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Influence of dwarf interstock on inter-stock grafting in Cashew (*Anacardium occidentale*)

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ABSTRACT

Cashew (*Anacardium occidentale*) is a perennial nut crop, extensively cross-pollinated and heterozygous, therefore seedlings cannot be utilized for commercial planting. However, rootstock can be generated from seednuts and used for grafting by a preferred cashew variety. Because of its perennial nature, this crop will require a lengthy breeding cycle to produce any unique features. As a result, inter-stock grafting technology represents a fresh way to grafting success and producing unique features in cashews. With this background, we conducted a study on inter-stock grafting with various dwarfing scion materials as inter-stock scions with a desirable variety in nursery trials across two seasons (October and April) to determine the survival percentage for future research. Three different inter-stock scions (Nethra Vaman, Taliparamba, and V-7) were employed with two commercial types (V-4 and Bhaskara), and dwarf trait and other growth parameters were measured. Grafting success rates ranged from 40 to 96.67 percent during 2022-23 and 63.33 to 100 percent during 2023-24. Across various grafting seasons. Grafting in April had a better survival rate than grafting in October, and V4 variety had a higher success rate than Bhaskara among different interstock grafting.

Keywords: Bhaskara, Cashew, Graft, Interstock, Vengurla 4

INTRODUCTION

Cashew (*Anacardium occidentale* L.) is a perennial nut crop , extensively cross-pollinated and heterozygous in nature, therefore seedlings cannot be used for commercial planting. However, rootstock can be raised by seednut and used for grafting by desirable cashew varieties. Because of its perennial nature, inducing any specific features in this crop will require a lengthy breeding cycle. According to 2023 data, Maharashtra has a high production of 1145 kg/ha. It is grown in 34 countries with an area of 6.85 million ha and an output of 3.85 million MT. The average productivity is 564 kg/ha, with the highest productivity in Mexico (2489 kg/ha) and Vietnam (1123 kg/ha). The current low productivity is attributed to several factors, such as the establishment of a plantation with seedlings of nondescript origin, due to poor and irregular flowering due to adverse environmental conditions (Parameswaran *et al*, 1984), poor fruit set and excessive premature fruit drop (Patnaik *et al,* 1985), low hermaphrodite flowers , nutritional deficiency (Subbaiah, 1983), inefficient pollination (Heard *et al,* 1990) and irregular and prolonged flowering (Aliyu, 2005).

Cashew is an evergreen, dicotyledonous, woody, tropical tree with a medium canopy size. On average, the plant attains a height of 5-8 m. The leaves are alternate, simple, globous, oblong, leathery, and often notched at the apex. The size of the leaf varies from 6 to 24 cm in length and 4 to 15 cm in width based on species and variety. The root system of a completely grown cashew tree consists of a taproot surrounded by a well-developed and extensive network of lateral roots, 90% of which lie at a soil depth of 15–32 cm. The growth pattern of the cashew tree alternates between vegetative and reproductive phases. There are two types of branching in cashew: intensive and extensive types (Damodaran, 1965). An intensive type of growth pattern tends to give the bushy appearance to trees, whereas an extensive type results in a spreading tree habit. Annually, two or three peak periods of growth are observed in bearing cashew trees with the development of stray shoot growth. In bearing trees, from flower flush, many shoots develop that give rise to terminal inflorescence/panicle. The other vegetative flush gives rise to lateral shoots that develop soon after the main crop has matured.

Dwarf traits in cashew are important to reduce the height of cashew trees for ease of harvesting, and

