



## Research Article

# EFFECT OF DIFFERENT VARIETIES OF CASHEW SCION AND GRAFTING PERIOD ON GRAFTING SUCCESS OF CASHEW SAPLING (*Anacardium occidentale* L.)

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**Abstract-** The present experiment was carried at Agricultural and Horticultural Research Station, Ullal, Mangalore, Dakshina Kannada, Karnataka state, India during 2016-17. Among the treatments, lowest number of days (10.90 days) taken for scion sprouting in UN-50 during April followed by Ullal-3 where it sprouts at 11 days. During October lowest number of scion sprout were recorded in Ullal-1 and Ullal-3 (14.40 days). The observations at April grafting showed that the shoot height ranged from 7.00 to 5.30 cm. The maximum shoot height was (7.00 cm) was found in UN-50 grafts prepared in the month of April followed by Ullal-3. The April month has recorded highest percentage of success ranged from 85.80 to 84.00 (%). There was no significant difference found in October grafted. Correlation analyses in both the month such as April and October to measure for suitable month with other characters indicated that, in the month of April, leaf size was found to be significant and positively correlated with shoot height. Number of days taken to sprout scion was found to be significantly and positively correlated with T mosquito damage at 6 months and grafts success at 3 months. With over all observation in correlation analysis suggest that leaf size, number of days taken to sprout scion, graft success at three and six months as well as T mosquito damage would decide the success rate of quality grafts.

**Key words-** Variety of scion, Grafting period, Grafting Success, Saplings, *Anacardium occidentale* L

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## Introduction

Cashew (*Anacardium occidentale* L., Anacardiaceae) is a very important commercial crop of India which is earning more foreign exchange to the country. It was introduced into India from Brazil by Portuguese travellers during sixteenth century mainly for checking soil erosion on all along the coast. Though at the outset cashew was considered as a suitable crop for soil conservation, forestation as also for wasteland development but gradually gained commercial importance. Cashew is now widely grown in tropical climate because of its very well adoption, easy cultivation and remunerative market price. The area under cashew cultivation in India is 10.40 lakh hectares and the production is around 7.79 lakh MT. The national average productivity is 753 kg per hectare [1]. To get higher yield, we should concentrate on the quality planting materials as well as high yielding varieties. The varieties are usually grafted one which could give early and more yield per tree. To get good grafts depends on grafting success. In this view present investigation was carried out under coastal zone of Karnataka.

## Material and Methods

Six Cashew varieties were selected from 15 years old cashew tree of Agricultural and Horticultural Research Station, Ullal, Mangalore, Dakshina Kannada, Karnataka state during 2016-17. Scions of Ullal-2 were collected from non flowering lateral shoots of current season growth which measure 12 cm long, uniformly straight 18mm in diameter, brown to pale brown colour with 4 to 5 leaves with soft wood were selected. The scions were cut early in the morning to avoid desiccation and wrapped with moist gunny bag, and should be placed in cooler

area of the nursery before grafting operation. The scions were grafted on 45 days old root stocks which rose in the month of April and October at Agricultural and Horticultural Research Station, Ullal. The experiments were laid out in a complete randomized design with six treatments and five replication and data were statistically analysed using SPSS 16v.

## Result and Discussion

There was a significant difference with respect number of days taken to scion sprouting. Among the treatments, lowest number of days (10.90 days) taken for scion sprouting in UN-50 during April followed by Ullal-3 where it sprouts at 11 days. During October lowest number of scion sprout were recorded in Ullal-1 and Ullal-3 (14.40 days). Result indicated that April grafted cashew varieties were found early scion sprouting compared to October grafted in all cashew varieties. From the data [Table-1] it is evident that the influence of season of grafting on the shoot height was found to be significant at April grafting.

