. Graft sprouting took place seven days earlier in polyhouse as compared to open field conditions. This result is in accordance with Samiullah *et al*. (3), and Singh *et al*. (4) who reported that grafting in green house significantly reduces the time taken for sprouting than those grafted in open field conditions. Maximum success per cent of sprouting was recorded in Allahabad Safeda under polyhouse conditions. The interaction between varieties and different conditions was observed to be significant for days taken to graft sprouting, per cent of graft sprouting, per cent of graft survival, length of sprouted shoot and number of leaves per shoot (Table 1). Maximum

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length and number of leaves per shoot was recorded in Allahabad Safeda under polyhouse conditions. It is due to the fact that warmer and humid air inside the polyhouse induces the soil to warm up. Thus, the growth parameters like length and number of leaves per shoot were positively influenced by the warmer environment inside the polyhouse. These results are in agreement of the results of Pandey *et al*. (2).

The interaction between different months and conditions differed significantly with respect to number of days taken to sprout, per cent of graft sprouting and per cent of graft survival (Table 2). However, days taken to sprout were *at par* during different months of wedge grafting in polyhouse as well as in open field condition. The maximum per cent of graft sprouting, per cent of graft survival, length of sprouted shoot and number of leaves per shoot was recorded in the month of July under polyhouse condition. It might be due to favourable temperature, high relative humidity, long sun-shine hours and low evaporation rate like climatic condition which are congenial for growth and development of plant in the month of July.

The interaction among different varieties, months and conditions were observed to be non-significant for number of days taken to graft sprouting and per cent graft sprouting (Table 3). However, graft sprouting took place earlier in Allahabad Safeda under polyhouse conditions. It could be attributed to genetical performance of the variety and suitable micro-climatic condition inside polyhouse, which has favourable effect on early sprouting of graft-scion. This result is in agreement of Bajpai *et al*. (1), who has recorded varietal differences in relation to sprouting of grafts. Per cent graft sprouting was found to be highest in Allahabad Safeda, Lucknow-49 and Allahabad Surkha in the month of July, October and September, respectively under polyhouse conditions. The interaction among different varieties, months

Table 1. Interaction effect of variety and growing condition on graft sprout and sprout characters in guava.

Treatment	No. of days taken to sprout		Per cent of graft sprouting		Per cent of graft survival		Length of sprouted shoot (cm)		No. of leaves per shoot	
	Poly house	Open field	Poly house	Open field	Poly house	Open field	Poly house	Open field	Poly house	Open field
V_1	12. 27	19.08	77.17 (61.45)*	63.43 (52.79)	77.17 (61.45)	66.43 (54.59)	7.56	6.45	7.73	6.68
V_2	12. 36	19.64	68.90 (56.10)	61.41 (51.59)	65.90 (54.27)	63.41 (52.77)	5.91	6.25	5.91	5.75
V_3	12.91	19.73	63.16 (52.63)	58.92 (50.13)	63.16 (52.63)	58.92 (50.13)	5.68	5.54	5.69	5.59
CD at 5%	0.42		3.20		2.79		0.43		0.45	

*Transformed data

Table 2. Interaction effect of grafting month and growing conditions on graft sprout and sprout characters in guava.

Treatment	No. of days taken to sprout		Per cent of graft sprouting		Per cent of graft survival		Length of sprouted shoot (cm)		No. of leaves per shoot	
	Poly house	Open field	Poly house	Open field	Poly house	Open field	Poly house	Open field	Poly house	Open field
M_1	9.23	14.51	71.14 (57.50)	62.49 (52.23)	75.14 (60.09)	68.49 (55.85)	7.12	6.27	7.79	6.45
M_2	9.03	14.73	68.15 (55.64)	58.83 (50.08)	71.15 (57.51)	62.83 (52.43)	5.92	6.21	6.68	5.46
M_3	9.48	14.76	64.16 (53.22)	56.18 (48.54)	68.16 (55.64)	58.18 (49.70)	5.56	5.84	6.54	5.89
M_4	9.27	14.97	63.50 (52.83)	54.86 (47.78)	58.50 (49.89)	52.86 (46.63)	5.74	5.54	5.54	5.45
CD at 5%	0.48		3.70		3.23		0.50		0.50	

*Transformed data

Table 3. Interaction effect of variety, month of grafting and growing condition on graft sprout and sprout characters of grafted guava plants.

