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P Tanuja
Department of Fruit Science, College of Horticulture (UAHS), Mudigere, Karnataka, India

D Thippesha
Department of Fruit Science, College of Horticulture (UAHS), Mudigere, Karnataka, India

Corresponding Author:
P Tanuja
Department of Fruit Science, College of Horticulture (UAHS), Mudigere, Karnataka, India

Interaction effect of age and curing of scion on success rate of softwood grafts in sapota (*Achras zapota* L.)

P Tanuja and D Thippesha

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Abstract
An experiment was conducted on the interaction effect of curing of scion and age of scion on success rate of grafts in sapota with 18 treatments replicated thrice adopting factorial randomized block design from 2014 to 2015 at the College Research Farm, Department of Fruit Science, College of Horticulture (UAHS), Mudigere, Karnataka. The interaction effect on the age and curing of scion revealed that minimum number of days for sprout initiation (9.33 days), 50% sprouting (19.677 days) and 100% (30.677) sprouting occurred when 3 months age old with 10 days cured scions were grafted. The same interaction also recorded maximum sprouts at 30 (1.60), 60 (2.23) and 90 (2.43) days after grafting, maximum number of leaves and leaf area index was observed at 60 (5.13 and 2.13) and 90 (5.50 and 2.70) days after grafting and maximum length and breadth of leaves was observed at 60 (5.52 cm and 3.68 cm) and 90 (6.17cm and 3.88 cm) days after grafting. The maximum height of the graft at 30 (36.67 cm), 60 (36.77 cm) and 90 (37.11 cm) days after grafting, maximum scion girth at 60 (4.72mm), maximum per cent graft success at 30 (66.66%), 60 (65.33%) and 90 (64.00%) days after grafting and maximum survival percentage (80.88) was registered with 3 months age old scion, which was cured for 10 days. The 10 days cured scion with 3 months age old scion resulted in maximum net income (₹ 22, 250 per 1000 grafts) and maximum cost: benefit ratio (2.06). This high benefit ratio is mainly because of interaction effect i e, by using the 3 months age old scion with 10 days curing which helped in giving the higher success rate because of their actively growing stage.

Keywords: *Achras zapota* L., curing, days after grafting, age of scion, grafts survival, success rate

Introduction
Sapota (*Achras zapota* L.) is one of the important tropical fruits belongs to family Sapotaceae. Many fruit growers were attracted towards cultivation of sapota on account of its better adoption to diverse soil and climatic conditions. Hence, there is ample scope for further increasing area under this crop. In the recent past, sapota has shown a phenomenal growth and attained the status of a major fruit crop after mango, banana and citrus. India is considered to be the largest producer of sapota in the world and it is being cultivated in an area of about 1.63 lakh hectare with a production of 14.95 lakh metric tonnes (Anonymous 2013) [1]. Though the fruit crop is having vast scope, the expansion of area under cultivation is limited due to the non availability of sufficient genuine planting material. The major problem in sapota is difficulties in rapid clonal multiplication, since it is a difficult to root plants, comparatively takes longer time for rooting, less success and high percentage of post separation mortality of layers which necessitates resorting to grafting. The most commercial method of propagation in sapota at present is approach
grafting. But, there are difficulties in approach grafting, which is being practiced at present. This method is cumbersome, labour intensive and the rate of multiplication is also very low because of limited availability of scion shoots near the ground level of mother trees. So, the branches are to be bent or pandal is to be erected near to the mother tree, which makes watering difficult to the pots and involve additional expenses and labour. To overcome this problem, softwood grafting which is followed in mango and cashew may be tried. Softwood grafting was reported to be very easy, convenient in handling, involve simple skills and can be done within short time. The most important is that, it is a detached scion method. Hence, in order to have more grafting success with low cost and less labour intensive softwood grafting is being mainly practiced.

Success, survivability and growth of grafts depend upon many other factors including variety, grafting method, time of grafting, age of scion and rootstock and environmental conditions (Hartmann *et al*. 1997) [4]. Pre-curing of the scion and age of the scion shoots plays an important role in the success of grafting. Defoliation of the scion also plays an important role in high success rate of grafting. Successful grafting cannot be possible until the scion sticks of proper age are selected for the grafting. The age of the scion plays a key role in success of grafting. Hence, there is a need for standardizing the age and curing of scion for high success rate in softwood grafting of sapota. Keeping the above factors in view, the present investigation was carried out to know the effect of age and curing of scion on success rate of soft wood grafting in sapota.