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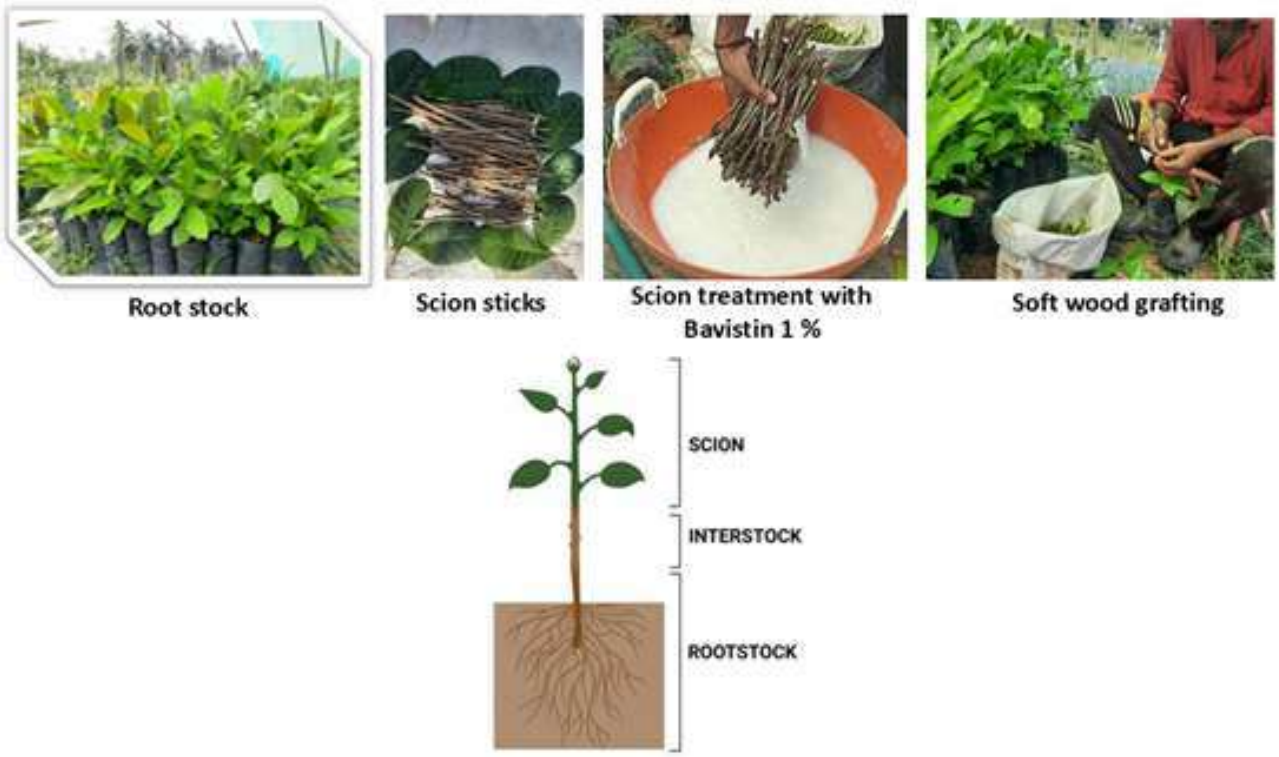

Fig. 1 Interstock grafting methodology

the availability of dwarf sources is scarce, and it is very difficult to multiply by grafting due to its low success rate. *Anacardium pumilum* was a dwarf species of cashew and tried with inter-stock grafting, and it was not successful or low success rate reported (Bhagya *et al,* 2022). Generally, dwarf species will have a low yield in nature, and this trait can be used in high-yielding varieties to reduce the tree height with a good yield. Thus, a preliminary nursery study was undertaken to know the success rate of grafting by interstock grafting technology

MATERIALS AND METHODS

The present research experiment was carried out during 2023-24 at the nursery of ICAR-Directorate of Cashew Research, Puttur, Karnataka, located at (latitude 12°46′36"N, longitude 75°16′08, and altitude 72 m above MSL) in the west coast region of India. The climate of this study site was tropical, with an annual rainfall of 3500 mm per year. The soil media used for the experiment was analyzed, and pH varies from 5.98, EC (0.198 ds/m), OC (0.86), available N (75.2 kg/ha), available P (45.32 kg/ha), and available K (178 kg/ha) in a two-set experiment (Table 1). Interstock grafting was carried out in different seasons (October 2023 and April 2024) by using the softwood grafting method with 60-day-old rootstocks and different interstocks were used as shown in Table 2 *viz.* Nethra Vaaman, Taliparamba, V7, and two controls (without interstock grafting) to know the survival percentage of the graft and to induce dwarfness in cashew (Fig. 1). So, preliminarily, we have studied to know the success of interstock grafts in cashew, and the recorded survival percentage of grafts was recorded at monthly intervals after the grafting. Survival percentage was calculated by using the below-mentioned equation after the 180 days of grafting. This experiment was carried out with CRD with 3 replications, and 20 grafts per replication were done. Data was statistically analyzed with Excel and interpreted.

