Plant Archives Vol. 25, Supplement 1, 2025 pp.144-147 e-ISSN:2581-6063 (online), ISSN:0972-5210

Plant Archives

Journal homepage: http://www.plantarchives.org
DOI Url : https://doi.org/10.51470/PLANTARCHIVES.2025.v25.supplement-1.020

PERFORMANCE OF DIFFERENT GENOTYPES OF ROSY ADENIUM (*ADENIUM OBESUM*) UNDER PRAYAGRAJ AGRO-CLIMATIC CONDITIONS

Dream Yadav* and Urfi Fatmi
Department of Horticulture, Naini Agricultural Institute, Faculty of Agriculture, Sam Higginbottom University of Agriculture, Technology and Sciences, Prayagraj-211007, India
*Corresponding author E-mail: dreamyadav94@gmail.com
(Date of Receiving : 25-09-2024; Date of Acceptance : 02-12-2024)

ABSTRACT

The experiment was carried out during September, 2023 to July, 2024, in naturally ventilated polyhouse, Department of Horticulture, SHUATS, Prayagraj, in Completely Randomized Design (CRD) with ten different rosy adenium genotypes, replicated thrice. Different genotypes used in this experiment were R12, R19, R59, R76, R111, R116, R141, R142, R151and R160. The 10 rosy adenium genotypes under study showed significant variation in all the parameters studied. The genotype R59 reported significantly better performance in parameters like plant height (26.5 cm), scion length (15.3 cm), graft diameter (1.45 cm), days taken to bud initiation (129 days), and self-life (15 days).
Keywords: *Adenium obesum*, rosy adenium, genotype, plant growth, self-life

Introduction

Adenium obesum (Desert Rose) belongs to the family Apocynaceae, is a succulent shrub have surged in popularity for both indoor and outdoor sustainable landscaping due to their ease of upkeep, drought tolerance, and visual appeal (Colombo *et al*., 2018; Dimmitt *et al*., 2009; Chavan *et al*., 2016). Originating from Africa and the Arabian Peninsula, Adenium thrives in dry climates, demonstrating adaptations like a striking caudex for water storage and resilience to poor soils (Plaizier, 1980). Its vibrant blooms, attraction to pollinators, and flexibility render it well-suited for contemporary techniques such as xeriscaping and urban horticulture. Driven by its improved bloom quality and stress resilience Paul *et al.* (2015), new grafted adenium is constantly evolving and becoming more and more valued in the floriculture markets Wannakrairoj (2008). Hence, this research aimed to evaluate adenium genotypes suited to the specific Prayagraj agro-climatic conditions to maximize cultivation results.

Methods and Material

The present study was carried out in naturally ventilated polyhouse, Department of Horticulture, Sam Higginbottom University of Agriculture, Technology and Sciences, Prayagraj, during September 2023-July 2024. There were total number of 10 genotypes viz. R12, R19, R59, R76, R111, R116, R141, R142, R151 and R160 consisting of total number of 120 plants. The experiment was conducted in Completely Randomized Block Design (CRD) with three replications. One-year older grafted adenium genotypes were procured from Mondal Nursery, Kolkata, West Bengal. Prior to planting, plants were treated with 0.2% fungicide solution for an hour. The genotypes were planted in 4-inch earthen pots using a 1:1:0.5:0.5:0.25:0.25 (v/v) of sand, vermicompost, gravel, horticultural charcoal, bone meal and neem cake and fungicide was incorporated into the mixture to avoid fungal attack. Soft pruning of adenium genotypes was done to prepare the plants for winter dormancy, for minimizing stress from cold winters, fungicide was applied on the cut end to prevent any fungal infections. To manage aphid infestations on adenium plants, a foliar spray of a 0.2% soap solution was applied. Intercultural practice

Hoeing and de-suckering was done without damaging graft union and root stock to improve soil aeration, enhance water retention and ensuring efficient allocation of nutrients and water to the desired shoot system. The observation was taken on vegetative parameters (plant height, SPAD value, caudex diameter, scion length and graft diameter) and flowering parameters (days taken to bud initiation, number of petals, flower diameter and self-life). The average values from the samples of each genotype in every replication were worked out and results were used to evaluate the performance of different genotypes on different growth and flowering parameters.

