

Comparative efficacy of different propagation techniques in guava

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ABSTRACT

An experiment was conducted to find out the relative efficacy of different budding or grafting methods in guava on two rootstocks during different months (February, July and November). The experimental material consisted of scion cultivar Allahabad Safeda. Five methods of propagation, viz. shield budding, patch budding, veneer grafting, wedge grafting and wedge grafting with polycap were tried on two rootstocks, namely L-49 and Local guava in open and under polyhouse conditions. The result exhibited significant variation with respect to number of days taken for sprouting, sprouting per cent, per cent bud/graft success, number of branchlets and leaf area per budded/grafted plant. The minimum number of days taken for bud sprouting was recorded in the treatment combination $S_2M_5C_2$ (local guava seedling rootstock + wedge grafting with polycap under polyhouse) during February (9.17 days), followed by July (9.70 days) and November (12.56 days) months. Maximum sprouting was also recorded in the same treatment combination during November (96.08%), February (93.95%) and July (91.13%). The maximum graft/ bud survival was observed in the treatment $S_2M_5C_2$ during November (94.85%) followed by February (92.84%) and July (89.64%) months. However, the minimum survival was noted in the treatment $S_1M_1C_1$ (L-49 rootstock + shield budding under open conditions) when propagation was done during November (42.45%) preceded by February (45.46%) and July (51.89%) during both the years. Present results suggest that in guava highest graft take success was obtained by using wedge grafting along with polycap on local guava as rootstock under polyhouse conditions.

Key words: Budding, guava, polyhouse, *Psidium guajava*, wedge grafting.

INTRODUCTION

Guava (*Psidium guajava* L.) is one of the most important fruit crops of the tropics. In India, it claims to be the fifth most important fruit crop after mango, banana, citrus, apple and papaya in terms of area and the sixth in terms of production. Non availability of quality planting material and consequent substitution using poor quality seedlings have adversely affected the guava production and productivity (Singh *et al.*, 7). In India, air-layering, stooling and inarching have been practiced for its multiplication for many years. The main limitations of above methods are absence of tap root system and poor establishment of air-layers in the field. Further, these methods are very cumbersome, labour-intensive and does not allow for the multiplication of a large number of plants from a limited source material. Different types of propagation methods have been tried in guava with varying success rates. Keeping these facts in view, the present investigation was carried out to find out relative efficacy of various methods of propagation using different rootstocks in open and polyhouse conditions.

MATERIALS AND METHODS

The present investigation was carried out during 2010-11 and 2011-12 at the Horticulture Research Garden, Institute of Agricultural Sciences, BHU, Varanasi. The experimental material consisted of scion cultivar Allahabad Safeda. Five methods of propagation, viz. shield budding (M_1), patch budding (M_2), veneer grafting (M_3), wedge grafting (M_4) and wedge grafting with polycap (M_5) were tried on two rootstocks namely L-49 (S_1) and Local guava (S_2) in open (C_1) and under polyhouse (C_2) conditions. There were 20 treatment combinations replicated three times in Completely Randomized Design. The budding or grafting was practiced on 9-12 month-old guava rootstocks raised by seed in polybags. The scion shoots (15 to 18 cm long) of pencil thickness (0.5 to 1.0 cm) with 3 to 4 healthy buds were selected for grafting. Each selected shoot was defoliated one week before separation from the mother plant in order to invigorate the axillary buds. However, fresh buds were used for budding treatments. The experiment was conducted during three months, viz., February, July and November. In polyhouse, the relative humidity ranged from 60-70% and the temperature was maintained between 25-30°C. The temperature differences between the polyhouse and

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open field conditions were less during the early or late hours of the day. The data on bud sprouting was recorded and the average time taken for a bud to sprout from the date of budding or grafting was worked out and expressed in days. Observations were recorded on success of grafting such as sprouting percentage, mortality percentage and success percentage. The sprouted buds/grafts survived for minimum 15 days after sprouting were only counted and expressed in per cent. The survival per cent was calculated in relation to the number of buds/grafts attempted. Data on vegetative growth, viz. length and girth of sprouted shoot, number of branchlets, number of leaves and leaf area were recorded after 90 days. Samples of leaves from five plants were collected for determining leaf area by using leaf area meter and expressed as leaf area per plant.