$$\text{Survival \%} = \frac{no.of\ grafts\ survived}{\text{Total no of grafts}} \times 100 \ldots\ldots\ldots\ldots (1)$$

RESULT AND DISCUSSION

In any perennial crops with cross-pollinated crops, it's very difficult to induce desirable traits. Here we have taken dwarf nature cashew varieties for inducing dwarfness, and a preliminary study was taken up in the nursery. In this study we have tried interstock grafting in the nursery and evaluated the survival percentage of grafts (Fig 2 and Table 3). The grafting carried out during the month of October had a survival and success percentage that varied from 40 to 86.6 %

Table 1. Soil properties of potting media used for grafting in nursery.

Content name	Values	Remark
pH	5.98	Acidic
EC (ds/m)	0.198	Normal
Organic carbon (%)	0.86	High
Available N(kg/ha)	75.2	Low
Available P(kg/ha)	45.32	High
Available K(kg/ha)	178	Medium
Fe (ppm)	10.42	Sufficient
Mn (ppm)	17.06	Sufficient
Zn (ppm)	4.42	Sufficient
Cu (ppm)	2.63	Sufficient
B (ppm)	20.92	Sufficient

Table 2. Treatment details used in interstock grafting technology.

Treatment	Interstock	Main scion
T_1	Nethra vamaan	V4 (Vengurla 4)
T_2	Nethra vamaan	Bhaskara
T_3	Taliparamba	V4 (Vengurla 4)
T_4	Taliparamba	Bhaskara
T_5	V7 (Vengurla 7)	V4 (Vengurla 4)
T_6	V7 (Vengurla 7)	Bhaskara
T_7	Control	V4 (Vengurla 4)
T_8	Control	Bhaskara

Table 3. Survival percentage of interstock grafts of different seasons in cashew.

Treatment	Survival % (October 2023 grafts)	Survival % (April 2024 grafts)
T1-Nethra vamaan+V4	83.33	71.67
T2-Nethra vamaan +Bhaskara	63.33	55.00
T3-Taliparamba+V4	86.66	40.00
T4-Taliparamba+Bhaskara	80.00	40.00
T5-V7+V4	100.00	40.00
T6-V7+Bhaskara	86.66	46.67
T7-V4	100.00	73.33
T8-Bhaskara	100.00	86.67

(Table 3). Among the different interstocks, the Taliparamba interstock had a lower survival percentage with the V4 and Bhaskara varieties and V7 as the interstock with the V4 variety (40 %) grafts. Nethra vamaan with V4 recorded 71.67 %, and Nethra vamaan with the Bhaskara variety reported 55 %, and the control (no interstocks) reported the highest survival percentage in both V4 (73.33 %) and the Bhaskara variety (86.6 %) as compared to interstock grafts.

