

Response of Adenium (*Adenium obesum*) types to wedge grafting

Abstract

The present investigation entitled “Response of Adenium (*Adenium obesum*) types to wedge grafting.” Experiment conducted at College of Horticulture, Dr. B.S.K.K.V., Dapoli, Dist. Ratnagiri (Maharashtra) during October-November of academic year 2023-2024. The experiment was laid out in Randomized Block Design (RBD) in ten treatment and three replications. The result revealed that early sprouting (11.47 days), number of sprout per plant (1.93), sprouting percentage (91.67 %) and survival percentage (86.67 %) highest in type T₃ (ADBSKKVCOH -3 Pink). Thus it can be observed that type T₃ (ADBSKKVCOH -3 Pink) give significant result to sprouting as well as survival parameters by wedge grafting.

Keywords: Adenium, wedge grafting, type, caudex, sprout.

1. Introduction

Adenium is a flowering plant in the family Apocynaceae first described as a genus in 1819 (Vimalraj *et al.*, 2019). It is called desert rose as it requires the minimum amount of the water. Desert rose is native to the Arabian Peninsula that includes Aden, Saudi Arabia and Oman. Other names of Adenium such as Sabi star, Kudu, Mock azalea and Impala lily. The desert rose (*Adenium obesum*), with its bright flowers, has long represented affluence and abundance. Propagation of Adenium can be done by seeds, cuttings and grafting. Propagation through seed is not reliable due to the low seed production, a result of pollination problems and possible

sterile male and female flowers (Roy and Fatmi, 2022). Grafting allows growers to combine desirable traits from different *Adenium* varieties or species. By grafting a scion onto a compatible rootstock, growers can propagate plants with specific flower colours, forms or growth habits leading to improved ornamental value. Grafting can be used to enhance the development of the caudex, the swollen stem characteristic of *Adeniums*.

Wedge grafting in *Adenium* facilitates the propagation of desired traits by enabling the efficient union of the scion and the rootstock. This technique relies on the principle of vascular cambium compatibility between the scion and rootstock, ensuring successful graft union and subsequent growth. *Adenium* like many other plants, possess a vascular cambium layer responsible for the transportation of water, nutrients and growth regulators. Wedge grafting involves matching the cambium layers of the scion and rootstock, promoting the flow of nutrients and signals crucial for graft union and sustained growth.

The scope of ornamental nursery businesses in the Konkan region of India is quite promising due to several factors. The Konkan region, with its unique climate and geographical features, offers a favorable environment for the growth of a wide range of ornamental plants. With increasing urbanization and interest in gardening among homeowners and businesses, there is a growing demand for ornamental plants in residential, commercial and public spaces. The region's tourism industry also creates demand for aesthetically pleasing landscapes in hotels, resorts and tourist spots. Wedge grafting used to introduce novel genetic traits or characteristics into existing *Adenium* cultivars. This technique plays a significant role in the cultivation, research and commercial production of *Adenium* plants, offering numerous benefits to growers, breeders and researchers alike.

2. Material and Method

The present investigation entitled "Response of *Adenium* (*Adenium obesum*) types to wedge grafting". The experiment was conducted at Hi-tech unit, College of Horticulture, Dapoli Dr. Balasaheb Sawant Konkan Krishi Vidyapeeth, Dapoli, Dist.Ratnagiri, India, 415712. The experiment was laid out in Randomized Block Design with Ten treatment viz. T₁ (ADBSKKVCOH- 1 Variegated), T₂ (ADBSKKVCOH - 2 Yellow Throats with Red Corolla), T₃ (ADBSKKVCOH -3 Pink), T₄ (ADBSKKVCOH -4 White), T₅ (ADBSKKVCOH -5 White with Red Strips), T₆ (ADBSKKVCOH -6 Dark Pink), T₇ (ADBSKKVCOH -7 Light Red), T₈ (ADBSKKVCOH -8 White Throats with Red Corolla), T₉ (ADBSKKVCOH -9 Yellow with Pink Strips), T₁₀ (ADBSKKVCOH- 10 Red) and three replications. Scion collected from this

ten Adenium types. For raising rootstock used seed as a planting material. Seeds are collected from mature pods which contain average 50 seeds. These seeds are sown for raising rootstock. After 6-8 months mature, healthy plants which are free from pest and disease infestation are used as a rootstock. The stem girth of rootstock is about 5.9-7.3 mm which is suitable for wedge grafting. The grafts were taken care along with sanitation. The sprouts on rootstocks were removed for early growth of graft.