RESULTS AND DISCUSSION

The interaction between different rootstocks, methods and conditions differed significantly with respect to number of days taken to sprout, sprouting per cent and survival per cent (Tables 1, 2 & 3). During 2010-11, the minimum number of days taken for sprouting of buds was recorded in the treatment combination $S_2M_5C_2$ (Local guava rootstock + wedge grafting with polycap under polyhouse) during February (9.17 days), July (9.70 days) and November (12.56 days) months. However, the bud took maximum time for sprouting in treatment $S_1M_1C_1$ (L-49 rootstock + shield budding under open conditions) when propagation was done during November (39.16 days). The experiment was repeated during 2011-12, almost

similar trends were observed. Earlier sprouting of bud was observed in polyhouse as compared to open field conditions. This might be due to the fact that under polyhouse conditions creation of high humidity around bud scions reduced the desiccation of active tissue of scion bud as compared to open field conditions. This result is in accordance to the findings of Samiullah *et al.* (4) and Singh *et al.* (6) who have reported that grafting under greenhouse significantly reduces the time taken for sprouting than those grafted under open field conditions.

Similarly, the maximum sprouting was also recorded in the treatment combination $S_2M_5C_2$ (local guava seedling rootstock + wedge grafting with polycap under polyhouse) in November (96.08%), February (93.95%) and July (91.13%) followed by $S_2M_4C_2$ (local guava rootstock + wedge grafting under polyhouse). However, minimum sprouting was recorded in the treatment $S_1M_1C_1$ (L-49 rootstock + shield budding under open conditions) when propagation was done during February (49.08%), July (55.59%) and November (45.98%) during 2010-11. During 2011-12, both the rootstocks, different methods of budding or grafting and growing conditions performed almost in the same manner as observed during 2010-11 (Table 2). The only difference was in terms of maximum bud sprouting was recorded in $S_2M_5C_2$ (Local guava rootstock + wedge grafting with polycap under polyhouse) followed by $S_2M_4C_2$ (Local guava rootstock + wedge grafting under polyhouse) during February (92.85%) which was *at par* with sprouting in November (91.91%). The production and interlocking of parenchymatus cells (callus tissue) by both stock and scion along with establishment of intimate contact

Table 1. Interaction effect of rootstock, method and growing conditions on days to bud sprouting.

Treatment	February				July				November			
	2010-11		2011-12		2010-11		2011-12		2010-11		2011-12	
	C ₁	C ₂	C ₁	C ₂	C ₁	C ₂	C ₁	C ₂	C ₁	C ₂	C ₁	C ₂
S_1M_1	27.96	26.43	28.90	25.60	26.05	25.46	26.68	26.32	39.16	28.89	38.28	27.14
S_1M_2	26.94	22.93	26.43	23.46	24.83	21.00	23.17	22.22	37.50	26.22	36.37	23.71
S_1M_3	25.51	22.43	26.74	21.13	24.50	21.48	25.65	20.39	33.43	24.57	35.01	22.50
S_1M_4	18.05	14.99	19.12	13.94	15.52	13.77	14.95	12.85	30.77	18.42	31.15	16.33
S_1M_5	15.75	13.96	16.43	11.62	14.96	12.06	12.71	10.35	25.03	16.19	26.35	14.92
S_2M_1	26.16	21.70	27.46	20.93	24.25	21.82	23.47	20.52	33.11	24.80	32.69	24.21
S_2M_2	22.04	20.84	23.38	19.61	20.42	19.95	20.94	19.22	31.10	23.65	31.38	23.24
S_2M_3	21.20	20.46	20.11	19.93	19.39	18.56	20.23	17.89	30.47	22.70	30.88	22.36
S_2M_4	14.01	11.03	15.51	10.38	14.31	10.69	12.60	10.41	25.05	15.94	25.33	14.00
S_2M_5	12.48	9.17	11.28	8.09	11.16	9.70	10.68	9.50	22.42	12.56	22.89	11.24
CD _{0.05}	1.72		1.89		2.10		1.76		1.69		1.60	

