

Original Research Article

Standardization of Period for Soft Wood Grafting in Custard Apple (*Annona squamosa*)

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ABSTRACT

Keywords

Soft wood grafting, Custard apple, Experiment.

An investigation was carried out, “Standardization the period for softwood grafting in dry land fruit crop: custard apple”. The experiment was conducted at the Central Nursery Scheme, VNMKV, Parbhani in Complete Randomized Design comprising of twelve treatments with three replications. Among different treatments highest percent success and linear growth of the graft was observed when grafting was carried out on 1st February, minimum days required to sprouting (16.16 days), maximum initial percent success (100 %) final percent success (94.99 %), number of leaves (22.01), leaf area (164.91cm²), number of sprouted buds (6.02), length of tap roots (23.89 cm) and root shot ratio (0.88) were recorded when grafting was carried out 1st February. None of grafts were successful when grafting was carried out in 1st May and 1st June.

Introduction

Custard apple is the most important dry land fruit crop. In different countries the name custard apple is given to separate species of genus *Annona*. In India, the custard apple is *Annona squamosa*, in the USA, *A. reticulata* or *A. glabra*. According to Hayes (1966) the term custard apple may be applied to all *Annonas* are mostly consumed as dessert fruits. Custard apple is very delicious fruit. The important features of custard apple are its wide adoptability to soil and climatic conditions and free from pest and diseases. Custard apple is mostly subtropical fruit performing in warm climate with moderate winter and humidity for high production. Custard apple is mostly consumed as table fruit. They are also used in ice – creams and

others milk products on a limited scale (Rao, 1975). The immature fruits, seeds, leaves and roots are of considerable medicinal value both in Ayurveda and Yunani systems of medicine (Kirtikar and Basu, 1933).

Generally the dry land fruit crops are propagated by seed. In this region attempt were made by various workers to locate superior types through the survey in custard apple. In recent year softwood grafting has become popular because of its added advantages over other methods. This has been successfully tried in mango, sapota, aonla (Amin, 1978). However, little information is available on the softwood grafting in custard apple. Therefore an

investigation was planned to study the standardization of period for softwood grafting in custard apple.

Materials and Methods

An experiment was conducted at the Central Nursery Scheme, VNМКV, Parbhani. The experiment was laid out in Complete Randomized Design (CRD) comprising of twelve treatments which were replicated thrice.

The treatment used were T₁- Grafting on 1st December 2004, T₂- Grafting on 1st January 2005, T₃- Grafting on 1st February 2005, T₄- Grafting on 1st March 2005, T₅-Grafting on 1st April 2005, T₆-Grafting on 1st May 2005, T₇- Grafting on 1st June 2005, T₈- Grafting on 1st July 2005, T₉- Grafting on 1st August 2005, T₁₀- Grafting on 1st September 2005, T₁₁- Grafting on 1st October 2005 and T₁₂- Grafting on 1st November 2005. The seedlings were selected were about 7 to 10 months old, 40-50 cm in height and 0.3 -0.6 cm in diameter above ground level at the time of grafting operation. Custard apple bud sticks were taken from current season growth of about 8-10 months, 15-25 cm in length with 8-10 buds with brownish black in colour was used. The scion bud sticks were defoliated 8- 10 days prior to grafting operation. Soft wood grafting in custard apple was done by as reported in mango by Amin (1974). The rootstock seedling was deheaded 15-20cm height above the ground level. A vertical slit of 2.5 to 3.0cm length was given on the rootstock. On scion shoot similar matching cut was prepared in slanting manner on both the surfaces in lower portion. It is inserted on rootstock and wrapped by using polythene tape. The grafts in polythene bags were watered on alternate day. The emerging shoots on the rootstocks were nipped off whenever they appeared while watering the plants care was taken that

tied strips were not wetted. Five uniform grafts were selected in each treatment for recording observations. The data were recorded on various parameters for two years and pooled data was shown in Table 1 and 2.

Results and Discussion

Results presented in Table 1 revealed that the significantly minimum numbers of days were required for sprouting when grafted on 1st February (16.06) and maximum days were required when grafting was carried out on 1st December (33.50). Significantly maximum initial percent success was observed when grafting was carried out on 1st February and March (100 %). These treatments were at par with each other.

Significantly final percent success (94.99 %) was obtained in case of grafting carried out on 1st February. No success was obtained when grafting on 1st May and 1st July.