Materials and Methods

The investigation was conducted with 18 treatments with three replications adopting factorial randomized block design in the low cost polyhouse, Department of Fruit Science, College of Horticulture, Mudigere, Karnataka State during 2014 to 2015. Soft wood grafting method was followed using four to six months old rootstock. For this, the top growth of rootstock was decapitated with sharp knife and secature. Then longitudinal cut of 5 cm length was given from the terminally pruned rootstock. A scion shoot of about same thickness was selected. The length of scion was about 8-10 cm. The basal end of scion was given two gentle sloping cuts of about 5 cm on opposite sides by removing the bark and a little wood giving a wedge shape. Care was taken to retain some bark on remaining two sides. The wedge shaped scion thus prepared was inserted into the 'V' shaped slit of the stock and secured firmly with 150 gauge thickness transparent polythene strip of 1.5 cm width and 30 to 45 cm length, to keep the stock and scion in firm contact. The scions were covered with small transparent tubular bag to prevent entry of water into the grafted portion and also to avoid desiccation of the scion by creating humidity and microclimate near and above the graft union region. The observations were recorded on number of days for bud initiation, days taken for 50% sprouting, days taken for 100% sprouting, number of bud sprouts per graft, sprout length, sprout girth, number of leaves per graft, length and breadth of the leaves, leaf area index, height of the graft, girth of the graft, graft index, per cent graft success and survivability percentage.

Results and Discussion

All the treatments were significantly differed among all the parameters in sapota after grafting. The days taken for sprout initiation differed significantly (Table 1) among the treatments (age and curing of scion). The significantly less number of days (9.33 days) were taken for initiation of sprout in 3 months with 10 days cured scion and more number of days (15.58 days) was observed for initiation of sprouts in 9 months with 0 days cured scion. The significantly less number of days (19.67 days) were taken for 50 per cent sprouting in 3 months with 10 days cured scion and more number of days (27.00 days) was observed for initiation of sprout in 9 months with 0 days cured scion. The significantly less number of days (30.67 days) were taken for 100 per cent bud sprouting in 3 months with 10 days cured scion and more number of days (37.33 days) were required for 100 per cent bud sprouting in 9 months with 0 days cured scion (Table 1). At 45 days after grafting, higher sprout length (4.07 cm) and higher sprout girth (4.81 cm) were recorded in 3 months with 10 days cured scion (Table 3). The observations confirm that three months age old scion with precured scions defoliated 10 days before grafting took minimum number of days for bud break and increase in length and girth of grafts when compared to without pre-cured scion wood. This might be due to the fact that defoliation causes an immediate rise in sucrose content of phloem sap of the shoots (Zimmerman 1958) [12], which helped in movement of the solutes towards the apex of the shoot and young scions by resulting in higher meristematic activity at the bud level. This was in conformity with Jha and Shyamal (1995) [5].

Table 1: Interaction effect of age and curing of scion on number of days taken for bud sprouting in softwood grafting of sapota

Age of the scion	Curing of the scion	No. of days for bud sprouting		
		Initiation	50% sprouting	100% sprouting
A_1- 3	C_1- 0 days	14.67	25.90	36.27
months age	C_2- 2 days	14.00	25.57	35.17
old scion	C_3- 4 days	12.67	24.00	33.33
	C_4- 6 days	11.33	23.00	32.50
	C_5- 8 days	11.33	22.17	32.24
	C_6- 10 days	9.33	19.67	30.67
A_2- 6	C_1- 0 days	12.87	26.67	35.58
months age	C_2- 2 days	13.33	25.67	35.17
old scion	C_3- 4 days	13.17	24.33	35.67
	C_4- 6 days	12.00	23.30	33.67
	C_5- 8 days	11.00	22.05	33.05
	C_6- 10 days	11.00	21.00	31.33
A_3- 9	C_1- 0 days	15.58	27.00	37.33
months age	C_2- 2 days	14.45	25.67	36.67
old scion	C_3- 4 days	12.78	26.00	34.83
	C_4- 6 days	12.40	25.00	34.11
	C_5- 8 days	12.33	22.33	33.00
	C_6- 10 days	11.93	21.66	32.00
S.Em ±		0.61	0.59	0.57
CD @ 5%		1.75	1.68	1.63