Table 2. Interaction effect of rootstock, method and growing conditions on sprouting percentage of bud/ graft.

Treatment	February				July				November			
	2010-11		2011-12		2010-11		2011-12		2010-11		2011-12	
	C ₁	C ₂	C ₁	C ₂	C ₁	C ₂	C ₁	C ₂	C ₁	C ₂	C ₁	C ₂
S ₁ M ₁	49.08 (44.45)*	53.16 (46.80)	50.93 (45.51)	55.61 (48.20)	55.59 (48.19)	59.52 (50.47)	55.78 (48.30)	58.00 (49.59)	45.98 (42.68)	65.81 (54.20)	42.12 (40.45)	63.41 (52.76)
S ₁ M ₂	54.03 (47.29)	63.87 (53.03)	52.25 (46.27)	63.66 (52.91)	61.39 (51.57)	65.57 (54.05)	62.06 (51.96)	65.12 (53.79)	47.96 (43.82)	69.07 (56.19)	48.27 (43.99)	67.51 (55.23)
S ₁ M ₃	57.66 (49.39)	65.98 (54.30)	57.65 (49.38)	68.30 (55.72)	59.05 (50.20)	64.78 (53.58)	60.21 (50.87)	62.60 (52.28)	49.52 (44.71)	70.31 (56.96)	51.15 (45.64)	72.13 (58.12)
S ₁ M ₄	79.65 (63.18)	84.11 (66.51)	77.44 (61.62)	85.11 (67.31)	74.78 (59.84)	78.17 (62.15)	75.54 (60.35)	79.32 (62.95)	56.62 (48.79)	85.29 (67.43)	58.43 (49.84)	83.00 (65.64)
S ₁ M ₅	84.25 (66.60)	86.29 (68.29)	84.45 (66.76)	89.15 (70.83)	77.69 (61.80)	82.34 (65.13)	78.85 (62.61)	84.27 (66.61)	72.80 (58.56)	94.86 (76.92)	73.65 (59.12)	90.83 (72.36)
S ₂ M ₁	52.18 (46.23)	54.89 (47.79)	51.43 (45.80)	58.42 (49.83)	52.23 (46.26)	65.78 (54.20)	53.15 (46.79)	66.04 (54.34)	46.92 (43.21)	67.19 (55.05)	44.64 (41.91)	65.85 (54.23)
S ₂ M ₂	56.99 (49.00)	72.50 (58.35)	54.21 (47.40)	74.88 (59.90)	66.42 (54.58)	68.91 (56.12)	70.55 (57.12)	71.24 (57.56)	48.15 (43.92)	70.32 (56.99)	45.92 (42.64)	68.74 (56.00)
S ₂ M ₃	67.65 (55.32)	73.10 (58.76)	68.24 (55.68)	75.02 (60.00)	63.85 (53.03)	65.87 (54.24)	68.31 (55.74)	69.51 (56.46)	54.69 (47.68)	75.86 (60.56)	57.11 (49.07)	76.11 (60.73)
S ₂ M ₄	80.10 (63.51)	91.61 (73.23)	79.39 (63.00)	88.58 (70.26)	77.56 (61.74)	87.39 (69.20)	76.78 (61.19)	82.62 (65.45)	64.57 (53.45)	85.00 (67.22)	65.16 (53.81)	83.55 (66.05)
S ₂ M ₅	86.29 (68.27)	93.95 (75.88)	86.66 (68.67)	92.85 (74.52)	81.89 (64.80)	91.13 (72.73)	80.76 (63.99)	90.13 (71.76)	80.95 (64.11)	96.08 (78.66)	81.44 (64.46)	91.91 (73.45)
CD _{0.05}	2.53		2.44		2.60		2.51		2.23		1.81	