Results presented in Table 2 revealed that maximum height was obtained during 1st January. Significantly more diameter was produced when grafting was carried out on 1st December 2004, 2005 and 1st January 2005 (0.43 cm). When grafting was carried out on 1st July (0.32 cm) minimum diameter of sprouted scion shoot was recorded. The maximum number of buds were recorded when grafting was carried out on 1st February (6.02) followed by 1st January, 1st December and 1st October (3.33) and at par with each other.

Maximum buds were found in the month of 1st February. As temperature and humidity are enough for sprouting of buds in the month of February.

The maximum numbers of leaves (22.01) were produced when grafting was carried

out on 1st February. The minimum leaves produced when grafting was carried out on 1st September (13.33).

The treatment T₃ (grafting on 1st February) recorded maximum leaf area (164.91 cm²) while minimum in treatment T₁ (grafting on 1st December).

In custard apple maximum days required for sprouting was observed in month of December probably may be due to less temperature and inadequate flow of cell sap and early bud sprouting was also reported by Mawaniand Singh (1992).

Highest success was in February and March it is due to the favorable internal and external conditions like optimum humidity and moderate temperature and biochemical status. During March to April condition are favourable for rapid cell growth as stated by Hartman and Kestar (1972) the results are supported by Shinde *et al.*, (1996), Kulkarni (1990) in custard apple.

Higher percent success in the month of February may be due to the favorable internal and external conditions lie optimum humidity, moderate temperature and biochemical status.

After harvesting of fruits, leaf fall is common in custard apple. It is due to the plant in dormant condition from November to February. At this period (dormant period) sufficient food material is stored in the scion which helps better success and higher grafting percentage. Pawar *et al.*, (2003) reported that highest percent success was obtained when grafted on 1st February. These results are in confirmation with earlier results reported by Gojamugunde (1993) and Kulkarni (1990) in custard apple. None of the grafts were successful when grafting was performed on 1st May and 1st June.

Maximum buds were found in the month of 1st February. As temperature and humidity are enough for sprouting of buds in the month of February. The findings are conformity with the finding of Kulkarni (1990). He reported that the grafting dates on 15th February and 25th January produced more number of buds in custard apple.

The maximum numbers of leaves (22.01) were produced on 1st February is might be due to higher cell activity and early sprouting which are responsible for more number of leaves. The results are supported by the studies of Kulkarni (1990) and Pawar *et al.*, (2003).

The treatment T₃ (grafting on 1st February) recorded maximum leaf area (164.91 cm²) it is due to number of leaves were increased leaf area. Similar observations recorded by Gojamugunde (1997) and Kulkurni (1990).

Significantly maximum length of root (23.79 cm) was recorded in 1st February this might be due to vigorous growth of shoot length.

1st February treatment which produced more number of leaves resulted in more production of photosynthetic products and their translocation through phloem to the root zone which might have helped increasing the length of tap root (Rao, 1975). The results supported by Sarada *et al.*, (1991) in cashew.

Significantly more number of secondary roots (21.90) recorded when grafting was carried out on 1st February. The grafts prepared on 1st February produced more number of secondary roots. This might be due to vigorous shoot growth which produced more number of photosynthetic products and their translocation may have helped in creation of more secondary roots. The root: shoot ratio was obtained (0.88)

when grafting was carried out on 1st February followed by 1st December, 1st January (0.61) and 1st March (0.59) were at

par with each other. The minimum root: shoot ratio was observed in 1st October (0.50).

Table.1 Effect of grafting period on number of days required for sprouting percent on initial success and final success of custard apple

Tr.No.	Treatments	No. of days required for sprouting	Percent of initial success of 30 days after grafting	Final success percent
T ₁	Grafting on 1 st Dec. 2004	33.50 (5.83)	84.99 (9.22)	70.00 (8.39)
T ₂	Grafting on 1 st January 2005	27.13 (5.23)	86.66 (9.32)	83.33 (9.13)
T ₃	Grafting on 1 st February 2005	16.06 (4.06)	100 (10.02)	94.99 (9.67)
T ₄	Grafting on 1 st March 2005	20.74 (4.60)	100 (10.02)	86.33 (9.31)
T ₅	Grafting on 1 st April 2005	22.56 (4.79)	78.33 (8.96)	35.00 (6.39)
T ₆	Grafting on 1 st May 2005	0.00 (0.70)	0.00 (0.70)	0.00 (0.70)
T ₇	Grafting on 1 st June 2005	0.00 (0.70)	0.00 (0.70)	0.00 (0.70)
T ₈	Grafting on 1 st July 2005	25.80 (5.08)	23.33 (4.85)	21.83 (4.81)
T ₉	Grafting on 1 st August 2005	29.96 (5.51)	35.00 (5.92)	28.33 (5.33)
T ₁₀	Grafting on 1 st Sept. 2005	29.09 (5.41)	40.00 (6.36)	36.66 (6.08)
T ₁₁	Grafting on 1 st Oct. 2005	30.25 (5.54)	55.09 (7.49)	53.33 (7.33)
T ₁₂	Grafting on 1 st Dec. 2005	28.16 (5.40)	56.66 (7.33)	53.33 (7.55)
	SE	0.20	0.30	0.33
	CD at 5%	0.59	0.88	0.93

