

## Response of wedge grafting and time on survival of mango (*Mangifera indica*) in polyhouse and open field condition

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### ABSTRACT

The experiment was conducted to find out optimum time for wedge grafting in mango (*Mangifera indica* L.) on different dates of grafting, viz. 15 November (D<sub>1</sub>), 1 December (D<sub>2</sub>), 15 December (D<sub>3</sub>), 1 January (D<sub>4</sub>), 15 January (D<sub>5</sub>), 1 February (D<sub>6</sub>), 15 February (D<sub>7</sub>) and 1 March (D<sub>8</sub>) under polyhouse condition and open field condition. Wedge grafting gave more yield in March in polyhouse (69.31%) and open field condition (59.70%). There was better response to height of plants in polyhouse condition than open field condition. The height of grafted plants was 46.09 cm, length of graft union 4.59 cm and stem girth 1.55 cm. The time taken for first sprout (9.33 cm), number of sprouts (9.08), length of sprout (21.45), number of leaves / plant (23.30), fresh weight of leaves (27.13), dry weight of leaves (18.15), fresh weight of grafted plant (75.30), dry weight of grafted plant (18.96).

**Key words:** Wedge grafting, Polyhouse condition, Open field condition, Grafting

Mango (*Mangifera indica* L.) of Anacardiaceae family, is most significant commercial fruit. For establishing permanent mango orchards, veneer grafting is considered the most efficient and cost-effective method (Tewari and Bajpai, 2002). Unlike wedge grafting, veneer grafting only requires one angled cut on the scion (Singh *et al.* 2005; Singh *et al.* 2007 and Ram and Pathak, 2005). However, timing is crucial for successful grafting in mangoes. Choosing the wrong time to graft, especially with fluctuating temperatures and humidity, can lead to failure. The wedge grafting is particularly useful for farmers who need reliable mango plants. In wedge grafting, they cut the scion (branch) at an angle on both sides, forming a wedge shape. Wedge grafting boasts a very high success rate, up to 90-100% (Yadav *et al.*, 2018) Hence, an experiment was conducted to find the effect of suitable time, survival percentage and performance of wedge grafting on mango to ensure availability of superior planting material for commercial cultivation.

### MATERIALS AND METHODS

The experiment was conducted on mango in polyhouse and open field condition at College of Agriculture, Rewa, Madhya Pradesh, during November 2023 to March 2024. Wedge grafting of mango was carried in eight dates, season, viz. 15 November (D<sub>1</sub>), 1 December (D<sub>2</sub>), 15 December (D<sub>3</sub>), 1 January (D<sub>4</sub>), 15 January (D<sub>5</sub>), 1 February (D<sub>6</sub>), 15 February (D<sub>7</sub>) and 1 March (D<sub>8</sub>) under polyhouse and open field conditions. The factorial randomized block design with two replications and eight treatment combinations was used. The grafting was done on 6–8-month old seedling. The seedlings were raised by

using the local seeds. The seedlings at 3-4 leaf stage were transplanted to polythene bags (300 gauge thickness) with well-drained medium black soil and FYM (1:1). The healthy and quality seedlings were used for grafting.

The terminal one season old scion shoots which having 15 - 18 cm long of pencil thickness (0.5 - 1.0 cm) with 3 - 4 healthy buds and free from pest and disease were selected for grafting. Selected scions were defoliated on mother plant, one week prior to detachment of apical growing portion of selected shoots was beheaded, which helped in forcing the dormant grafts to swell. The grafts on scion were made ready to start sprouting at the time of grafting. For grafting lower end of selected and detached scion stick was prepared in the form of wedge of about 4-5 cm. The top portion of rootstock was decapitated at 15-20 cm height and then top portion of stem was split vertically about 4-5 cm in length forming "V" shape. The wedge shaped scion was inserted into "V" shaped slit and tied with polythene strip and then placed grafted plants in open field and polyhouse.

### RESULTS AND DISCUSSION

The maximum plant height (46.09 cm) was found on 15 February in polyhouse condition and in open field condition (43.63 cm) on 1 March. The minimum height (34.52 cm) of grafted plant in polyhouse condition was recorded on 1 December and 15 November (35.36 cm) in open field conditions. There was a significant interaction between polyhouse and open field conditions. Whereas, maximum height of grafted plant (43.54 cm) was on 15 February and minimum height (35.40 cm) of grafted plant on 1 December.

The maximum length (4.59 cm) was found on 15

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February in polyhouse condition and in open field condition (4.54 cm) the minimum length (3.44 cm) of graft union in polyhouse condition and open condition. (3.56 cm) on 15 January the same trend was in interaction between polyhouse condition and open field condition whereas. maximum length of graft union (4.56 cm) on 15 February and minimum length of graft union (3.50 cm) on 15 January.

The maximum graft survival (69.31 %) was found on 1 March in poly house condition and open field condition (59.70 %) on 15 February. The minimum (54.29 %) graft survival in polyhouse condition and open field condition (43.69 %) on 1 January. There was a significant interaction between polyhouse condition and open field condition whereas maximum graft survival (64.20 %) on 1 March and minimum graft survival (48.99 %) on 1 January. The similar findings were reported by Singh *et al.* (2005), Singh *et al.* (2007) and Ram and Pathak (2005).