*Transformed values

of considerable amount of cambial region of both stock and scion under favourable environmental conditions may have resulted in better sprouting (Hartmann *et al.*, 1). These results are in consonance with the earlier findings of Singh and Pandey (5).

During 2010-11, the maximum graft/ bud survival was observed in the treatment S₂M₅C₂ (Local guava rootstock + wedge grafting with polycap under polyhouse) during November (94.85%) followed by February (92.84%) and July (89.64%). However, the minimum survival was noted in the treatment S₁M₁C₁ (L-49 rootstock + shield budding under open conditions) when propagation was done during November (42.45%) preceded by February (45.46%) and July (51.89%). During 2011-12, almost similar pattern was observed during second year of experimentation (2011-12) with the exception that the treatment combination S₂M₅C₂ exhibited highest survival per cent in February (91.45%), which was *at par* with survival in November month (90.33%). The success of budding and grafting methods was minimum under open field conditions when guava plants were budded or grafted during November (Table 3). Unfavourable atmospheric

conditions and possibility of incomplete union between rootstock and scion which might have created stress conditions to the growing sprouts (Pandey *et al.*, 2). The temperature range of 20° to 26°C and RH 70 to 80% inside the polyhouse was found to be most conducive for the success.

The interaction among different rootstocks, methods and conditions were significant for length of sprouted shoot, number of branchlets, number of leaves and leaf area measured after 90 days of budding/ grafting during 2010-11. However, variations due to rootstock × method × growing condition were found to be non-significant with respect to number of branchlets and number of leaves during 2011-12. During 2010-11, the maximum sprout length was recorded in the treatment S₂M₅C₂ (Local guava rootstock + wedge grafting with polycap under polyhouse) when propagation was done during February (20.04 cm), July (21.18 cm) and November (18.89 cm) followed by the treatment S₁M₅C₂ (L-49 rootstock + wedge grafting with polycap under polyhouse conditions). Whereas, the shortest length of sprout was recorded in the treatment S₁M₁C₁ (5.62 cm) when budding/ grafting was performed during

Table 3. Interaction effect of rootstock, method and growing conditions on per cent survival of bud/ graft.

