



## RESEARCH PAPER

# Effect of different grafting dates and wrapping materials on success of softwood grafting in custard apple (*Annona squamosa* L.) cv. LOCAL SELECTION

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## SUMMARY:

The experiment was conducted at Fruit nursery, Horticulture Research farm, B.A. College of Agriculture, Anand Agricultural University, Anand during March, 2010 to August, 2010. The treatments comprised of five grafting dates and two wrapping materials. The experiment was laid out in a Completely Randomized Design with factorial concept and three replications. The results revealed that treatment of grafting date 01-4-2010 and Degradable tape (D<sub>2</sub>T<sub>2</sub>) recorded significantly minimum days for sprouting (12.66), maximum sprouting of grafts (100%), maximum increment in length of scion (16.90%) and highest no. of fully opened leaves (21.80) on scion at 90 DAG as compared to other treatments.

**KEY WORDS :** Custard apple, Grafting dates, Polythene strip, Degradable tape

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Custard apple (*Annona squamosa* L.) is a delicious and important minor fruit crop which is cultivated in tropical and sub tropical climate. It comes under family Annonacea and native of the West Indies but it was cultivated since early times throughout Central America to Southern Mexico.

The fruit is composed of loosely cohering carpels forming a squamose or tuberculated surface. The black seeds are surrounded by white, creamy pulp which is very sweet and pleasantly flavoured. The custard apple is important for its nutritive values; ripened fruits are consumed mainly in fresh form. There has been good demand for custard apple in preparation of ice-cream and pudding. Custard apple contains protein 1.8 g, fat 0.57 g, carbohydrates 20.82 g, calcium 17 g, phosphorus 54 g, iron 0.3 mg, thiamine 0.10 g, riboflavin

0.06 g and ascorbic acid 35.9 g (Food value per 100 g of edible portion).

Custard apple is a subtropical fruit preferring warm climate with moderate winter and humidity for high production. The tree remains dormant during cold season for a short period, yet frost and prolonged cool weather adversely affects the growth. It can tolerate temperature several degrees below freezing, but temperatures beyond 40<sup>o</sup> C cause heavy flower abscission in northern India. Areas with an annual rainfall of 125-250 cm are highly suitable for its commercial cultivation. The optimum temperature requirement is between 15<sup>o</sup> to 25<sup>o</sup> C. It has a wide range of adaptability and can be grown successfully upto 1000 meters altitude (Bose *et al.* 2002).

The present investigation was carried out to find out

suitable date of grafting and wrapping material for obtaining maximum success through softwood grafting in custard apple.

## EXPERIMENTAL METHODS

The present investigation was carried out at Fruit Nursery, Horticulture Research farm, B.A. College of Agriculture, Anand Agricultural University, Anand during March, 2010 to August, 2010. The experiment was laid out in Factorial Completely Randomized Block Design (FCRD) with ten treatment combinations and three replications. Treatments comprised of combinations of Grafting dates ( $D_1$ ) and Wrapping materials ( $T_1$ ). The details of experimental treatments were

- $D_1T_1$ : 15-3-2010 and Polythene strip,
- $D_1T_2$ : 15-3-2010 and Degradable tape,
- $D_2T_1$ : 01-4-2010 and Polythene strip,
- $D_2T_2$ : 01-4-2010 and Degradable tape,
- $D_3T_1$ : 15-4-2010 and Polythene strip,
- $D_3T_2$ : 15-4-2010 and Degradable tape,
- $D_4T_1$ : 01-5-2010 and Polythene strip,
- $D_4T_2$ : 01-5-2010 and Degradable tape,
- $D_5T_1$ : 15-5-2010 and Polythene strip, and
- $D_5T_2$ : 15-5-2010 and Degradable tape.

Potting mixture of soil and FYM with a ratio of 1:1 was used for raising seedlings of custard apple rootstocks for

softwood grafting. Regular clear polythene strip of 200 gauge having width of 1.5 – 2.0 cm which normally nurserymen uses for grafting and a newly introduced degradable tape of 25mm roll contains 1000 perforated sections each of 40 mm length which is self adhesive, stretches easily up to 6 times of its original length. Self-adhesion is activated when stretched and shrinks to fit after application. It degrades after 4-5 months thereby eliminating the need for tape removal purpose was used to tie scion and root stock at the graft union.

Defoliated scion sticks (10 days prior) were collected without damaging the buds. The length of scion stick was kept 8 -10 cm. The lower end of the scion stick was prepared in the form of wedge of about 3 cm. The top portion of custard apple (*Annona Squamosa* L.) cv. Local selection rootstock plant was and then top portion of the stem was split vertically about 3 cm in length forming 'V' shape. The wedge of scion was inserted into the slit of the rootstock and tied with polythene strip and degradable tape as per treatment details. The prepared grafts were kept in partial shady condition.

## EXPERIMENTAL FINDINGS AND ANALYSIS

The experimental results revealed that the success of grafting was found to be the significantly influenced due to grafting dates, wrapping materials and their combination.

