



Short communication

Effect of cultivars and season on grafting success in sapota under Paschim Midnapur conditions of West Bengal

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ABSTRACT

Two sets of experiments were carried out during 2007-08 to assess incompatibility of sapota cultivars to softwood grafting, and to find out the best time for softwood grafting, in a private orchard at Jhargram of Paschim Midnapore, West Bengal. Considerable variation in success of softwood grafting among sapota cultivars was observed. Among ten cultivars studied, CO-2 showed highest compatibility with Khirnee rootstock to softwood grafting, followed by Cricket Ball and DSH-2. There was a total failure in graft-take in cultivars CO-1, DSH-1 and Guthi. Softwood grafting success was highest in sapota when carried out on 1st July (72%) followed by 15th August (70%), 5th June (62%) and 15th June (56%).

Key words : Sapota, softwood grafting, Khirnee, cultivars, incompatibility, season

The sapota or Chiku (*Achras sapota* L.) is one of the most delicious, sweet, pulpy fruits, grown extensively in 24-Parganas (North and South) and Purba Midnapur districts of West Bengal. Due to its tropical nature, the crop is also found to grow well in the drier tracts of West Bengal, like Paschim Midnapore. There is a good demand for planting material of this crop not only in West Bengal, but also in the neighboring states of Jharkhand, Bihar and Orissa. The crop is mainly propagated by grafting on to Khirnee (*Manilkara hexandra* L.) rootstock. Although inarch grafting or approach grafting is universally practised, the method is laborious, time-consuming and also expensive. Currently, an alternative to approach grafting, softwood method of grafting in polythene bags, is becoming very popular. However, its success depends mainly on season of operation and varietal reaction to this method, which need to be standardized for West Bengal conditions. This information is particularly lacking for the western part of West Bengal where the weather is somewhat different from that in other parts of the state.

The study was undertaken in the nursery of MPS farm at Paschim Midnapore where adequate nursery facilities and mother plants are available. The investigation was conducted in 2007 and 2008 following Randomized

Block Design using 'Cricket Ball' as the scion. To identify the best time of operation for large-scale production of sapota grafts, grafting was made on 1-year old Khirnee rootstock seedlings, during June to October. Fifty grafts with three replications were made each time. To study varietal response to softwood grafting, scions of ten cultivars, viz., Cricket Ball, CO-1, CO-2, CO3, DSH-1, DSH-2, Guthi, H-7/1, Kalipati and PKM-2 were grafted on Khirnee rootstock on 1st July of 2007 and 2008. Fifty grafts with three replications in each combination were made. The terminal portion of sapota shoot having grayish coloured wood (6-8 mm thick and 6-8 cm in length) was used as scion. Each graft was tied and covered with white polythene (Pepsi-cap) for creating higher humidity around the scion. Grafted plants were kept under partial shade for better success. Plant growth was recorded 90 days after grafting.

Data presented in Table 1 reveal that sapota cultivars responded significantly to softwood grafting, with different degree of success. The highest successful grafts were obtained in CO-2 (85%) variety, followed by 'Cricket Ball' and 'DSH-2' (65%). But, there was total failure of graft in CO-1, DSH-1 and Guthi varieties. Other cultivars like CO-3, H-7/1, Kalipatti and PKM-2 also showed poor response to softwood grafting. The results clearly indicates

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Table 1. Response of sapota cultivars to softwood grafting after three months

Cultivar	Success (%)	Plant height (cm) (extended new growth)	Number of leaves/graft
Cricket Ball	65 (53.73)	2.8	15.4
CO-1	0 (0.00)	0.0	0.0
CO-2	85 (67.21)	6.0	19.0
CO-3	25 (30.00)	1.4	10.0
DSH-1	0 (0.00)	0.0	0.0
DSH-2	65 (53.73)	3.2	17.6
Guthi	0 (0.00)	0.0	0.0
H-7/1	30 (33.21)	2.6	8.8
Kalipatti	25 (30.00)	1.1	8.2
PKM-2	20 (26.57)	2.4	8.0
SEm ±	1.5	0.3	0.7
CD ($P=0.05$)	4.4	0.8	2.2

Figures in parantheses indicate angular transformed values

that graft-incompatibility phenomenon exists between stock and scion of sapota cultivars, which may be attributed to varied woody nature of tissues, differential active-movement of sap, presence of growth promoting/inhibiting factors at the site of graft union hampering cambial activity between stock and scion. Differential response of sapota cultivars to softwood grafting has also been reported by Kulwal *et al* (1988) and Shirol *et al* (2005). Incompatibility in softwood grafting in cultivars was also reported in fruit crops like cashew (Ghosh, 1995) and custard apple (Ghosh and Tarai, 2005). Another interesting observation in this experiment was that cultivars, CO-2, Cricket Ball and DSH-2 [that gave the highest percentage of success (85 to 65%) under Paschim Midnapore, West Bengal Condition], showed less success in softwood grafting under Dharward conditions of Karnataka (Shirol *et al.*, 2005). This finding indicates that propagation technique needs to be standardized in each variety for each locality. Growth of the grafted plants in respect of height and leaf production was better in cultivars with higher grafting success compared to that cultivars those performed poorly in softwood grafting.

It is clear from data in Table 2 that success in softwood grafting is significantly influenced by time of grafting. Highest success (70 to 72%) was recorded when grafting was carried out on 1st July and 15th August, followed by 5th and 15th June. Higher grafting success during the early part of monsoon (5th June to 1st July) was mainly due to favourable weather conditions (high humidity and atmospheric temperature) which could have resulted in maximum cambial activity in both stock and scion. Besides,

Table 2. Effect of season on success of softwood grafting in sapota after three months

Date of operation	Success (%)	Number of leaves/graft
5 th June	62 (51.94)	13.8
15 th June	56 (48.45)	14.0
1 st July	72 (58.05)	12.0
15 th July	45 (42.13)	14.8
1 st August	15 (22.79)	8.0
15 th August	70 (56.79)	9.6
1 st September	20 (26.57)	7.0
15 th September	10 (18.43)	6.0
1 st October	0 (0.00)	-
SEm ±	1.6	-
CD ($P=0.05$)	4.8	1.6

Figures in parantheses indicate angular transformed values

the scion seemed to be in a physiologically active condition for better sap flow at that time. Although early and middle part of the rainy season (15th August) was found to be better under Paschim Midnapore condition of West Bengal, in Dharwad (Karnataka), the months of April and May were the best suited for softwood grafting in sapota with graft success of 47 to 62% (Sulikeri *et al*, 1997). In Navsari (Gujarat) January and February were congenial for approach-grafting (Bhuva *et al*, 1990) in sapota. Growth of grafts in terms of leaf production was higher in grafts prepared during the early part of rainy season (5th June to 15th July) and leaf number progressively decreased in grafts prepared after 15th July.

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