Current Horticulture **13**(3): 61–64, July–September 2025
DOI: 10.5958/2455-7560.2025.00043.3
Received: 05 December 2024; Accepted: 19 July 2025

Performance evaluation of novel vibrant multi-petalous germplasm in Adenium (*Adenium obesum*)

Alka Singh[1*], G. D. Patel[1], H. P. Shah1, V. B. Patel[2], Avnish Pandey[3], Dinesh Kumar[1] and S. K. Chavan[4]

[1]*Department of Floriculture and Landscape Architecture, ASPEE College of Horticulture, NAU, Navsari, Gujarat, India*

Abstract

Research aiming on crop improvement has been conducted in Adenium, a popular flowering pot plant with the basic objective of novel flower morphological traits at the Advance Technology Centre of Soilless System, Department of Floriculture and Landscape Architecture, NAU, Navsari, during 2016-2021. Hybridization was done in Adenium involving six parents where in three varieties were taken as male parents, *viz.,* Double Sweet Heart (DSH), Vithoons White (VW), Pineapple Rose (PR) and three as female parents, *viz.,* Arrogant(A), Mor Lok Dok (MD) and Black Dragon (BD) and their crosses were studied. Among the different crosses, NAMDDSH (MD × DSH) and NAADSH (A × DSH) appeared to have novel traits with multipetalous flower form in white and deep red flower colour respectively. These crosses were further multiplied by grafting and evaluated along with their parent varieties for stability during 2019 to 2021. NAMDDSH bearing white flowers and NAADSH with red flowers were found novel and significantly superior in terms of the flower form with 10 petals, number of flowers per cluster (8-9), flowers opened at a time on a cluster (3.6-4.4) and flower longevity (11-12.5 days). Besides NAADSH exhibited enhanced flower size (8-8.16 cm) among all the germplasms. These germplasms can be further exploited for commercial application as well as for breeding.

Key words: Adenium, Flowering pot plant, Novel traits, Multipetalous

The *Adenium obesum* (Forssk.) Roem. & Schult, has recently been gaining high popularity as a pot plant in the floriculture industry at the global level (Paul *et al.,* 2015, McBride *et al.*, 2014, Wannakrairoj *et al.*, 2008, Sindhuja *et al.*, 2020 and Singh *et al.,* 2018).

Belonging to the family Apocynaceae, it is an attractive flowering plant with sculptural caudex, good branching habits and tolerance to drought stress. A native of Africa, it is also found in Oman, Saudi Arabia and Yemen as a wild plant. It is popularly in cultivation now in many tropical countries including Thailand and India (Chavan *et al.*, 2016, Colombo *et al.*, 2018, Hossain 2018 and Singh *et al.,* 2023). There is high perspective of expansion of protected cultivation technology in India, contributing towards creation of self- employment and national economy (Singh, 2023). Adenium is a potential remunerative ornamental crop under protected cultivation (Singh *et al.*, 2018). Highly heterozygous in nature, adeniums are cross-pollinated plants. Work on genetic improvement in Adenium has been inadequate in our country (Chavan *et al.*, 2017, Chavan *et al.*, 2018, Singh *et al.*, 2019, Singh *et al.*, 2020). With the basic objective of introducing novelty in flower colour, doubleness and flowering habit, research integrating hybridization and selection in *Adenium* was conducted at the Department of Floriculture and Landscape Architecture, NAU, Navsari. New crosses in Adenium, *viz.,* NAMDDSH (MD X DSH) and NAADSH (A X DSH) were selected for novel morphological traits with regard to flower form flower colour, flower size, doubleness, flower longevity and clustering habit.

MATERIALS AND METHODS

Adenium germplasm

The hybridization in adenium was conducted at the Department of Floriculture and Landscape Architecture, ASPEE College of Horticulture, Navsari Agricultural University, Navsari, Gujarat, during 2016-2021. Completely randomized block design with four repetitions, consisting of five germplasms of adenium, comprising two crosses, *viz*., NAMDDSH (MD X DSH) and NAADSH (A X DSH) and three varieties as their parents, viz., Mor Lok Dok (MD), Arrogant (A) and Double Sweet Heart (DSH) was used. Initially, hybridization was carried out involving 6 parents, three male parent, *viz.,*Double Sweet Heart, Vithoons White and Pineapple Rose and three female parent, *viz.,* Arrogant, Mor Lok Dok and Black Dragon. Two crosses NAMDDSH (MD X DSH) and NAADSH (A X DSH) appeared to be superior with novel morphological traits with regard to flower form, flower colour, flower size, doubleness and flower clustering habit over their parents. These two crosses along with their parents were further multiplied by grafting as per the standardized method (Singh *et al.*, 2023) and evaluated for