The maximum stem girth (1.55 cm) was found in polyhouse condition on 15 November and on 1 December (1.30 cm) in open condition. The minimum stem girth (1.07 cm) of grafted plant in polyhouse condition and open field condition (0.90 cm) was recorded on 1 March. A similar trend was found in interaction between polyhouse condition and open field condition, The maximum stem girth (1.40 cm) was on 15 November and minimum (0.98 cm) on 1 March. There results are in close conformity with these of Tewari and Bajpai (2002).

The maximum time taken (11.55 days) for first sprout in polyhouse condition on 1 January (19.06 days) with open field condition. The minimum time taken for 1 sprout in polyhouse condition (9.33 days) and open field condition (16.90 days) on 1 March. A similar trend was found in interaction between polyhouse and open field

conditions, The maximum time taken for first sprout was (15.30 days) on 1 January and minimum time taken for first sprout was (13.11 days) on 1 March. This result in close conformity with those of Singh *et al.* (2005), Sivudu *et al.* (2014), and Visen *et al.* (2010).

The maximum number (9.08) of sprouts in polyhouse condition was recorded on 15 February and on 1 March 5.60 with open condition. The minimum number of sprouts in polyhouse condition (7.15) was recorded on 1 December and on 15 January (3.65) in open condition. A similar trend was found in interaction between polyhouse and open field conditions. The maximum number of sprouts was (7.28) on 15 February and minimum (5.55) on 15 January (Table 1).

The maximum length of sprout per plant in polyhouse condition (21.45 cm) was recorded in 1 March and in open condition (17.25 cm) The maximum number of leaves per sprout per plant in polyhouse condition (23.30) and open condition (18.05) in 1 March. The minimum length of sprouts per plant in polyhouse condition (15.20) and in open condition (7.40) on 15 November.

The maximum fresh weight (27.13 g) of leaves in polyhouse condition was recorded on 15 November and (19.77g) in open condition. The minimum fresh weight (13.03g) of leaves in polyhouse condition was recorded on 1 March and open field condition (7.80 g). The maximum dry weight of leaves (18.15 g) in polyhouse condition was recorded on 15 November and (13.13 g) in open field condition. The minimum dry weight of leaves was in polyhouse condition (6.77 g) and open condition (3.21 g) on 1 March.

The maximum fresh weight (75.30g) of grafted plant in polyhouse condition and (55.94g) in open condition 15 November. The minimum fresh weight of grafted plant

**Table 1.** Effect of growth and phenotypic character of polyhouse and open condition

Treatment	Hight of of grafted plant (cm)	Length of graft union (cm)	Survival (%)	Time taken for first 1 <sup>st</sup> sprout (days)	Number of of sprouts	Leaf area index	Fresh weight of of leaves (g)	Dry weight of of leaves (g)	Fresh weight of of grafted plants (g)	Dry weight of of grafted plant (g)
D <sub>1</sub>	35.35	3.72	59.85	13.18	5.74	6.01	23.45	15.64	65.62	17.00
D <sub>2</sub>	35.40	4.41	54.39	13.38	5.61	4.98	21.92	13.77	62.30	15.73
D <sub>3</sub>	37.60	4.01	50.34	13.95	6.00	3.63	20.10	11.41	56.63	14.30
D <sub>4</sub>	38.64	4.15	48.99	15.30	6.45	2.87	18.32	9.93	53.57	13.76
D <sub>5</sub>	41.65	3.50	50.35	14.69	5.94	2.18	16.20	7.90	51.28	12.44
D <sub>6</sub>	39.89	4.51	61.29	13.88	6.38	1.72	14.35	6.54	50.25	11.76
D <sub>7</sub>	43.54	4.56	62.83	13.32	7.28	1.28	11.84	6.18	46.62	10.54
D <sub>8</sub>	41.58	3.89	64.20	13.11	7.24	0.89	10.41	4.99	43.11	9.99
S.Em±	0.68	0.07	1.95	0.23	0.14	0.08	0.55	0.82	0.37	0.17
C.D.(5%)	2.08	0.22	5.60	0.66	0.40	0.27	1.65	2.49	1.14	0.51

was in polyhouse condition (49.47 g) and open condition (36.75 g) on 1 March. The maximum dry weight (18.96 g) of grafted plants in polyhouse condition (15.04 g) and in open condition on 15 November. The minimum dry weight (12.33 g) of grafted plants in polyhouse condition and open condition (7.65 g) on 1 March. The similar results were reported by Sultan and Singh (1984) and Bhatnagar (1962).

## CONCLUSION

Thus, it was concluded that wedge grafting in polyhouse condition gave better result than 15 November to 1 March. In open field condition, suitable period for wedge grafting was 1 January to 15 February. The Maximum percentage of graft survival obtained at polyhouse condition was (69.31%) on 1 March and in open field condition (59.70%) on 15 February.

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