At 30 days after grafting, significantly highest numbers of bud sprouts (1.60) were recorded in 3 months with 10 days cured scion over rest of the treatments. The less number of bud sprouts (1.01) were recorded in 9 months with 0 days cured scion. At 60 days after grafting, the higher number of bud sprouts (2.23) were recorded in 3 months with 10 days cured scion. The less number of bud sprouts (1.08) was recorded in 9 months with 0 days cured scion. At 90 days after grafting, the significantly highest

number of bud sprouts (2.43) was recorded in 3 months with 10 days cured scion over rest of the treatments. The significantly less number of bud sprouts (1.07) were recorded in 9 months with 0 days cured scion (Table 2). The observations confirm that precured scions defoliated 10 days before grafting with 3 months age old scion recorded maximum number of buds, it might be due to the fact that defoliated bud wood used for propagation, may be quite rich in carbohydrates and other stored food substances. Active stage of young scions resulted in vigorous growth of the graft (Prasad *et al.* 1990) [9] and several other workers (Mukherjee and Majumdar 1964, Singh and Srivastava 1979) [7, 11] emphasized the importance of pre curing and age of scion.

Table 2: Interaction effect of age and curing of scion on number of bud sprouts at different intervals

Age of the scion	Curing of the scion	No. of bud sprouting		
		30 DAG	60 DAG	90 DAG
A_1- 3	C_1- 0 days	1.02	1.13	1.24
months age	C_2- 2 days	1.03	1.20	1.27
old scion	C_3- 4 days	1.09	1.22	1.28
	C_4- 6 days	1.19	1.27	1.34
	C_5- 8 days	1.20	1.34	1.66
	C_6- 10 days	1.60	2.23	2.43
A_2- 6	C_1- 0 days	1.08	1.14	1.26
months age	C_2- 2 days	1.05	1.17	1.23
old scion	C_3- 4 days	1.17	1.26	1.27
	C_4- 6 days	1.23	1.32	1.34
	C_5- 8 days	1.33	1.34	1.61
	C_6- 10 days	1.40	2.10	2.20
A_3- 9	C_1- 0 days	1.01	1.08	1.07
months age	C_2- 2 days	1.19	1.15	1.17
old scion	C_3- 4 days	1.20	1.24	1.30
	C_4- 6 days	1.14	1.28	1.37
	C_5- 8 days	1.20	1.31	1.38
	C_6- 10 days	1.30	1.77	1.93
S.Em ±		0.61	0.06	0.04
CD @ 5%		1.75	0.18	0.10

Table 3: Interaction effect of age and curing of scion on sprout length and girth in softwood grafting of sapota

Age of the scion	Curing of the scion	Sprout height (cm)	Sprout girth (cm)
		45 DAG	45 DAG
A_1- 3	C_1- 0 days	2.55	3.09
months age	C_2- 2 days	2.98	3.17
old scion	C_3- 4 days	2.83	3.98
	C_4- 6 days	3.42	4.36
	C_5- 8 days	3.81	4.38
	C_6- 10 days	4.07	4.81
A_2- 6	C_1- 0 days	2.38	2.87
months age	C_2- 2 days	2.46	2.33
old scion	C_3- 4 days	3.12	3.33
	C_4- 6 days	3.42	3.33
	C_5- 8 days	3.51	4.13
	C_6- 10 days	3.83	4.77
A_3- 9	C_1- 0 days	2.27	2.17
months age	C_2- 2 days	2.27	2.87
old scion	C_3- 4 days	2.93	3.47
	C_4- 6 days	3.53	2.67
	C_5- 8 days	3.33	3.80
	C_6- 10 days	3.97	4.37
	S. Em ±	0.27	0.23
	CD @ 5%	0.80	0.67

The significantly maximum numbers of leaves (5.13) were found in 3 months with 10 days cured scion, 9 months with 0 days cured scion registered lower (3.43) number of leaves at 60 days after grafting. At 90 days after grafting, significantly more number of leaves (5.50) was noticed in 3 months with 10 days cured scion (Table 4). A lowest mean number of 3.29 leaves were recorded in 6 months with 0 days cured scion. The leaf area index of grafts was found to be significantly differing among treatments. At 60 days after grafting, the 3 months old with 10 days cured scion recorded highest leaf area index, whereas lower leaf area index of 1.06 was noticed in 9 months with 0 days cured scion. At 90 days after grafting, significantly maximum leaf area index (2.70) was recorded in 3 months with 10 days cured scion. Less leaf area index of 1.30 was observed in 9 months with 0 days cured scion. The results confirm that precured scions defoliated 10 days before grafting with 3 months age old scion recorded maximum number of leaves and leaf area index. This variation in different treatments might be due to the effect of defoliation and age of scion as the grafts produced from these scions were more vigorous and juvenile condition of scion sticks had still activated the buds and increase in the leaf area (Zimmerman 1958) [12]. Linear trend of growth was recorded by Dod *et al.* (1996) [2]. Kumar *et al.* (2012) [6] in guava also reported that scions cured for nine days gave better results in terms of number of leaves.

