



# **Response of Adenium (*Adenium obesum*) Types to Wedge Grafting**

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## **Authors' contributions**

*This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.*

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## **ABSTRACT**

The present investigation entitled "Response of Adenium (*Adenium obesum*) types to wedge grafting." was 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 %) maximum in type T<sub>3</sub> (ADBSKKVCOH -3 Pink). Thus it can be observed that type T<sub>3</sub> (ADBSKKVCOH -3 Pink) give significant result to sprouting as well as survival parameters by wedge grafting.

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**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 [1]. 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 [2]. 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. MATERIALS AND METHODS

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. T<sub>1</sub> (ADBSKKVCOH- 1 Variegated), T<sub>2</sub> (ADBSKKVCOH - 2 Yellow Throats with Red Corolla), T<sub>3</sub> (ADBSKKVCOH -3 Pink), T<sub>4</sub> (ADBSKKVCOH -4 White), T<sub>5</sub> (ADBSKKVCOH - 5 White with Red Strips), T<sub>6</sub> (ADBSKKVCOH -6 Dark Pink), T<sub>7</sub> (ADBSKKVCOH -7 Light Red), T<sub>8</sub> (ADBSKKVCOH -8 White Throats with Red Corolla), T<sub>9</sub> (ADBSKKVCOH -9 Yellow with Pink Strips), T<sub>10</sub> (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. This seeds are sown for raising rootstock. After 6-8 months mature, healthy plants which is free from pest and disease infestation used as a rootstock. The stem girth of rootstock 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 Day 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 [3].

## 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 ADBSKKVC0H-3 Pink required minimum number of days (11.47 days). The maximum number of days required for sprouting in ADBSKKVC0H 10 Red about (13.33 day). 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 types involved. Type ADBSKKVC0H-3 Pink have 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. [4] recorded scion started sprouting between 8 to 12 days after wedge grafting in the last week of January in pomegranate and Singh et al. [5] reported that Adenium grafted with wedge method took minimum time to sprouting (14.57 days).

### 3.2 Number of Sprout per Plant

Type ADBSKKVC0H -3 Pink which showed approximately 2 sprout per plant which was at par to type ADBSKKVC0H -6 Dark Pink. The minimum number of sprout (1.27) which was observed in ADBSKKVC0H-9 Yellow with Pink Strips and ADBSKKVC0H -7 Light Red (1.27). This result might be due type ADBSKKVC0H-3 Pink established early connection between scion and rootstock, it required minimum 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. [6] 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 ADBSKKVC0H-3 Pink which was 91.67%. The lowest percentage of sprout found in ADBSKKVC0H-7 Light Red (73.33 %) and ADBSKKVC0H-8 White Throats with Red Corolla (73.33 %). Type ADBSKKVC0H-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. [7] 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. [8] concluded that wedge grafting was found superior to tongue grafting in respect of sprouting percent (62.22 %) and graft success (52.45 %) in walnut.