***Corresponding author :** alkaflori@nau.in
[2] Department of Basic Science and Humanities, College of Forestry, NAU, Navsari, Gujarat, India
[3] Hitech Floriculture Project, Agriculture College, Pune, Maharashtra, India

morphological characters and stability during 2019-2021. Observation on different flower traits was recorded from five randomly selected plants from each genotype in each replication. The data were recorded during 2019, 2020 and 2021. Observations were taken on flower form with number of petals/flower, colour variation in context to petal colour, petal margin colour and corolla tube colour. The observation on number of flowers/cluster, flowers opened at a time on a cluster, flower size and flower longevity by counting number of days from flower bud opening till the day of flower senescence were taken. The data were analysed statistically in CRD using OP Stat software.

RESULTS AND DISCUSSION

The NAMDDSH bearing white flowers and NAADSH bearing red flowers as well as one parent Double Sweet Heart (DSH) bearing pink flowers exhibited multipetalous flower form with ten petals in each flower while other two parent varieties Mor Lok Dok (MD) bearing white and Arrogant (A) bearing red flowers had five petals (Table 1 and Fig. 1). The NAMDDSH exhibited white color flower including petal and margin with pale greenish yellow tinge in centre of corolla tube while, NAADSH exhibited red-colored petals with deep red color petal margin with bright yellow colour in centre of corolla tube. Among parents, Mor Lok Dok (MD) showed white petals with pale greenish yellow tinge in the centre of corolla tube, flowers of Arrogant (A) showed red petals with bright yellow in the centre of corolla tube while Double Sweet Heart DSH beared pink flowers with deep pink petals margin along with with pale pink colour in the centre of corolla tube. These traits were stable for three years.

Genetic factor expresses morphological differences when different germplasm collections are grown under identical conditions and management practices. Doubleness, in crosses NAMDDSH and NAADSH were obtained from DSH as a Male parent which showed the bearing of multipetalous flowers having ten petals in each flower, this character was thus transmitted in the crosses. The heritability of multi-petalous flowering character from a parent has been previously observed in adenium (Singh *et al.*, 2019 and 2020). Similar observations have also been earlier recorded in adenium (Singh *et al.,* 2020). Observations depicting variation in a number of petals in different germplasm have also been earlier recorded in adenium (Sindhuja *et al.,* 2020 Singh *et al.,* 2019, Singh *et al.,* 2020).

The number of flowers/ cluster were more in NAMDDSH (8.0-8.58), NAADSH (8.17-8.92) and one parent MD (8.2-8.5). Number of flowers opened at a time on a cluster were more in NAMDDSH (4.25-4.42), NAADSH (3.67-4.67) and one parent MD (3.5-4.2) (Table 2). The flower size was maximum in NAADSH (8.02-8.16 cm) and minimum in MD (6.50-6.75 cm). The flower longevity was maximum in NAMDDSH (11.9-12.5

Table 1: Number of petals and flower colour as influenced by selected crosses and parent genotypes in adenium

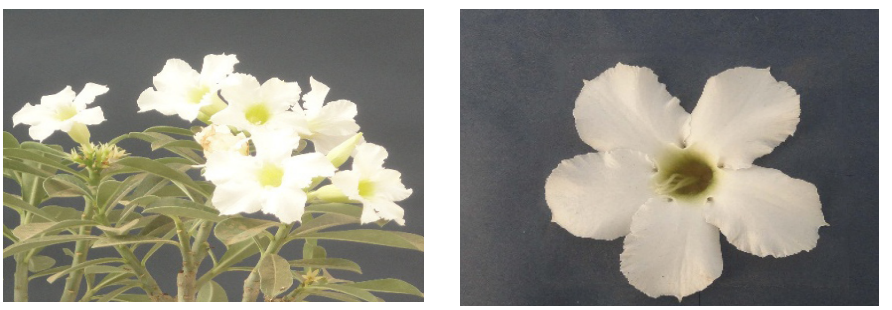
Genotype	No of Petals	Flower Colour		
		Petal margin colour	Petal colour	Corolla tube colour
Mor Lok Dok X Double Sweet Heart (NAMDDSH)	10	White	White	Pale greenish yellow
Arrogant X Double Sweet Heart (NAADSH)	10	Deep red	Red	Bright yellow
Mor Lok Dok (MD)	5	White	White	Pale greenish yellow
Arrogant (A)	5	Deep red	Red	Bright yellow
Double Sweet Heart (DSH)	10	Deep pink	Pink	Pale pink

