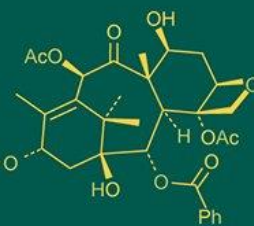
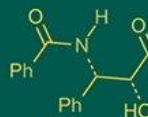


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Effect of time of grafting and age of rootstock on soft wood grafting success in guava

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Abstract

Guava (*Psidium guajava* Linn) is commercially propagated by air layering and poly-bag method of layering. However, multiplication rate through these methods is very low and hence availability of planting material of guava is very less which reflects on very limited area is under cultivation of guava. Farmers are asking about the planting material of guava but we cannot fulfill the demand of the growers and hence to cope up the demand of farmers, soft wood grafting might be the solution for commercial propagation of guava with higher rate of multiplication. The experiment was conducted during the year 2019-20, 2020-21 and 2022-23 at Horticulture Section, College of Agriculture, Nagpur to find out the suitable time of softwood grafting and suitable age of rootstock for soft wood grafting. In the present investigation, soft wood grafting practice was carried out on 7-10 months old local seedlings (four age of Rootstock) of guava during January to February month (First week of January, Third week of January, First week of February and Third week of February). For better success of softwood grafting in guava (93.92%), first week of February was found most suitable time and 9-10 months old rootstock was found most suitable age of rootstock.

Keywords: *Psidium guajava*, softwood grafting, rootstock age, grafting time, propagation

Introduction

Guava is commercially propagated by air layering and poly-bag method of layering. However, multiplication rate through these methods is very low and hence availability of planting material of guava is very less which reflects on very limited area is under cultivation of guava. Farmers are asking about the planting material of guava but we cannot fulfill the demand of the growers and hence to cope up the demand of farmers, soft wood grafting might be the solution for commercial propagation of guava with higher rate of multiplication. Keeping with the view in mind the experiment was conducted with following objectives to find out the suitable time of softwood grafting for commercial propagation of guava and to find out the suitable age of rootstock for softwood grafting for commercial propagation of guava.

Materials and Methods

The investigation was carried out in Horticulture section, College of Agriculture, Nagpur for finding the best time of soft wood grafting and suitable age of rootstock for soft wood grafting in guava. Local guava seedlings raised in polythene bags. Seeds were extracted from selected well ripe fruits of local guava and allowed it to dry under shade. These seeds were sown in polythene bags of 25 cm x 20 cm and 200 gauge thickness filled with the mixture of soil, sand and Farm yard manure in a ratio of 2:1:1. Vigorously growing seedlings of different age were used as root stocks, thirty seedlings each for soft wood grafting were selected and operation was carried out (Propagation) during January-February. The experiment was conducted for three years in Factorial Completely Randomized Design. There were four age of rootstock (07 months, 08 months, 09 months and 10 months) and four time of grafting (First week of January, Third week of January, First week of February and Third week of February) and it was replicated thrice.

In soft wood grafting, the shoots of the rootstock was decapitated at 20-25 cm height from the collar region.

A cut of 5 cm deep was made in the middle of the stock with sharp knife then prepared the detached scion of 8-10 cm length by giving two slanting cuts of about 4-5 cm long on both sides of the basal end. Scion was inserted and fixed in the straight cut portion of the stock and tied firmly with transparent polythene strip of 1.5 cm in width and 30 cm of length. The grafts were kept in shade net for further observation regarding final success.

Results and Discussion

Height of rootstock seedling

The data in respect of height of rootstock seedling was recorded at the time of grafting and it is presented in Table 1. It is revealed that the height of the rootstock seedling was significantly influenced by different age of rootstock and different grafting time.

Among the different age of rootstock used, 10 months old rootstock attained significantly maximum rootstock seedling height (42.69 cm) followed by nine months old rootstock seedling (36.47 cm). However, significantly minimum rootstock seedling height was recorded in seven months old rootstock (21.26 cm). Plant height was increase as age of rootstock seedling increase. This plant height was increase might be due to the more age of seedling. Similar results

was reported by Vasalakumari (1998) ^[7] in aonla.

Among the different time of grafting, significantly maximum height of rootstock seedling was recorded during first week of February (35.07cm) followed by third week of February (33.56 cm). However, significantly minimum rootstock seedling height was recorded during third week of January (31.55 cm). This plant height was increase might be due to the more age of seedling. Similar results was reported by Vasalakumari (1998) ^[7] in aonla.

Interaction effect

Among the different age of rootstock used for soft wood grafting at different time of grafting, significantly maximum height of rootstock seedling was recorded by 10 months old rootstock at first week of February (44.32 cm) followed by 10 months old rootstock seedling at third week of February (43.07 cm). However, significantly minimum rootstock seedling height was recorded in seven months old rootstock at first and third week of January (20.17 cm each). This rootstock seedling height was increase might be due to the combined effect of prolonged vegetative growth in the nursery and the onset of favorable climatic conditions in February that accelerate rapid cellular proliferation. Similar results was reported by Wailthare *et al.* (2020) ^[8].