Treatment	February				July				November			
	2010-11		2011-12		2010-11		2011-12		2010-11		2011-12	
	C ₁	C ₂	C ₁	C ₂	C ₁	C ₂	C ₁	C ₂	C ₁	C ₂	C ₁	C ₂
S ₁ M ₁	45.46 (42.38)*	50.91 (45.51)	46.08 (42.73)	53.20 (46.82)	51.89 (46.07)	58.00 (49.59)	55.67 (47.47)	56.34 (48.63)	42.45 (40.64)	62.87 (52.44)	40.26 (39.37)	62.35 (52.13)
S ₁ M ₂	52.05 (46.16)	62.63 (52.30)	49.41 (44.64)	61.87 (51.85)	57.92 (49.55)	64.30 (52.11)	60.12 (50.83)	63.67 (52.92)	44.06 (41.57)	65.62 (54.08)	46.14 (42.77)	66.73 (54.76)
S ₁ M ₃	56.05 (48.46)	63.42 (52.77)	54.72 (47.69)	65.24 (53.85)	56.19 (48.54)	64.63 (52.50)	57.85 (49.50)	61.04 (51.36)	45.14 (42.19)	68.25 (55.70)	47.89 (43.78)	69.85 (56.69)
S ₁ M ₄	77.85 (61.90)	83.28 (65.85)	76.23 (60.80)	83.84 (66.28)	72.23 (58.19)	75.02 (59.99)	72.60 (58.42)	76.45 (60.95)	54.03 (47.30)	83.69 (66.19)	55.45 (48.11)	81.76 (64.71)
S ₁ M ₅	82.65 (65.37)	84.71 (67.00)	82.32 (65.13)	87.12 (68.95)	75.64 (60.44)	79.10 (62.78)	76.78 (61.18)	83.52 (65.78)	71.67 (57.83)	93.74 (75.49)	71.45 (57.69)	89.30 (70.89)
S ₂ M ₁	49.35 (44.61)	51.62 (45.91)	48.76 (44.27)	56.52 (48.73)	50.79 (45.44)	63.44 (52.79)	57.32 (46.12)	65.81 (53.60)	45.02 (42.12)	66.71 (54.74)	42.90 (40.90)	64.82 (53.62)
S ₂ M ₂	54.27 (47.43)	70.29 (56.95)	50.23 (45.11)	70.96 (57.38)	63.39 (52.76)	66.66 (54.72)	68.26 (55.69)	70.02 (56.79)	45.62 (42.47)	68.64 (55.93)	44.10 (41.59)	67.48 (55.22)
S ₂ M ₃	64.70 (53.53)	70.24 (56.92)	66.64 (54.72)	73.91 (59.27)	62.37 (52.14)	63.90 (53.06)	66.56 (54.66)	68.06 (55.59)	53.60 (47.04)	74.69 (59.78)	55.60 (48.20)	73.35 (58.91)
S ₂ M ₄	78.81 (62.58)	90.91 (72.45)	76.98 (61.31)	87.36 (69.15)	75.78 (60.51)	86.07 (68.11)	73.79 (59.24)	81.66 (64.13)	61.22 (51.47)	82.41 (65.18)	62.15 (52.01)	81.61 (64.58)
S ₂ M ₅	84.75 (67.07)	92.84 (74.53)	84.05 (66.47)	91.45 (73.08)	80.73 (63.94)	89.64 (71.21)	78.65 (62.48)	89.09 (70.43)	79.74 (63.23)	94.85 (76.97)	80.33 (63.67)	90.33 (71.90)
CD _{0.05}	2.33		2.23		2.54		2.30		2.18		2.30	

*Transformed values

November month. During 2011-12, length of sprout at 90 days after budding/grafting followed similar trend as observed in 2010-11 (Table 4). Under polyhouse conditions, the length of sprout was comparable to open field conditions for the plants budded/ grafted during November, but meagre differences in length of sprout was recorded when budding/ grafting was done in July. During 2010-11, highest number of branchlets was recorded with treatment S₂M₅C₂ (Local guava rootstock + wedge grafting with polycap under polyhouse) when propagation was done in February (7.15) and November (6.81), while it was maximum in S₂M₅C₁ (Local guava rootstock + wedge grafting with polycap under open conditions) for July (6.91). During 2011-12, number of branchlets 90 days after budding/ grafting followed almost similar trend as it was observed during 2010-11.

During 2010-11, the number of leaves was also recorded to be the maximum with the treatment S₂M₅C₂ (Local guava rootstock + wedge grafting with polycap under polyhouse) during February (30.98) which was *at par* with number of leaves on November grafted plants (30.55). The maximum number of leaves (29.29) was

recorded in treatment S₂M₅C₁ when budding/ grafting was performed during July. When the experiment was repeated during 2011-12 (Table 4), slight variation with respect to number of leaves was recorded. During 2011-12, maximum number of leaves was recorded in treatment combination S₂M₅C₂ (Local guava rootstock + wedge grafting with polycap under polyhouse conditions) for February (28.62), July (31.27) and November (32.24). Maximum length and number of leaves per plant was observed under polyhouse conditions. It might be due to warmer and humid air inside the polyhouse, which 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 with Pandey *et al.* (3).