Table 4: Interaction effect of age and curing of scion on length and breadth of leaves at different intervals in softwood grafting of sapota

Age of the scion	Curing of the scion	Length of leaves (cm)		Breadth of leaves (cm)	
		60 DAG	90 DAG	60 DAG	90 DAG
A_1- 3	C_1- 0 days	3.37	3.57	2.07	2.76
months	C_2- 2 days	3.67	3.84	2.61	3.17
age old	C_3- 4 days	3.96	4.16	3.33	3.54
scion	C_4- 6 days	4.06	4.73	3.40	3.59
	C_5- 8 days	4.67	5.65	3.47	3.61
	C_6- 10 days	5.52	6.17	3.68	3.88
A_2- 6	C_1- 0 days	3.38	3.51	1.87	2.23
months	C_2- 2 days	3.57	3.73	2.64	2.81
age old	C_3- 4 days	3.93	3.97	3.09	3.37
scion	C_4- 6 days	4.53	4.58	3.28	3.43
	C_5- 8 days	5.37	5.40	3.33	3.59
	C_6- 10 days	5.73	5.87	3.62	3.73
A_3- 9	C_1- 0 days	3.00	3.33	1.9	2.31
months	C_2- 2 days	3.53	3.77	2.45	2.58
age old	C_3- 4 days	3.60	3.87	3.00	3.07
scion	C_4- 6 days	4.49	4.63	3.21	3.35
	C_5- 8 days	5.13	5.23	3.25	3.45
	C_6- 10 days	4.73	4.83	3.55	3.65
S. Em ±		0.16	0.20	0.09	0.17
CD @ 5%		0.45	0.58	0.25	0.49

The treatment with 3 months with 10 days cured scion recorded significantly superior leaf length at 60 days (5.52 cm) and 90 days (6.16 cm) after graft success. Lesser length of leaves (3.00 cm and 3.33 cm) was observed in A_3C_1 (9 months with 0 days cured scion) at 60 and 90 days after grafting respectively. At 60 days after grafting, maximum breadth of leaves (3.67 cm) was found in 3 months with 10 days cured scion. At 90 days after grafting, more leaf breadth (3.88 cm) was noticed in 3 months with 10 days cured scion. The treatment with 9 months with 0 days cured scion recorded lower leaf breadth of 2.23 cm. It can be attributed to the fact that the curing of scion and younger scions stimulate the meristematic activity in the plant tissues which helps in enhancing more photosynthates and helps in

increasing the leaf length and breadth. These findings are in line with those of Jha and Brahmachari (2002) [5]. At 30, 60 and 90 days after grafting, the significantly highest graft heights (36.67 cm) (36.77 cm) and (37.11 cm) were recorded in 3 months with 10 days cured scion. The lowest graft height at 30 (30.50cm), 60 (30.83 cm) and 90 (31.16cm) days after grafting was noticed in 9 months with 0 days cured scion (Table 5). This might be due to swollen terminal buds of cured scion in bulging condition which encouraged earlier sprouting and their continual growth of the grafts. The girth of scion at 30 and 90 days after grafting was found to be non significant. At 60 days after grafting, the treatment 3 months with 10 days cured scion recorded maximum scion girth (4.73mm). Whereas, the minimum scion girth (4.06 mm) was noticed in 9 months with 0 days cured scion. The observations confirm that pre-cured scions defoliated 10 days before grafting with 3 months age old scion recorded maximum diameter of grafts, it might be due to early sprouting of buds giving quick growth as explained by Patil *et al.* (2012) [8] and the results are in conformity with Jha and Brahmachari (2002) [5].