Table 1: Height of rootstock as influenced by age of rootstock at different time of grafting (Pooled mean for the three years)

Age of Rootstock	Height of rootstock (cm)				
	Time of Grafting				
	First week of January (B ₁)	Third week of January (B ₂)	First week of February (B ₃)	Third week of February (B ₄)	Mean
07 months(A ₁)	20.17	20.17	23.22	21.47	21.26
08 months(A ₂)	31.62	30.75	32.00	31.91	31.58
09 months(A ₃)	33.83	33.50	40.75	37.78	36.47
10 months (A ₄)	40.59	42.76	44.32	43.07	42.69
Mean	31.55	31.80	35.07	33.56	
	Age of Rootstock (A)	Time of Grafting (B)	BXA		
'F' test	Sig.	Sig.	Sig.		
SE (m)±	0.55	0.55	1.11		
CD at 5%	1.60	1.60	3.20		

Diameter of rootstock seedling

The data in respect of diameter of rootstock seedling was recorded at the time of grafting and it is presented in Table 3 and 4. It is revealed that the diameter of the rootstock seedling was significantly influenced by different age of rootstock and at different grafting time.

Among the different age of rootstock used, 10 months old rootstock attained significantly maximum diameter of rootstock seedling (0.49 cm) followed by nine months old rootstock seedling (0.47 cm). However, significantly minimum diameter of rootstock seedling was recorded in seven months old rootstock (0.34 cm).

Among the different time of grafting, significantly maximum diameter of rootstock seedling was noticed during first week of February (0.44 cm) followed by third week of

February (0.42cm). However, significantly minimum diameter of rootstock seedling was recorded during first and third week of January (0.41 cm each).

Among the different age of rootstock used for soft wood grafting at different time of grafting, significantly maximum diameter of rootstock seedling (Table 4) was recorded by 10 months old rootstock at first and third week of February (0.50 cm each) followed by nine months old rootstock at first week of February (0.48 cm). However, significantly minimum diameter of rootstock seedling was recorded in seven months old rootstock at third week of January (0.32 cm). This rootstock seedling diameter was increase might be due to the more age of seedling and favorable grafting time. Similar results was reported by Islam *et al.* (2019) ^[2] and Sivudu *et al.* (2014) ^[6] in softwood grafting.

Table 2: Diameter of rootstocks as influenced by age of rootstock at different time of grafting (Pooled mean for three years)

Treatments	Diameter of rootstock (cm)				
	Time of Grafting				
	First week of January (B ₁)	Third week of January (B ₂)	First week of February (B ₃)	Third week of February (B ₄)	Mean
07 months (A ₁)	0.34	0.32	0.33	0.34	0.34
08 months (A ₂)	0.36	0.40	0.47	0.40	0.40
09 months (A ₃)	0.46	0.44	0.48	0.46	0.47
10 months (A ₄)	0.47	0.47	0.50	0.50	0.49
Mean	0.41	0.41	0.44	0.42	
	Age of Rootstock (A)	Time of Grafting (B)	BXA		
'F' test	Sig.	Sig.	Sig.		
SE (m) ±	0.026	0.026	0.04		
CD at 5%	0.09	0.09	0.13		

Days required for sprouting

The data in respect of days required for sprouting of the grafts as influenced by the age of rootstock and time of grafting was recorded and it is presented in Table 5 and 6. It is revealed that the days required for sprouting of the grafts was significantly influenced by different age of rootstock and different grafting time.

Among the different age of rootstock used, 10 months old rootstock required significantly minimum days for sprouting of grafts (10.17 days) followed by nine months old rootstock seedling (11.24 days). However, significantly maximum days for sprouting were required for eight months old rootstock (12.93 days).

Among the different time of grafting, significantly minimum days for sprouting of grafts was noticed during first week of February (10.06 days) followed by third week of January (10.65 days). However, significantly maximum days for sprouting were required during first week of January (14.11 days).

Among the different age of rootstock used for soft wood grafting at different time of grafting, significantly minimum days for sprouting of grafts was noticed when grafting performed on 10 months old rootstock at first week of

February (7.22 days) followed by 10 months old rootstock used for grafting at third week of January (9.05 days). However, significantly maximum days for sprouting were recorded in seven months old rootstock at first week of January (14.90 days). This reduction in days required for sprouting might be due to the advanced age of the rootstock which provides an increased reserve of stored carbohydrates and mature vascular bundles that facilitate rapid cell division at the graft union. Additionally, the optimum temperature and moisture levels present in early February accelerate cambial activity and cellular metabolic processes, promoting faster parenchymatous cell proliferation. Similar results were reported by Islam *et al.* (2019) [2] and Sivudu *et al.* (2014) [6] who observed that as the age of the rootstock increases, the days required for initial bud sprouting significantly decrease due to the inherent physiological potential and superior nutrient storage capacity of older seedlings. Furthermore, the findings align closely with those of Wailthare *et al.* (2020) [8], who noted that seasonal timing significantly dictates the rate of graft healing, where late-winter and early-spring conditions trigger early sap flow and metabolic activation within the scion.