(Figures in the parenthesis denote square root transformed value)

Table.2 Effect of grafting period on vegetative parameter of custard apple

Tr. No.	Treatments	Height of graft (cm)	Diameter of sprouted scion shoot (cm)	No. of sprouted buds/graft	No. of leaves/graft	Leaf area per graft (cm ²)	Length of tap root/graft (cm)	No. of secondary roots/graft	Root : shoot ratio
T ₁	Grafting on 1 st Dec. 2004	31.11 (5.47)	0.43 (0.96)	5.34 (2.44)	15.55 (3.98)	69.31 (8.31)	18.74 (4.37)	18.66 (4.37)	0.62 (1.06)
T ₂	Grafting on 1 st January 2005	34.13 (5.88)	0.43 (0.96)	5.60 (2.49)	19.74 (4.48)	129.62 (10.69)	21.10 (4.63)	20.62 (4.59)	0.61 (1.05)
T ₃	Grafting on 1 st February 2005	28.04 (5.31)	0.35 (0.92)	6.02 (2.55)	22.01 (4.41)	164.91 (11.01)	23.79 (4.99)	21.90 (4.81)	0.88 (1.17)
T ₄	Grafting on 1 st March 2005	29.12 (5.44)	0.36 (0.93)	4.20 (2.17)	13.98 (3.77)	111.80 (10.53)	17.88 (4.14)	18.99 (4.41)	0.59 (1.04)
T ₅	Grafting on 1 st April 2005	31.63 (5.77)	0.37 (0.93)	4.00 (2.11)	14.96 (4.28)	83.70 (9.12)	19.01 (4.48)	18.62 (4.99)	0.61 (1.05)
T ₆	Grafting on 1 st May 2005	0.00 (0.70)	0.00 (0.70)	0.00 (0.70)	0.00 (0.70)	0.00 (0.70)	0.00 (0.70)	0.00 (0.70)	0.00 (0.70)
T ₇	Grafting on 1 st June 2005	0.00 (0.70)	0.00 (0.70)	0.00 (0.70)	0.00 (0.70)	0.00 (0.70)	0.00 (0.70)	0.00 (0.70)	0.00 (0.70)
T ₈	Grafting on 1 st July 2005	21.62 (4.38)	0.32 (0.99)	2.55 (2.20)	15.62 (4.09)	76.00 (8.73)	16.33 (4.04)	16.70 (4.14)	0.62 (1.02)
T ₉	Grafting on 1 st August 2005	25.50 (5.08)	0.33 (0.91)	3.11 (1.89)	16.48 (4.11)	94.43 (9.72)	17.46 (4.18)	16.90 (4.18)	0.63 (1.05)
T ₁₀	Grafting on 1 st Sept. 2005	25.61 (4.50)	0.33 (0.91)	3.33 (1.85)	13.33 (3.67)	95.43 (9.72)	17.25 (4.05)	17.25 (4.21)	0.55 (1.02)
T ₁₁	Grafting on 1 st Oct. 2005	29.61 (5.47)	0.33 (0.91)	3.33 (1.95)	15.69 (3.97)	98.70 (9.89)	19.22 (4.49)	19.22 (4.44)	0.50 (0.89)
T ₁₂	Grafting on 1 st Dec. 2005	29.27 (5.30)	0.43 (0.96)	3.93 (2.10)	14.26 (3.84)	93.79 (9.95)	17.57 (4.06)	19.00 (4.43)	0.52 (1.01)
	SE	0.31	0.014	0.09	0.25	1.00	0.21	0.17	0.03
	CD at 5%	0.87	0.042	0.26	0.67	2.90	0.61	0.49	0.09

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