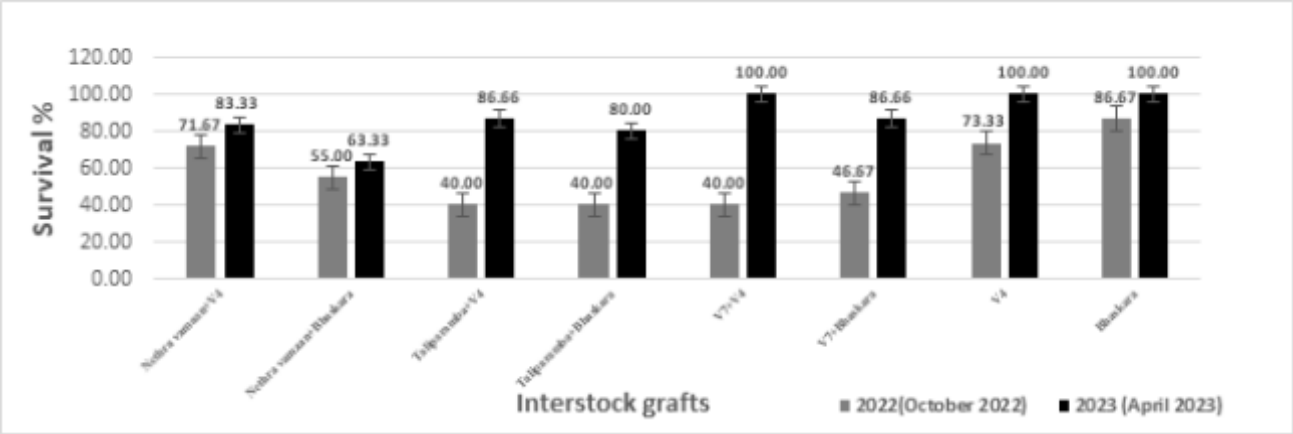

Fig. 2 Survival percentage of interstock grafting in cashew in different season

During April grafting interstocks, the survival percentage of grafts varies from 63.33 to 100 %. The highest survival percentage was reported in the control with no interstocks and was *on par* with interstock V7 with V4 (100 %), followed by V7 with Bhaskara (86.66 %), Taliparamba with V4 (86.66 %), Nethra Vamaan with V4 (83.33 %), Taliparamba with Bhaskara (80%), and the lowest survival percentage was observed in Nethra Vamaan with Bhaskara (Table 3). Among the different seasons of grafting, April grafts survival percentage is significantly higher as compared to October grafts except in Nethra vamaan as interstock which clearly indicated a seasonal influence on graft success. It was noticed that interstock grafting V4 is responded well in success rate as compared to Bhaskara. This success rate mainly depends on the compatibility of grafts (genotype), season, selection of scion sticks, skill of the graft man, and weather. These results were supported by Bhagya *et al* (2022). Higher success in the case of soft wood grafting is achieved in the seasons in which fluctuation in the day and night temperatures is minimum and high humidity is prevalent throughout the day (Swamy *et al,* 2010).

CONCLUSION

From this study, it was concluded that April month interstock grafting was better as compared to October grafting, and V4 variety interstock grafting had more success as compared to Bhaskara, and interstock grafting is possible in cashew and other dwarf-inducing species can be included in future studies. This study has shown that more scope is there to study on interstock grafting technology for speed breeding technique in cashew.

REFERENCES

Aliyu O M and Awopetu J A (2005). In vitro regeneration of hybrid plantlets of cashew (*Anacardium occidentale* L.) through embryo culture. *African J Biotech* **6**: 548-553.

Anonymous (2023). Statistics. ICAR-Directorate of Cashew Research, Puttur, Karnataka. *Cashew news* **29**(1): 20.

Bhagya H P, Adiga J D, Thondaiman V, Babli mog, Veena G L, Shamsudheen M, Manjesh G N and Manjunatha K (2022). Intervention in the grafting technology of cashew-Inter-stock technology in cashew. ICAR-Directorate of Cashew Research, Puttur, Karnataka. *Cashew News (June -December)* **28**(2): 6.

Damodaran V K, Abraham J, Alexander K M (1965). The morphology and biology of the cashew flower I-Flowering habit, flowering season, morphology of the flower and sex ratio. *Agri Res J Kerala* **3**(1&2): 23-28

Heard T A, Vithanage V and Chacko E K (1990). Pollination biology of cashew in the Northern Territory of Australia. *Aust J Agri Res* **41**: 1101-1114.

Parameswaran N K, Damodaran V K and Prabhakaran P V (1984). Relationship between yield and duration of different phases in flower opening in cashew (*Anacardium occidentale*.). *Indian Cashew* **16**(4):15-19.

Patnaik H P, Das M S and Panda J M (1985). Studies on the fruit set and fruit drop in cashew (*Anacardium occidentale* L.) under Odisha Conditions. *Indian Cashew Causerie J* **7**(4): 7-8.

Subbaiah C C (1983). Fruiting and abscission patterns in cashew. *J Agri Sci* (Cambridge) **100**:423-427.

Swamy K R M and Nayak M G (2010). Soft wood grafting and nursery management in Cashew. DCR technical bulletin no. 6. ICAR-Directorate of Cashew Research, Puttur, Dakshina Kannada Dist. Karnataka. pp.10.

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