Table 2: Number of flowers/cluster, number of flowers opened at a time per cluster, flower size (cm) and flower longevity (days) as influenced by selected crosses and parent genotypes in adenium

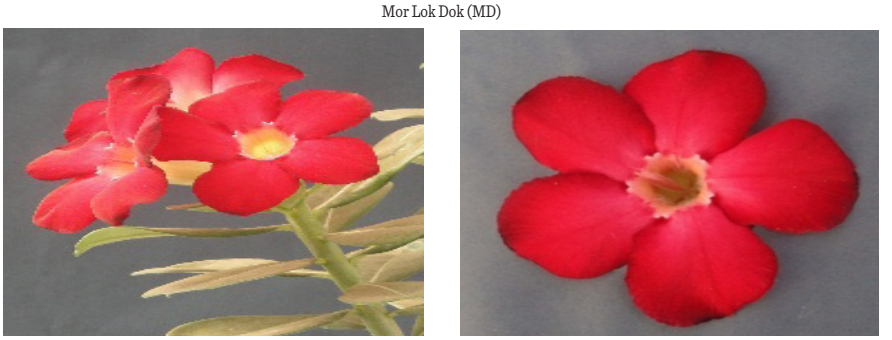
Genotype	Number of flowers/ cluster			Number of flowers opened at a time on a cluster			Flower size (cm)			Flower longevity (days)		
	2019	2020	2021	2019	2020	2021	2019	2020	2021	2019	2020	2021
Mor Lok Dok X Double Sweet Heart (NAMDDSH)	8.00	9.58	8.25	4.42	4.33	4.25	7.40	7.19	7.16	11.92	12.00	12.50
Arrogant X Double Sweet Heart (NAADSH)	8.75	9.92	8.17	3.67	4.25	4.67	8.02	8.14	8.16	11.25	11.00	11.42
Mor Lok Dok (MD)	8.50	8.60	8.20	3.60	3.50	4.20	6.50	6.75	6.75	8.50	7.75	8.50
Arrogant (A)	3.44	3.77	3.67	2.56	2.33	2.33	7.53	7.45	7.43	6.89	7.11	7.22
Double Sweet Heart (DSH)	5.11	5.33	4.89	3.22	3.33	2.89	7.44	7.59	7.43	10.44	9.89	9.33
S.Em ±	0.35	0.26	0.04	0.18	0.17	0.17	0.07	0.05	0.03	0.40	0.24	0.22
CD @ 5 %	1.06	0.79	0.11	0.56	0.52	0.51	0.21	0.15	0.10	1.21	0.73	0.66
CV %	10.01	6.77	2.94	11.38	11.03	11.43	1.89	1.35	0.87	6.67	4.29	3.96

NAMDDSH (Mor Lok Dok X Double Sweet Heart)

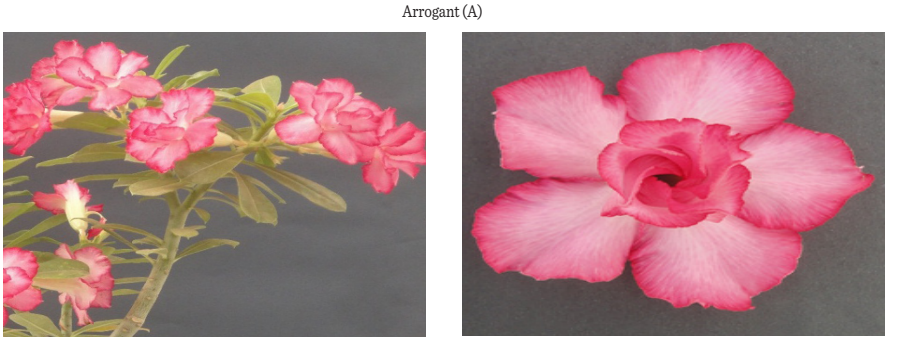
NAADSH (Arrogant X Double Sweet Heart)



Mor Lok Dok (MD)



Arrogant (A)



Double Sweet Heart (DSH)

Fig 1. Flowers of selected crosses and parent genotypes of Adenium

days), followed by NAADSH (11.3-11.4 days), (Table 2). Thus, variation observed in flowering parameters among different germplasms, i.e. crosses and parent varieties can be attributed to differences in their genetic make-up. Thus, variation in different floral characters indicates genetic divergence in genotypes also suggested by Varella *et al.* (2015), Sindhuja *et al.* (2022), Singh *et al.* (2017) and Singh *et al.* (2024).