Table 3: Days required for sprouting as influenced by age of rootstock and time of grafting (Pooled mean for three years)

Treatments	Days required for sprouting				
	Time of grafting				
	First week of January (B ₁)	Third week of January (B ₂)	First week of February (B ₃)	Third week of February (B ₄)	Mean
07 months (A ₁)	14.90	12.18	12.88	11.66	12.91
08 months (A ₂)	13.37	10.93	11.03	12.36	12.93
09 months (A ₃)	14.25	10.45	9.09	11.20	11.24
10 months (A ₄)	13.89	9.05	7.22	10.55	10.17
Mean	14.11	10.65	10.06	11.44	
	Age of Rootstock (A)	Time of Grafting (B)	BXA		
'F' test	Sig.	Sig.	Sig.		
SE (m) ±	0.19	0.19	0.038		
CD at 5%	0.54	0.54	0.11		

Grafting success

The data in respect of grafting success as influenced by the age of rootstock and time of grafting was recorded and it is presented in Table 7 and 8. It is revealed that grafting success was significantly influenced by different age of rootstock and different grafting time.

Among the different age of rootstock used, significantly maximum grafting success was recorded in 10 months old rootstock (70.99%) followed by nine months old rootstock (67.30%). However, significantly minimum grafting success was noticed in seven months old rootstock (35.65%).

Among the different time of grafting, significantly maximum grafting success was noticed during first week of February (72.62%) followed by third week of January (65.48%). However, significantly minimum grafting success

was recorded during first week of January (27.73%).

Different age of rootstock used for soft wood grafting at different time of grafting and it is significantly influenced on grafting success. Significantly maximum grafting success was noticed when grafting performed on 10 months old rootstock at first week of February (93.92%) followed by nine month old rootstock used for grafting at first week of February (92.93%). Maximum grafting success was found in 10 month old rootstock which might be due to rootstock attained the graftable size and guava crop remain in the dormancy during February. Similar results was reported by Amin (1978) [1], Joshi, (1998) [3], Raut, (2000) [4] and Shalini Manoharan (1999) [5] and Vasalakumari *et al*; (1998) [7] in Aonla.

Table 4: Grafting success as influenced by age of rootstock and time of grafting (Pooled mean for three years)

Treatments Age of Rootstock	Grafting success (%)				
	Time of Grafting				
	First week of January (B ₁)	Third week of January (B ₂)	First week of February (B ₃)	Third week of February (B ₄)	Mean
07 months (A ₁)	9.71 (18.15-)	43.23 (41.09)	50.73 (45.40)	38.84 (38.29)	35.65
08 months (A ₂)	21.21 (27.42)	57.05 (49.31)	64.88 (53.68)	46.35 (42.88)	47.37
09 months (A ₃)	37.61 (37.82)	76.59 (61.07)	92.93 (74.66)	62.07 (52.00)	67.30
10 months (A ₄)	42.39 (40.63)	85.07 (67.29)	93.92 (76.70)	62.61 (52.30)	70.99
Mean	27.73	65.48	72.62	52.47	
	Age of Rootstock (A)	Time of Grafting (B)	BXA		
'F' test	Sig.	Sig.	Sig.		
SE (m) ±	1.34	1.34	2.68		
CD at 5%	3.88	3.88	7.74		

(Note: Values in parenthesis are arc sign value)

**Fig 1:** Soft wood grafting during 1st week of February on different age of Rootstock

References

1. Amin RS. Soft wood grafting: a new technique for hard wood plant. *Current Science*. 1978;47(13):468-469.
2. Islam MA, Rahim MA, Rahman MM. Effect of age of rootstock and time of grafting on the success and growth of softwood grafting in mango. *Journal of Agriculture and Rural Development*. 2019;17(1):45-52.
3. Joshi PS. Studies on vegetative propagation in custard apple. M.Sc. Thesis (Unpublished). Dr. Panjabrao Deshmukh Krishi Vidyapeeth, Akola; 1998.
4. Raut HK. Effect of foliar application of plant growth regulators on seedling development and grafting success in *Aonla*. M.Sc. Thesis (Unpublished). Dr. Panjabrao Deshmukh Krishi Vidyapeeth, Akola; 2000.
5. Manoharan S. Studies on vegetative propagation of *Aonla*. M.Sc. Thesis (Unpublished). Dr. Panjabrao Deshmukh Krishi Vidyapeeth, Akola; 1999.
6. Sivudu BV, Reddy KS, Tanuja P. Effect of age of rootstock and time of grafting on graft success and survival in softwood grafting of sapota (*Manilkara achras*). *Indian Journal of Agricultural Sciences*. 2014;84(6):715-720.
7. Vasalakumari PK, Geetha CK, Rajeevan PK. Wedge grafting: A successful method of vegetative propagation for *Aonla*. *Journal of Applied Horticulture*. 1998;4(1-2):6-9.
8. Wailthare JK, Patil SR, Sonkamble AM. Effect of different environmental conditions on performance of sapota softwood grafts worked on invigorated Khirni rootstock. *Journal of Pharmacognosy and Phytochemistry*. 2020;9(2):360-363.