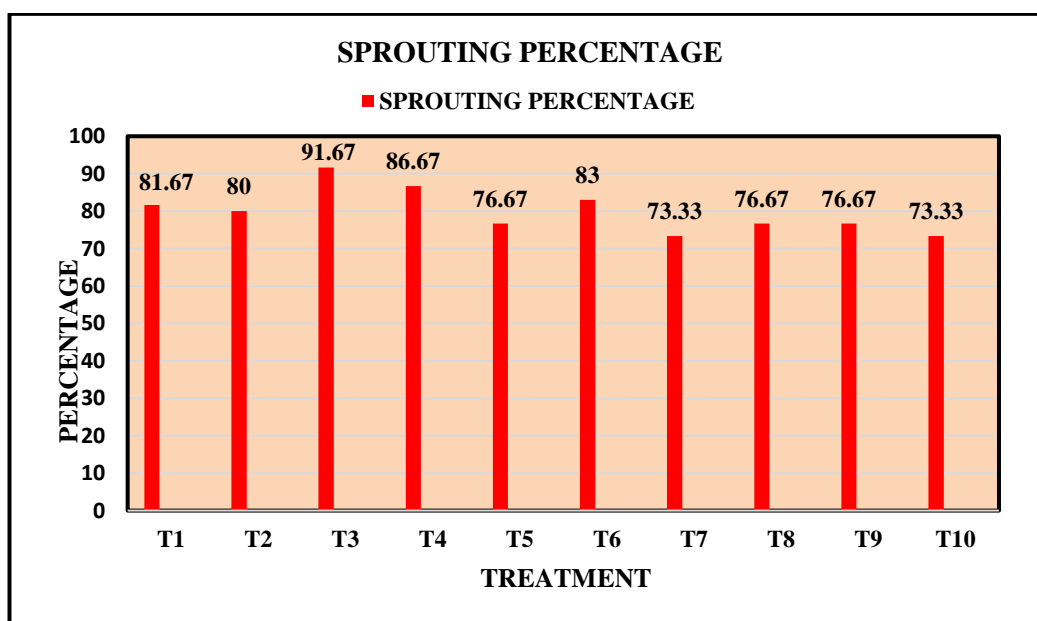


Fig. 1. Response of Adenium types to sprouting percentage by wedge grafting

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

<b>Sr. No</b>	<b>Treatment</b>	<b>Treatment Details</b>	<b>Number of days for sprouting</b>	<b>Number of sprout per plant</b>	<b>Sprouting percentage</b>	<b>Survival percentage</b>
<b>1.</b>	T <sub>1</sub>	ADBSKKVCOH-- 1 (Variegated)	12.60	1.47	81.67	73.33
<b>2.</b>	T <sub>2</sub>	ADBSKKVCOH -2 (Yellow Throats with Red Corolla)	12.07	1.67	80.00	81.67
<b>3.</b>	T <sub>3</sub>	ADBSKKVCOH--3 (Pink)	11.47	1.93	91.67	86.67
<b>4.</b>	T <sub>4</sub>	ADBSKKVCOH – 4 (White)	12.27	1.53	86.67	78.33
<b>5.</b>	T <sub>5</sub>	ADBSKKVCOH – 5 (White with Red Strips)	12.87	1.60	76.67	73.33
<b>6.</b>	T <sub>6</sub>	ADBSKKVCOH–6 (Dark Pink)	12.00	1.73	83.00	75.00
<b>7.</b>	T <sub>7</sub>	ADBSKKVCOH–7 (Light Red)	13.07	1.30	73.33	70.00
<b>8.</b>	T <sub>8</sub>	ADBSKKVCOH–8 (White Throats with Red Corolla)	13.07	1.40	76.67	71.67
<b>9.</b>	T <sub>9</sub>	ADBSKKVCOH - 9 (Yellow with Pink Strips)	12.73	1.27	76.67	70.00
<b>10.</b>	T <sub>10</sub>	ADBSKKVCOH–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

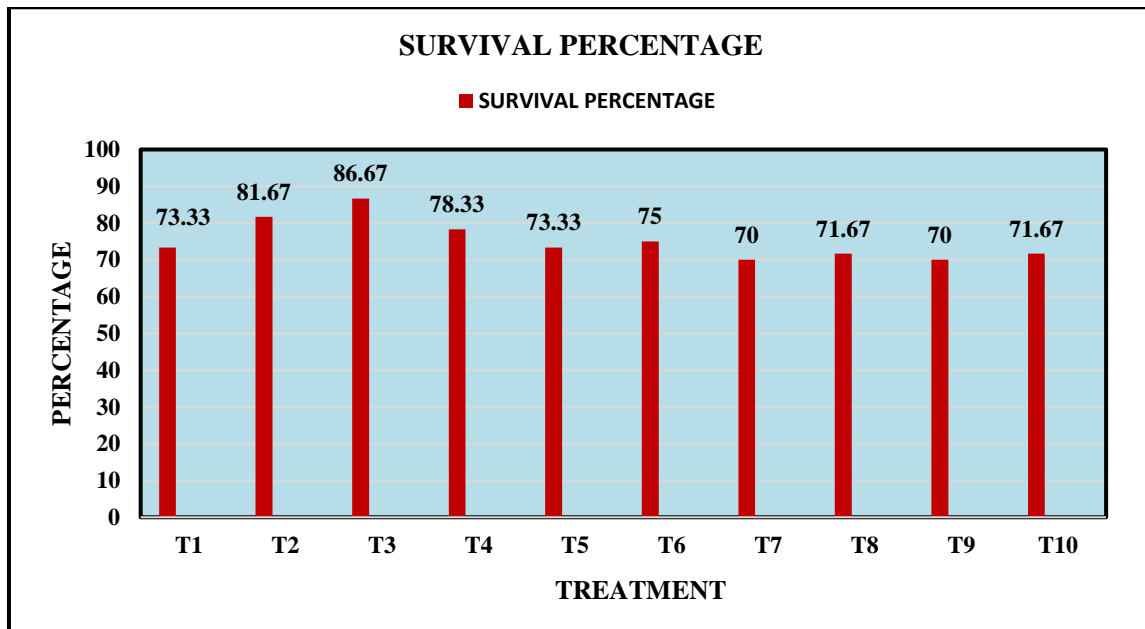


Fig. 2. Response of Adenium types to survival percentage by wedge grafting

### 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 ADBSKKVC0H-3 Pink (86.67%) showed maximum survival percentage among all types. It is observed that all type showed more than 70% survival percentage. The minimum survival percentage limit in type ADBSKKVC0H-9 Yellow with Pink Strips which was 70.00%. This might be due to, Adenium latexes have antimicrobial properties [9] that can help prevent pathogens from entering the wound site, thereby reducing the chances of graft failure due to infection. Type ADBSKKVC0H-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. [10] observed that the highest graft survival (67.84 %) was found in wedge grafting in Guava.

### 4. CONCLUSION

From present investigation it can be concluded that among the different Adenium types, type ADBSKKVC0H-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.

### DISCLAIMER (ARTIFICIAL INTELLIGENCE)

In this manuscript there is no use of generative AI technologies such as Large Language Models (ChatGPT, COPILOT, etc) and text-to-image generators.

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### COMPETING INTERESTS

Authors have declared that no competing interests exist.

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