CONCLUSION

The hybrids, NAMDDSH bearing white flowers and NAADSH bearing red flowers, assumes significance owing to their superiority and novelty in respect of flower colour and flower morphology with multipetalous flower form having ten petals in each flower along with more number of flowers/ cluster and *in-situ* flower longevity. These germplasms can be further registered and used for breeding.

ACKNOWLEDGEMENT

The authors duly acknowledge the state-funded grant received for the Advance Technology Centre of Soilless System for various crops, under which the present research was carried out..

REFERENCES

Chavan S K, Singh A, Bhandari A J and Patel B N. 2016. Management of Potted Adeniums. *Floriculture Today*. **21**(2): 10-15.

Chavan S K, Singh A and Barkule S R. 2017. Application of DNA marker (RAPD) technology to study molecular diversity in *Adenium obesum*(Forssk), Roem and Schult. *Ecology Environment and Conservation.* **24**: 403-07.

Chavan S K, Singh A and Barkule S R. 2018. Genetic variability studies on *Adenium obesum* (Forssk.) Roem. & Schult. *Asian Journal of Microbiology Biotechnology and Environmental Sciences.* **20**(3): 965-69.

Colombo R C, da Cruz, M A, de Carvalho, D U, Hoshino R T, CitoAlves G A and De Faria, R T. 2018. *Adenium obesum* as a new potted flower: growth management. *Ornamental Horticulture* **24**(3): 197-05.

Hossain M A. 2018. A review on *Adenium obesum*: A potential endemic medicinal plant in Oman. *International Journal of Basic and Applied Sciences*. **7**: 559-63.

McBride K M, Henny R J, Mellich T A and Chen J. 2014. Mineral Nutrition of *Adenium obesum* 'Red'. *Hort Science.* **49**(12): 1518–22.

Paul D, Biswas K and Sinha S K. 2015. Biological Activities of *Adenium obesum* (Forssk) Roem. And Schult.: A Concise Review. *Malaya Journal of Biosciences*. **2**(4): 214-20.

Sindhuja M, Singh A, Kapadiya C, Bhandari A J, Shah H P and Patel A I. 2020. Evaluation of *Adenium* genotypes for physiochemical and flowering characters. *International Journal of Chemical Studies.* **8**(4): 3840-44.

Sindhuja M, Singh A, Bhandari A J, Shah H P, Patel A I and Parekh V. 2022. Morphological characterization of different genotypes of adenium. *Indian Journal of Horticulture*. **79**(3): 296-304.

Singh B. 2023. Exploring potential of protected cultivation in India-a review. *Current Horticulture* **12**(2): 3-11.

Singh A, Bhandari A J, Chavan S K, Patel N B, Patel A I and Patel B N. 2017. Evaluation of *Adenium obesum* for potted ornamentals under soilless growing system. *International Journal of Current Microbiology and Applied Sciences.* **6**(12): 2141-2146.

Singh A, Chavan S K, Bhandari A J, and Patel B N. 2018. Production of Adenium Potted Ornamentals under Protected Cultivation. *New Age Protected Cultivation* **4**(1): 14-16.

Singh A, Chavan S K, Bhandari A J, Parekh V B, Shah H P and Patel B N. 2019. New Multipetalous Variety G. Ad.1 of *Adenium obesum*. *International Journal of Current Microbiology and Applied Sciences.* **8**(7): 22319-7706.

Singh A, Chavan S K, Bhandari A J, Parekh V B, Shah H P, Patel A I and Patel B N. 2020. New multipetalous variety G. Ad.2 in *Adenium obesum*, *Electronic Journal of Plant Breeding.* **11**(2): 346-50.

Singh A, Patel G D, Bhandari A J and Shah H P. 2023. Standardization of grafting technique in *Adenium obesum* (Forssk.) Roem. And Schult. *Progressive Horticulture.* **55**(1): 62-67.

Singh A, Chavan S K, Patel G D, Bhandari A J, Shah H P and Patel V B. 2024. G.N.Ad 4 (Shobhita): A New Profuse flowering variety of *Adenium obesum*. *Biological Forum – An International Journal.* **16**(3): 147-152.

Varella T L, da Silva G M, Maximiliano K Z, Mikovski A I, da Silva Nunes, J R, De Carvalho I F and da Silva M L. 2015. In vitro germination of desert rose varieties. *Ornamental Horticulture.* **21**(2): 227-34.

Wannakrairoj S. 2008. Status of ornamental plants in Thailand. *Acta Horticulturae* **788**: 29-36.