**Table 1: Effect of grafting dates on success of softwood grafting in custard apple (*Annona squamosa* L.)**

Treatments	Days for sprouting of grafts	Sprouted grafts at 90 DAG (%)	Increment in length of scion at 90 DAG (%)	Increment in girth of scion at 90 DAG (%)	Number of fully opened leaves	Survival percentage 90 DAG (%)
$D_1$ : 15-3-2010	15.20	93.33	15.30	45.62	18.03	78.33
$D_2$ : 01-4-2010	16.43	90.00	15.50	36.21	20.98	85.00
$D_3$ : 15-4-2010	21.50	46.67	9.83	32.38	16.27	70.00
$D_4$ : 01-5-2010	24.00	30.00	9.09	36.13	9.69	56.66
$D_5$ : 15-5-2010	21.74	46.67	9.46	37.44	18.86	51.66
S.E. $\pm$	0.60	3.33	0.28	1.50	0.46	2.11
C.D. (P=0.05)	1.792	9.83	0.82	4.43	1.38	6.22

**Table 2: Effect of wrapping materials on success of softwood grafting in custard apple (*Annona squamosa* L.)**

Treatments	Days for sprouting of grafts	Sprouted grafts at 90 DAG (%)	Increment in length of scion at 90 DAG (%)	Increment in girth of scion at 90 DAG (%)	Number of opened leaves at 90 DAG	Survival percentage 90 DAG (%)
$T_1$ : Polythene strip	20.7	58.66	11.16	36.31	17.44	68.00
$T_2$ : Degradable tape	19.48	64.00	12.51	38.80	16.09	68.70
S.E. $\pm$	0.38	2.10	0.17	0.95	0.29	1.33
C.D. (P=0.05)	NS	NS	0.52	NS	0.87	NS

NS=Non-significant

**Table 3: Interaction effect of grafting dates and wrapping materials on success of softwood grafting in custard apple (*Annona squamosa* L.)**

Treatments	Days for sprouting of grafts	Sprouted grafts at 90 DAG (%)	Increment in length of scion at 90 DAG (%)	Increment in girth of scion at 90 DAG (%)	Number of fully opened leaves	Survival percentage 90 DAG (%)
D <sub>1</sub> T <sub>1</sub>	16.53	100.00	15.02	43.33	20.00	86.66
D <sub>1</sub> T <sub>2</sub>	13.86	86.66	15.58	47.92	16.06	70.00
D <sub>2</sub> T <sub>1</sub>	20.20	80.00	14.09	44.64	20.16	80.00
D <sub>2</sub> T <sub>2</sub>	12.66	100.00	16.90	27.77	21.80	90.00
D <sub>3</sub> T <sub>1</sub>	20.86	46.66	8.77	31.44	17.22	66.66
D <sub>3</sub> T <sub>2</sub>	22.13	46.66	10.90	33.33	15.33	73.33
D <sub>4</sub> T <sub>1</sub>	19.33	20.00	8.03	29.97	12.00	53.33
D <sub>4</sub> T <sub>2</sub>	28.66	40.00	10.15	42.29	7.38	60.00
D <sub>5</sub> T <sub>1</sub>	23.41	46.66	9.89	32.16	17.83	53.33
D <sub>5</sub> T <sub>2</sub>	20.06	46.66	9.04	42.72	19.88	50.00
S.E. ±	0.85	4.71	0.39	2.12	0.66	2.98
C.D. (P=0.05)	2.53	13.90	1.16	6.26	1.95	8.79
C.V. %	7.52	13.31	5.77	9.79	6.84	7.56

**Effect of grafting dates:**

Significantly minimum days for sprouting (15.20), higher percentage of sprouted grafts (93.33%) and maximum increment in girth of scion (45.62%) were recorded when grafting was done on 15-03-10 (T<sub>1</sub>) whereas, grafting on 01-04-2010 recorded maximum increment in length of scion (15.50%), no. of fully opened leaves (20.98) and highest survival percentage (85.00%) at 90 DAG as compared to other grafting dates. This result may be attributed due to the optimum temperature (29 - 31°C) and moderate humidity (45 - 55%) prevailed during these dates. This finding is in conformity with the results obtained by Chovatia (1994) and Kudmulwar *et al.* (2008) in custard apple.

**Effect of wrapping materials:**

Among wrapping materials, custard apple grafts tied with degradable tape (T<sub>2</sub>) recorded significantly maximum increment in length of scion (38.80%) while the highest no. of fully opened leaves (17.44) were found when grafts tied with polythene strip (T<sub>1</sub>). Whereas, for other characters both

the wrapping materials *i.e.* polythene strip (T<sub>1</sub>) and degradable tape (T<sub>2</sub>) was found non significant (Table 2).

**Interaction effect:**

In the interaction effect of grafting dates and wrapping materials, interaction between grafting date 01-4-2010 and Degradable tape (D<sub>2</sub>T<sub>2</sub>) recorded significantly minimum days for sprouting (12.66), maximum sprouting of grafts (100%), maximum increment in length of scion (16.90%), highest no. of fully opened leaves (21.80) and significantly maximum survival of grafts (90.00 %) at 90 DAG followed by interaction of grafting date 15-3-2010 along with Degradable tape as wrapping material (Table 3). These significant differences may be attributed due to combination of congenial weather conditions prevailed during grafting in the month of March and April and proper wrapping material Degradable tape, which prevented desiccation of cut surface and increased callus formation that has positive effect on the growth of custard apple (Zenginbal *et al.*, 2006).

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