During the experiment observations were recorded such as number of days required to first sprout, number of sprout per plant, sprouting percentage and survival percentage. The generated data was subjected to statistical analysis method as suggested by Panse and Sukhatme (1995).

3.Results and Discussion

3.1 Number of days required to first sprouting

There is variability in the timing of initial sprouting after wedge grafting. Table.1 presents statistical analysis on the number of days required for Adenium to sprout by wedge grafting. From data analysis, type ADBSKKVCOH-3 Pink required lowest number of days (11.47 days). The highest number of days required for sprouting in ADBSKKVCOH 10 Red is about 13.33 days. The average number of days required to first sprouting in Adenium was 12.54 days. This might be due to environmental conditions, grafting technique and the specific Adenium varieties involved. Type ADBSKKVCOH-3 Pink has the highest amount of latex which is helpful for early joining of rootstock and scion hence it required minimum number of days for first sprouting. The lowest number of days required for first sprouting observed by Chandra *et al.* (2011) recorded scion started sprouting between 8 to 12 days after wedge grafting in the last week of January in pomegranate and Singh *et al.* (2023) reported that Adenium grafted with wedge method took minimum time to sprouting (14.57 days).

3.2 Number of sprout per plant

Type ADBSKKVCOH -3 Pink which showed approximately 2 sprout per plant which is at par to type ADBSKKVCOH -6 Dark Pink. The lowest number of sprout (1.27) which was observed in ADBSKKVCOH-9 Yellow with Pink Strips and ADBSKKVCOH -7 Light Red (1.27). This result might be due to type ADBSKKVCOH-3 Pink established early connection between scion and rootstock, it required lowest number of days to first sprout (11.47 days). Early graft union between the scion and rootstock stimulates rapid development, which increases the number of sprouts. This result is in close conformity with the result as obtained

by Mayavel *et al.* (2022) concluded that wedge grafting showed high performance in number of sprouts (8) in Tamarind.

3.3 Sprouting percentage

The total success of the grafting process depends on obtaining a high sprouting percentage. Table.1 presents statistical analysis of sprouting percentage for Adenium types by wedge grafting which is represented in fig.1. Highest sprouting percentage attained by ADBSKKVOH-3 Pink which is about 91.67%. The lowest percentage of sprout found in ADBSKKVOH-7 Light Red (73.33 %) and ADBSKKVOH-8 White Throats with Red Corolla (73.33 %). Type ADBSKKVOH-3 Pink showed early sprouting and maximum number of sprout. Sprouting percentage influenced by variables like light, humidity, and temperature. This ideal circumstances increase the percentage of sprouting by encouraging growth and healing at the graft union. The result quite corresponds closely to the one that was attained by Visen *et al.* (2010) recorded the maximum success of grafts was obtained in greenhouse (81.71 %) during September to December in guava by wedge grafting and Ahmed *et al.* (2012) concluded that wedge grafting was found superior to tongue grafting in respect of sprouting percent (62.22 %) and graft success (52.45 %) in walnut.