Table 5: Interaction effect of age and curing of scion on height of the graft at different intervals in softwood grafting of sapota

Age of the scion	Curing of the scion	Height of the graft (cm)		
		30 DAG	60 DAG	90 DAG
A_1- 3	C_1- 0 days	33.67	34.33	35.00
months age	C_2- 2 days	34.30	35.67	35.77
old scion	C_3- 4 days	34.77	35.83	36.17
	C_4- 6 days	35.50	35.16	35.83
	C_5- 8 days	35.85	35.90	36.33
	C_6- 10 days	36.63	36.77	37.11
A_2- 6	C_1- 0 days	33.33	33.33	34.00
months age	C_2- 2 days	33.58	34.25	34.92
old scion	C_3- 4 days	33.58	34.67	35.67
	C_4- 6 days	34.00	35.33	36.00
	C_5- 8 days	34.88	36.33	36.67
	C_6- 10 days	35.99	36.86	36.86
A_3- 9	C_1- 0 days	30.50	30.83	31.17
months age	C_2- 2 days	32.00	31.67	32.33
old scion	C_3- 4 days	32.67	33.83	34.50
	C_4- 6 days	33.01	34.67	35.00
	C_5- 8 days	33.27	35.67	36.33
	C_6- 10 days	34.21	34.01	34.33
S.Em ±		0.45	0.64	0.69
CD @ 5%		1.29	1.84	1.99

Table 6: Interaction effect of age and curing of scion on graft girth at different intervals in softwood grafting in sapota

Age of the scion	Curing of the scion	Graft girth (mm)		
		30 DAG	60 DAG	90 DAG
A_1- 3	C_1- 0 days	4.28	4.30	4.36
months age	C_2- 2 days	4.46	4.50	4.53
old scion	C_3- 4 days	4.39	4.43	4.47
	C_4- 6 days	4.63	4.66	4.69
	C_5- 8 days	4.73	4.72	4.77
	C_6- 10 days	4.69	4.73	4.73
A_2- 6	C_1- 0 days	4.20	4.27	4.30
months age	C_2- 2 days	4.07	4.14	4.18
old scion	C_3- 4 days	4.27	4.35	4.35
	C_4- 6 days	4.43	4.47	4.50
	C_5- 8 days	4.31	4.34	4.38
	C_6- 10 days	4.60	4.63	4.67
A_3- 9	C_1- 0 days	3.93	4.07	4.13
months age	C_2- 2 days	3.91	4.01	4.16
old scion	C_3- 4 days	4.03	4.06	4.13
	C_4- 6 days	4.35	4.38	4.41
	C_5- 8 days	4.11	4.24	4.28
	C_6- 10 days	4.20	4.44	4.47
S.Em ±		0.12	0.11	0.11
CD @ 5%		NS	0.33	NS

The percent graft success showed significant differences among different treatments. Per cent graft success was significantly highest in 3 months with 10 days cured scion at 30 (66.67%), 60 (65.33%) and 90 (64.00%) days after grafting. The treatment A_3C_1 (9 months with 0 days cured scion) recorded lower graft success at 30, 60 and 90 days after grating with 41.66%, 41.33% and 40.67% respectively (Table 6). The graft index showed significant differences among different treatments (age and curing of scion). A perusal of the data revealed that, graft take percentage in soft wood grafting was higher when pre defoliated scions were used, as compared to that of freshly defoliated scions. This might probably because pre- defoliated scions suffer less from desiccation than those of freshly defoliated scions, which retain their leaf stalks for some time after grafting and cut ends of the leaf stalk accelerate the desiccation process. The results are in conformity with Ram and Bist (1982) [10]. Success with age of scions was probably because of activation of the meristematic cells in juvenile condition. The success due to pre-

curing may be due to swelling of buds resulting in better sprouting in precured scions as explained by Hartmann and Brahmachari (2002) [3]. The interaction influences of different age groups of scions and curing days treatments were found to be significant. The graft survival percentage was higher (80.88%) in 3 months with 10 days cured scion and more than 75 per cent of grafts have survival percentage at par with the 3 months with 10 days cured scion. The lower graft survival percentage (45%) was recorded in 9 months with 0 days cured scion. The percentage of survivability was found to increase with the increase in the curing days and decrease in the age of the scions. The higher meristematic activity and higher reserved food material in layers influenced the maximum survival of layers after transplanting. The higher percentage of survival after grafting can be attributed to the possession of better activity of the cells by the juvenile condition of the scion and higher accumulation and the translocation of the food materials by the use of cured scion. Similar trend was also reported in mango by Mukherjee and Majumdar (1964) [7], Singh and Srivastava (1979) [11].