During 2010-11, that the maximum leaf area was recorded with treatment S₂M₅C₂ for February (46.28 cm²), July (46.75 cm²) and November (48.17 cm²) months. However, the minimum leaf area (19.98, 22.43 and 15.81 cm²) was recorded with treatment S₁M₁C₁ when budding/ grafting was performed in February, July and November months, respectively.

Table 4. Interaction effect of rootstock, propagation method and growing condition on length of sprout and number of branchlets per budded/ grafted plant.

Treatment	Sprout Length (cm)						No. of branchlets																	
	February			July			November			February			July			November								
	2010-11	2011-12		2010-11	2011-12		2010-11	2011-12		2010-11	2011-12		2010-11	2011-12		2010-11	2011-12							
	C ₁	C ₂	C ₁	C ₁	C ₂	C ₁	C ₁	C ₂	C ₁	C ₂	C ₁	C ₂	C ₁	C ₂	C ₁	C ₁	C ₂	C ₁						
S ₁ M ₁	10.52	13.34	11.15	13.42	12.36	14.45	11.79	14.96	5.62	12.53	6.00	13.12	3.46	4.47	3.23	4.35	4.25	4.72	4.33	4.70	2.12	3.36	2.02	3.41
S ₁ M ₂	11.53	13.42	12.44	13.91	13.18	15.62	15.09	15.46	6.26	13.79	6.12	13.64	3.11	4.50	4.14	4.58	4.21	4.83	4.24	5.00	2.20	3.80	2.27	3.75
S ₁ M ₃	12.20	14.19	11.75	14.82	13.90	15.83	12.93	16.16	7.02	14.15	6.00	14.54	4.31	5.30	4.35	5.41	5.72	5.26	5.43	5.50	3.03	4.47	2.94	4.53
S ₁ M ₄	14.82	18.04	15.45	17.39	16.15	18.64	17.05	19.02	7.70	15.98	7.28	14.79	5.07	6.05	5.48	6.32	5.18	5.87	5.47	5.98	3.90	5.48	3.82	5.51
S ₁ M ₅	16.02	18.93	16.66	17.50	17.18	18.85	17.89	19.93	8.84	16.12	8.38	16.63	5.80	6.23	5.80	6.93	6.03	6.55	6.09	6.50	4.20	6.15	4.25	6.27
S ₂ M ₁	12.24	15.34	11.66	15.26	15.17	16.50	15.68	17.00	6.53	13.64	6.36	13.72	3.31	4.93	3.60	4.82	4.40	4.56	4.38	4.76	2.15	3.47	2.15	3.49
S ₂ M ₂	13.67	15.58	12.63	15.50	15.86	17.38	15.79	17.72	6.90	14.23	7.29	14.88	3.39	5.26	4.23	5.06	4.43	4.78	4.42	4.84	2.21	3.89	2.18	4.02
S ₂ M ₃	13.79	15.10	12.64	16.15	16.60	17.61	17.22	16.70	7.05	14.73	7.33	15.22	4.79	5.50	5.10	5.56	5.27	5.53	5.57	5.82	3.50	4.92	3.58	4.87
S ₂ M ₄	16.82	18.40	15.97	18.69	18.19	20.63	17.91	20.24	8.19	17.25	7.87	16.83	5.27	6.12	5.77	6.16	5.99	6.12	5.92	6.18	4.06	5.45	4.01	5.64
S ₂ M ₅	18.18	20.04	17.18	21.23	19.80	21.18	18.75	22.13	9.40	18.89	9.62	20.05	5.60	7.15	6.33	6.94	6.91	6.24	6.85	6.27	4.28	6.81	4.25	7.69
CD _{0.05} at 5%	0.68	0.80	0.80	NS	NS	1.48	1.48	0.85	0.78	0.78	0.85	0.46	0.33	0.47	0.36	0.36	0.47	0.36	0.36	0.36	0.36	0.36	0.36	0.36

Table 5. Interaction effect of rootstock, propagation method and growing condition on number of leaves and leaf area per budded/ grafted plant.