Character	Time Treatment	Polyhouse				Open field			
		M1	M2	M3	M4	M1	M2	M3	M4
No. of days taken to sprout	V_1	9.85	10.18	10.26	10.26	15.58	16.53	17.53	17.58
	V_2	10.01	10.26	9.93	10.36	15.52	16.58	17.37	17.61
	V_3	10.26	10.50	10.26	10.83	15.43	16.74	17.53	17.95
	CD at 5%	NS							
Per cent of graft sprouting	V_1	74.18 (59.46)	68.16 (55.64)	73.17 (58.80)	66.15 (54.42)	60.17 (50.86)	64.17 (53.23)	62.18 (52.04)	68.20 (55.67)
	V_2	59.14 (50.26)	63.14 (52.61)	66.15 (54.42)	73.16 (58.79)	54.15 (47.38)	58.16 (49.69)	58.17 (49.70)	72.18 (58.16)
	V_3	62.14 (52.02)	66.16 (54.42)	71.16 (57.51)	65.17 (53.83)	57.16 (49.11)	62.17 (52.04)	64.18 (53.23)	54.15 (47.38)
	CD at 5%	NS							
Per cent of graft survival	V_1	67.21 (55.06)	56.94 (48.98)	56.14 (48.52)	49.59 (44.76)	61.83 (51.84)	56.79 (48.90)	48.99 (44.42)	54.42 (47.53)
	V_2	56.19 (48.55)	55.41 (48.10)	54.27 (47.44)	51.83 (46.04)	62.22 (52.07)	57.40 (49.48)	49.41 (44.66)	53.97 (47.27)
	V_3	55.35 (48.07)	52.41 (46.38)	52.23 (46.27)	49.19 (44.53)	58.26 (49.75)	54.69 (47.69)	51.93 (46.10)	48.33 (44.04)
	CD at 5%	2.28							
Length of sprouted shoot (cm)	V_1	7.33	7.94	5.14	5.59	6.89	6.83	7.18	5.42
	V_2	6.19	6.41	6.21	5.83	6.22	5.40	6.41	5.97
	V_3	6.35	5.41	6.23	5.19	5.26	5.69	6.93	4.67
	CD at 5%	0.89							
No. of leaves per shoot	V_1	7.89	6.56	6.24	5.36	6.85	5.56	5.24	5.32
	V_2	7.24	5.98	5.45	5.68	5.69	5.96	5.75	4.18
	V_3	6.31	5.21	4.68	5.45	6.23	6.52	4.21	4.96
	CD at 5%	NS							

*Figures in the parenthesis are angular transformed values

and conditions were observed to be significant for per cent of graft survival and length of sprouted shoot. Maximum per cent of graft survival was recorded in Allahabad Safeda in the month of July under polyhouse conditions. The maximum length of sprouted shoot was recorded with Allahabad Safeda in the month of August under polyhouse conditions. The results showed non-significant variation with respect to number of leaves per shoot among the different treatments. However, maximum number of leaves per shoot was recorded with Allahabad Safeda in the month of July under polyhouse condition and the minimum values were recorded in open field conditions. Temperature plays an important role in photosynthetic activity of the leaves. Optimum temperature increases the rate of photosynthesis and leads to formation of more food materials that facilitate and improve the growth and development of the graft sprout inside polyhouse (Figs. 1 & 2).

On the basis of results obtained from above experiment, it can be concluded that wedge grafting in the month of July can be a best method for multiplication of guava. Higher success per cent of wedge grafting is recorded in cultivar Allaabad Safeda than L-49 and Allahabad Surkha under polyhouse conditions.

REFERANCES

1. Bajpai, P.N., Singh, A.R., Yatti, V. and Chaturvedy, O.P. 1989. Effect of cultivars and

Fig. 1. Wedge grafting in guava under open field conditions.

Fig. 2. Wedge grafting in guava polyhouse under conditions.

age of root stocks on the performance of veneer grafting in mango. *Acta Hort.* **231**: 259-62.

2. Pandey, V.K., Dwivedi, S.K. Pandey, A. and Sharma, H.G. 2004. Low cost polyhouse technology for vegetable cultivation in Chhattisgarh region. *Plant Arch.* **4**: 295-301.

3. Samiullah, Hussain S.A., Rab, A. and Mohammad, H. 2004. Side grafting and various scion parts interaction in guava. *Pakistan J. Biol. Sci.* **7**: 1127-29.

4. Singh, G., Gupta, S., Mishra, R. and Singh, A. 2007. Technique for rapid multiplication of guava (*Psidium guajava* L.). *Acta Hort.* **735**: 177-83.

5. Singh, G., Gupta, S., Mishra, R. and Singh, G.P. 2005. Wedge grafting in guava - a novel vegetative propagation technique, Pub. CISH, Lucknow, 12 p.

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