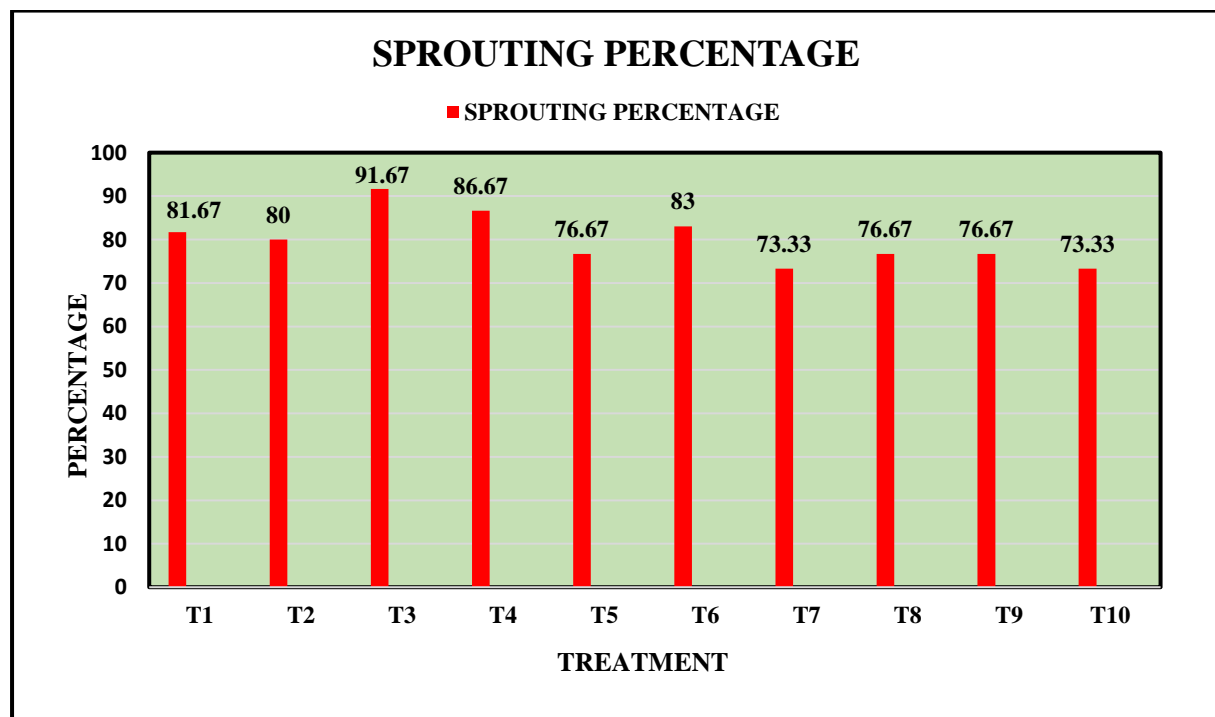


Fig.1: Response of Adenium types to sprouting percentage by wedge grafting

Table. 1: Response of Adenium types to sprouting and survival parameters by wedge grafting

Sr. No	Treatment	Treatment Details	Number of days for sprouting	Number of sprout per plant	Sprouting percentage	Survival percentage
1.	T ₁	A DBSKK VCOH-- 1 (Variegated)	12.60	1.47	81.67	73.33
2.	T ₂	A DBSKK VCOH -2 (Yellow Throats with Red Corolla)	12.07	1.67	80.00	81.67
3.	T ₃	A DBSKK VCOH--3 (Pink)	11.47	1.93	91.67	86.67
4.	T ₄	A DBSKK VCOH – 4 (White)	12.27	1.53	86.67	78.33
5.	T ₅	A DBSKK VCOH – 5 (White with Red Strips)	12.87	1.60	76.67	73.33
6.	T ₆	A DBSKK VCOH–6 (Dark Pink)	12.00	1.73	83.00	75.00
7.	T ₇	A DBSKK VCOH–7 (Light Red)	13.07	1.30	73.33	70.00
8.	T ₈	A DBSKK VCOH–8 (White Throats with Red Corolla)	13.07	1.40	76.67	71.67
9.	T ₉	A DBSKK VCOH - 9 (Yellow with Pink Strips)	12.73	1.27	76.67	70.00
10.	T ₁₀	A DBSKK VCOH–10 (Red)	13.33	1.40	73.33	71.67
Mean			12.25	1.53	79.96	75.17
Range			11.47-13.33	1.27-1.93	73.33-91.67	70.00-86.67
‘F’ test			SIG	SIG	SIG	SIG
SEm ±			0.18	0.07	1.64	2.53
CD at 5 %			0.49	0.22	4.87	7.53