The observations at April grafting showed that the shoot height ranged from 7.00 to 5.30 cm. The maximum shoot height was (7.00 cm) was found in UN-50 grafts prepared in the month of April followed by Ullal-3. The observations on shoot height in October month indicated no significant difference. The data pertaining to production of number of leaves per graft as influenced by season of grafting is presented in [Table-1]. There was no significant difference in no. of leaves observed per plant in April grafting. The maximum number of leaves was recorded in the grafts prepared in month of October ranged from 5.60 to 4.50. Maximum number of leaves (5.60) was recorded in UN-50. Least was observed in NDR 2-1

(4.50 No's). The data pertaining to leaf size per graft as influenced by season of grafting is presented in [Table-1].

**Table-1** Effect of different scion grafting on days taken to sprout, shoot height, leaves and leaf size of cashew grafts

Treatment	No. of days taken to sprout scion		Shoot height (cm)		No. of leaves		Leaf size (cm)	
	April	October	April	October	April	October	April	October
Ullal-1	11.10	14.40	5.80	5.60	4.10	4.60	14.60	12.50
Ullal-2	11.70	15.10	5.90	5.50	4.50	4.80	13.90	12.70
Ullal-3	11.00	14.40	6.80	5.40	4.50	5.50	19.30	13.50
Ullal-4	11.80	15.30	5.40	5.60	4.20	4.70	14.60	12.40
UN-50	10.90	14.50	7.00	5.50	4.10	5.60	19.20	13.50
NDR 2-1	12.00	16.30	5.30	5.00	4.50	4.50	13.70	12.10
C.D. (P=0.05)	0.64	0.46	0.61	NS	NS	0.48	0.62	0.50
CV (%)	6.25	3.44	11.19	11.26	10.41	10.82	4.33	4.38

There was a significant increase in leaf size in April grafted plants it ranged from 13.70 to 19.30 cm. The maximum leaf size was recorded in Ullal-3 (19.30cm) followed by UN-50 (19.20 cm). The least increase in leaf size were observed in October grafted ranged from 12.10 to 12.40 cm. The data on percentage of

success recorded from April and October grafting revealed that the season of grafting had a significant effect on the success of grafts. The April month has registered highest percentage of success ranged from 85.80 to 84.00 (%). There was no significant difference found in October grafted [Table-2].

**Table-2** Effect of different scion grafting on success duration, moisture Stress, graft canopy and T-mosquito damage on cashew grafts.

Treatment	Graft success @ 3 months (%)		Graft canopy @ 6 months		Moisture stress (%)		T-mosquitoes damage 6 months (%)	
	April	October	April	October	April	October	April	October
Ullal-1	85.80	71.40	16.60	19.50	12.00	14.00	1.10	2.00
Ullal-2	85.40	73.00	16.20	23.50	12.00	13.80	1.20	2.00
Ullal-3	85.20	71.30	15.60	24.70	11.00	13.20	1.30	2.60
Ullal-4	85.40	71.00	14.80	24.40	11.60	13.50	1.00	2.20
UN-50	84.00	71.60	16.00	23.50	12.70	13.90	1.00	2.10
NDR 2-1	85.30	71.30	16.40	23.20	11.80	13.00	1.30	2.30
C.D. (P=0.05)	0.71	NS	NS	1.67	0.35	0.43	NS	0.37
CV (%)	0.93	2.89	9.90	8.01	3.27	3.56	30.63	18.56

**Table-3** Correlations of different scion on grafting success in April (below) and October (above)

	No. of days taken to sprout scion	Shoot height (cm)	No of leaves	Leaf size (cm)	Moisture stress (%)	T-mosquitoes damage @ 6 months (%)	Graft success @ 3 months (%)	Graft canopy @ 6 months
No. of days taken to sprout scion	-	-0.69**	0.70**	-0.78**	-0.70**	0.02	-0.03	0.05
Shoot height (cm)	-0.91**	-	-0.19 <sup>NS</sup>	0.88**	0.12 <sup>NS</sup>	0.51**	-0.02	-0.29*
No. of leaves	-0.84**	0.47**	-	-0.14	-0.91**	0.93**	0.91**	-0.02
Leaf size (cm)	-0.91**	0.99**	0.34**	-	0.27*	0.48**	0.11 <sup>NS</sup>	-0.28*
Moisture stress	-0.16	0.16	0.35**	-0.02	-	-0.92**	0.91**	0.34**
T- Mosquitoes damage 6 months (%)	0.40**	-0.13	-0.98**	-0.16	-0.89**	-	-0.78**	-0.50**
Graft success @ 3 months (%)	0.49**	-0.75**	0.00	-0.74**	-0.57**	0.63**	-	0.97**
Graft canopy @ 6 months	0.27*	0.25*	-0.51**	0.37**	-0.38**	0.24	-0.44**	-