Treatment	No. of leaves						Leaf area (cm ²)																	
	February			July			November			February			July			November								
	2010-11		2011-12	2010-11		2011-12	2010-11		2011-12	2010-11		2011-12	2010-11		2011-12	2010-11		2011-12						
	C ₁	C ₂	C ₁	C ₂	C ₁	C ₂	C ₁	C ₂	C ₁	C ₂	C ₁	C ₂	C ₁	C ₂	C ₁	C ₂	C ₁	C ₂						
S ₁ M ₁	9.99	13.02	8.79	15.39	12.02	14.28	12.28	13.80	6.48	11.75	6.23	10.55	19.98	23.73	18.72	24.07	22.43	25.20	19.71	24.49	15.81	23.79	14.98	24.52
S ₁ M ₂	11.51	15.06	10.73	13.96	13.47	15.67	14.68	15.02	7.09	13.52	7.54	12.75	21.56	26.16	20.61	25.19	23.21	27.82	25.68	26.86	16.40	24.33	17.92	25.34
S ₁ M ₃	15.79	18.40	16.51	20.55	17.35	19.82	16.32	21.08	8.54	17.50	8.21	16.74	30.53	36.24	32.05	37.29	31.87	34.10	30.92	33.84	19.15	31.97	20.63	30.40
S ₁ M ₄	19.02	23.01	18.52	24.11	19.98	22.42	20.86	23.47	9.51	22.96	10.17	21.76	33.78	40.72	32.15	41.35	35.11	41.19	37.08	40.56	20.23	39.89	22.92	38.85
S ₁ M ₅	21.62	24.10	20.42	25.08	22.14	25.70	22.07	27.16	12.69	25.17	13.03	24.70	39.45	41.83	38.92	42.15	41.78	42.69	40.27	45.44	21.92	42.68	24.11	40.69
S ₂ M ₁	14.84	18.81	15.73	16.75	16.78	19.19	14.53	19.67	10.96	18.61	10.03	19.06	23.95	29.17	26.72	28.23	27.83	29.09	26.30	28.54	17.84	28.92	18.93	27.42
S ₂ M ₂	16.18	19.60	16.86	18.11	18.67	21.51	15.96	19.68	10.03	19.47	10.22	19.39	27.96	32.00	30.23	31.09	29.14	31.35	27.91	29.61	18.45	31.03	19.40	30.30
S ₂ M ₃	21.83	23.76	20.09	22.34	22.55	24.80	20.84	24.05	12.96	24.18	12.72	23.56	34.51	36.80	34.00	35.75	35.83	39.41	31.71	38.98	21.36	38.91	21.18	37.72
S ₂ M ₄	23.64	27.98	24.25	28.43	26.33	28.14	24.77	29.19	13.75	26.27	14.33	27.23	41.67	42.02	44.17	44.42	43.12	43.11	41.93	42.26	25.88	42.85	24.55	41.24
S ₂ M ₅	24.76	30.98	26.07	28.62	29.29	28.70	27.21	31.27	16.56	30.55	14.09	32.24	42.10	46.28	43.03	47.75	43.04	46.75	44.96	45.63	26.02	48.17	25.85	49.11
CD _{0.05}	1.29	1.47	1.47	NS	NS	2.11	2.11	1.35	1.33	1.33	1.35	3.09	3.13	3.09	3.13	2.89	2.99	2.89	2.99	2.68	2.68	2.85	2.85	2.85

When the experiment was repeated during 2011-12 (Table 5), almost similar trends were observed. 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.

The present study thus provide evidence that in guava highest graft take success was registered when wedge grafting with polycap was done using Local guava as rootstock under polyhouse conditions in February.

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