3.4 Survival percentage

In wedge grafting, the survival percentage is the fraction of grafts that effectively establish and continue to grow after the original grafting procedure. This metric is crucial as it indicates the overall viability and success of the grafting technique. Type ADBSKKVOH-3 Pink (86.67%) showed highest survival percentage among all types. It is observed that all type showed more than 70% survival percentage. The lowest survival percentage limit in type ADBSKKVOH-9 Yellow with Pink Strips which is 70.00%. This might be due to, *Adenium* latexes have antimicrobial properties (Aktar *et al.*, 2017) that can help prevent pathogens from entering the wound site, thereby reducing the chances of graft failure due to infection. Type ADBSKKVOH-3 Pink have high amount of latex which is helpful for protection from pathogens. Temperature, humidity and light all have an impact on the success rate of grafting and subsequent sprouting in different plant species. The result quite corresponds closely to the one that was attained by Padmapriya *et al.* (2021) observed that the highest graft survival (67.84 %) was found in wedge grafting in Guava.

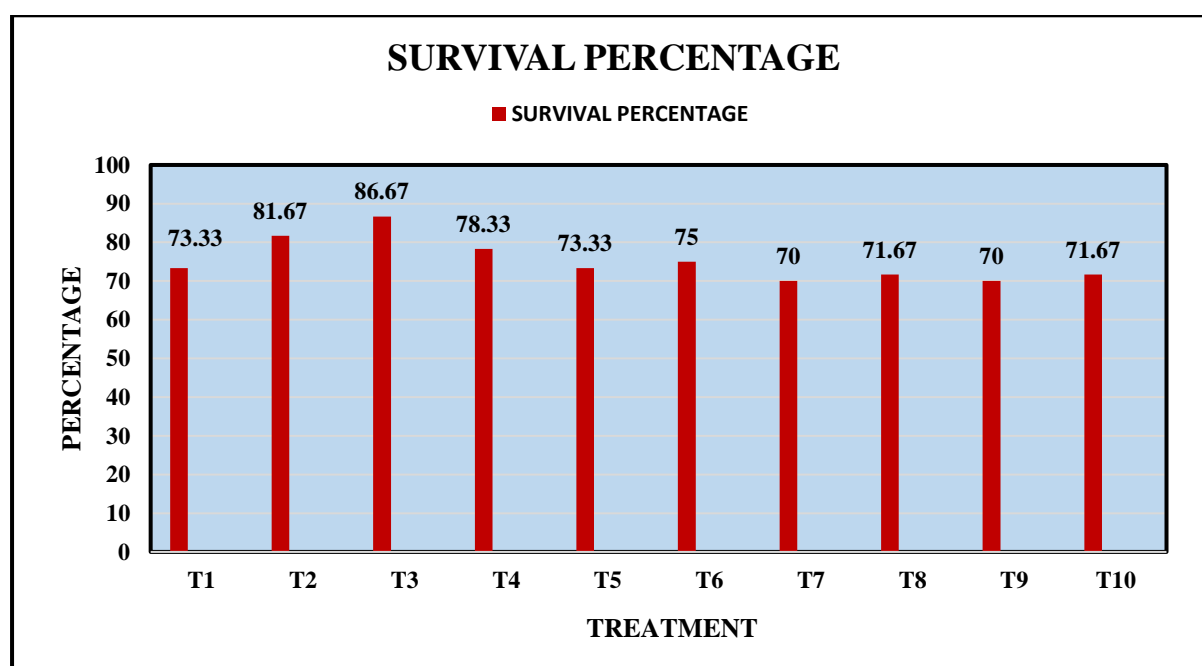


Fig.2: Response of *Adenium* types to survival percentage by wedge grafting

4. Conclusion

From present investigation it can be concluded that among the different Adenium types, type ADBSKKVCOH-3 Pink propagated by wedge grafting proved superior for the various parameters of graft studied such as, sprouting percentage (91.67%), survival percentage (86.67%), number of days required to first sprout (11.47 days) and number of sprout per plant (1.93 sprout). The current inquiry yielded suggestive data that require additional research to make suggestions.

6. References

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