\*significant @ 0.05 level of probability; \*\* significant @ 0.01 level of significant

There was no significant difference observed in April grafted plants. There was a significant difference in graft canopy during October ranged from 19.50 to 24.70. The maximum canopy in Ullal-3 (24.70 cm) followed by Ullal-4 (24.40 cm). Least canopy graft canopy was recorded in Ullal-1 (19.50 cm) [Table-2]. Moisture stress was observed during April grafted plant ranged from 11.00 to 12.70 days. Significantly lowest moisture stress was observed in April grafted in the treatment NDR 2-1 (1.80 days), higher moisture stress was found in treatment UN-50 (12.70 days). In October grafted plants higher moisture stress was reported it ranged from 14.00 to 13.00 days [Table-2]. April grafted plants showed non significant differences in all the treatments by tea mosquito bug damage. Significant difference was recorded in October grafted plants it ranged from 2.00 to 2.60 per cent. Lowest per cent damage was reported in Ullal-1 and Ullal-2 (2.00 %). The highest damage was observed in Ullal-3 (2.60) [Table-2]. The temperature and relative humidity play an important role in getting higher graft success. High

minimum temperature and high relative humidity are most congenial for quick and high callus formation at the graft union which are the prerequisites for quick and stout joint development. In addition, less fluctuation between maximum and minimum temperature also contributes to high success of graft union and further growth of grafts [2]. Correlation analyses were done for the both month such as April and October to measure for suitable month with other characters. In the month of April, leaf size was found to be significantly and positively correlated with shoot height. Number of days taken to sprout scion was found to be significantly and positively correlated with T mosquito damage at 6 months and grafts success at 3 months. Number of leaves was found to be significantly and positively correlated with shoot height. In the month of October, number of days taken to sprout was found to be significantly and positively correlated with number of leaves. Shoot height was found to be significantly and positively correlated with leaf size. T mosquito dame at 6 months was found to be significantly and

positively correlated with shoot height, number of leaves and leaf size. With over all observation in correlation analysis suggest that leaf size, number of days taken to sprout scion, graft success at three and six months as well as T mosquito damage would decide the success rate of quality grafts. The present findings are in line with those reported by Anjarwalla, *et al.*, (2016) and Kalinganire, *et al.*, (2007) [3,4] showed that grafting methods (Wedge and Side veneer) did not have significant effect on survival of *Adansonia digitata* grafts. The lack of significant influence of method and season on survival coupled with significant decline in survival across all seasons suggests that death of grafts could be due to other parameters that were not measured. Several biotic and abiotic factors that affect plant development have been reported to hinder survival of grafts in the nursery. Several fungal rots were observed at the point of union during assessments. The abiotic factors reported to be affecting development of plant grafts include poor craftsmanship that could cause poor alignment of rootstock with scions; thus, leading to early deaths [5]. Poor environmental conditions like above optimum temperatures coupled with high relative humidity may also affect the development of grafts and cause rotting at the graft union [6]. According Chipojol, *et al.*, (2007), [7] the light, temperature, relative humidity, growth hormone concentrations, carbohydrate concentration/ reserve in the grafted materials could be varying across seasons and is likely to affect shoot growth and plant vigor. Present study also showed variations with respect to scion grafting in April and October months might be attributed to varying weather conditions.

### Conclusion

The present study reveals that the season of grafting in the month April and October significantly influenced on scion sprouting, graft success, canopy, moisture stress and per cent tea mosquito bug damage. It indicated that April grafting is found most suitable to achieve maximum per cent graft success compared to October grafting.

**Application of research:** Cashew propagation

**Research Category:** Horticultural Research

**Abbreviations:** DCCD= Directorate of Cashew nut& Cocoa Development

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