Table 7: Interaction effect of age and curing of scion on percent graft success and survival percentage at different intervals in softwood grafting of sapota

Age of the scion	Curing of the scion	Percent graft success			Survival percentage
		30 DAG	60 DAG	90 DAG	
A_1- 3 months age old scion	C_1- 0 days	43.33	43.00	42.67	50.00
	C_2- 2 days	50.00	48.33	48.00	62.14
	C_3- 4 days	53.33	51.67	51.33	75.55
	C_4- 6 days	54.33	53.00	52.67	72.22
	C_5- 8 days	56.67	56.66	56.66	80.39
	C_6- 10 days	66.67	65.33	64.00	80.88
A_2- 6 months age old scion	C_1- 0 days	42.59	41.67	41.33	48.33
	C_2- 2 days	46.67	46.33	45.67	61.67
	C_3- 4 days	46.33	46.00	45.67	73.89
	C_4- 6 days	52.29	51.63	51.63	71.55
	C_5- 8 days	56.29	55.96	54.96	79.67
	C_6- 10 days	64.26	63.59	62.92	80.22
A_3- 9 months age old scion	C_1- 0 days	41.67	41.33	40.67	45.00
	C_2- 2 days	45.67	45.33	44.67	60.00
	C_3- 4 days	44.59	44.26	43.59	72.22
	C_4- 6 days	51.00	50.667	49.67	70.89
	C_5- 8 days	55.33	55.00	54.00	79.55
	C_6- 10 days	59.00	58.33	57.00	79.67
S. Em ±		2.83	2.64	2.48	6.42
CD @ 5%		8.14	7.57	7.12	18.46

Table 8: Interaction effect of age and curing of scion on cost:benefit ratio of softwood grafting in sapota per thousand grafts

Age of the scion	Curing of the scion	Total cost of production (₹)	Successful grafts	Gross income (₹)	Net income (₹)	Cost:benefit ratio
A_1- 3 months age old scion	C_1- 0 days	9950	420	21,500	11,050	1:1.11
	C_2- 2 days	10,250	510	25.500	15,250	1:1.48
	C_3- 4 days	10,250	480	24,000	13,750	1:1.34
	C_4- 6 days	10.500	520	26,000	15,500	1:1.47
	C_5- 8 days	10,750	560	28,000	17,250	1:1.60
	C_6- 10 days	10.750	660	33,000	22,250	1:2.06
A_2- 6 months age old scion	C_1- 0 days	9950	410	20,500	10,550	1:1.06
	C_2- 2 days	10,250	450	22,500	12,250	1:1.19
	C_3- 4 days	10,250	450	22,500	12,000	1:1.17
	C_4- 6 days	10.500	510	25.500	15,250	1:1.48
	C_5- 8 days	10,750	540	27,500	16,250	1:1.51
	C_6- 10 days	10.750	620	31,000	20,250	1:1.88
A_3- 9 months age old scion	C_1- 0 days	9950	400	20,000	10,050	1:1.01
	C_2- 2 days	10,250	440	22,000	11,750	1:1.14
	C_3- 4 days	10,250	470	23,500	13,250	1:1.29
	C_4- 6 days	10.500	480	24,000	13,500	1:1.30
	C_5- 8 days	10,750	540	27.000	16,250	1:1.51
	C_6- 10 days	10.750	570	28,500	17,750	1:1.65

The 3 months age old with 10 days cured scion resulted in maximum net income (₹ 22,250/1000 grafts), which was followed by 6 months age old with 10 days cured scion (₹ 20,250 per 1000 grafts), whereas it was minimum (₹ 10,050 per 1000 grafts) in 9 months age old with 0 days cured scion (Table 7). The maximum cost: benefit ratio (2.06) was observed from the treatment 3 months age old scion with 10 days cured scion which was followed by treatment 6 months age old scion with 10 days cured scion (1.88), while, the minimum cost: benefit ratio (1.01) was recorded in 9 months age old with 0 days cured scion. The high benefit ratio is mainly because of interaction effect i e by using the three months age old scion with curing which helped in giving the higher success rate because of their actively growing.

It is concluded that to achieve maximum success in case of softwood grafting in sapota, the selection of younger scions of three to four months age with ten days curing. The pre-curing of scion is more beneficial in terms of better success rate along with better overall graft growth. In future, more treatments in age of the scion, curing and interactions with two or more different popular varieties may be studied for more robust and accurate results.

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