Results and Discussion

Vegetative Parameters

Plant height

The data on plant height of all genotypes has been mentioned in Table1. Plant height ranged between 19.3 cm to 26.5 cm. Among all the genotypes, significantly taller plants (25.7 cm) were observed in genotype G3 (R59) which was found to be at par with G2 (R19, 24.3 cm) while shorter plants (19.5 cm) were observed in genotype G9 (R151). This variation in plant height in different rosy adenium genotypes might be due to genetic makeup of the genotypes and environmental variables significantly impacting their growth potential. These kinds of results are in agreement with Dimmit *et al*. (2009) and Varella *et al*. (2015).

Table 1 : Vegetative parameters of different genotypes of rosy adeniums

Genotype	Plant height (cm)	SPAD value	Scion length (cm)	Graft diameter (cm)
G1 (R12)	22.2	56.2	10.1	1.11
G2 (R19)	25.2	45.84	12.2	1.26
G3 (R59)	26.5	53.48	15.3	1.45
G4 (R76)	19.9	46.89	8.5	1.15
G5 (R111)	21	52.38	10.3	1.43
G6 (R116)	23.5	53.61	10	1.27
G7 (R141)	23.2	52.55	10.5	1.16
G8 (R142)	21.8	49.01	12.6	1.27
G9 (R151)	19.3	42.05	9.6	1.28
G10 (R160)	20.3	53	9.1	1.31
F-test	**S**	S	**S**	**S**
$CD_{0.05}$	2.106	2.307	2.821	0.213
SE(d)±	1.002	1.098	1.343	0.101
CV (%)	5.509	2.663	15.218	9.794

SPAD value

The data on SPAD value of all the genotypes were statistically analyzed and presented in Table1. significantly higher SPAD value (56.2) was observed in G1 (R12) followed by G6 (R111, 53.6) while, lower SPAD value (42.0) was observed in genotype G9 (R151).

Variation in SPAD value of different genotypes of rosy adenium might be attributed to adaptability of different genotypes having different genetic makeup which give different response to a given environmental condition of a specific location. Genetic variations play a significant role as each genotype possesses distinct traits that affect chlorophyll content and plant health. these results are in conformity with Sindhuja *et al.* (2020) in adenium.

Scion length

The data on scion length across all genotypes show statistically significant differences. The analyzed data is presented in Table1. significantly a longer scion length (15.3 cm) was observed in G3 (R59) which was found at par with genotype G8 (R142, 12.6 cm) while shorter scion length (8.5 cm) was observed in genotype G4 (R76).

Graft diameter

The data on graft diameter of all the genotypes were recorded and significant differences were observed. The statistically analyzed data is presented in Table1. Among all the genotypes, significantly a bigger graft diameter (1.45 cm) was observed in G3 (R59) which was found to be at par with genotype G5 (R111, 1.43 cm), G9 (R151, 1.28 cm), G6 (R116, 1.27 cm), G8 (R142, 1.27 cm) and G2 (R19, 1.26 cm) while, smaller graft diameter (1.11 cm) was observed in genotype G1 (R12).

Variation in scion length and graft diameter in different genotypes of rosy adenium might be due to a complex interplay of genetic factors and environmental

conditions. These findings align with previous studies on adenium by Dimmit *et al*. (2009) and Dimmitt and Hanson (2009) who reported similar result.

Flowering Parameters

Days taken to bud initiation

The data clearly showed in Table 2. The significantly lesser number of days to bud initiation (129) was observed in G3 (R59) which was found at par with genotype G9 (R151, 130), G7 (R141, 131), G5 (R111, 132) and G4 (R76, 133) while, more days taken to bud initiation (140) was observed in genotype G1 (R12). days taken to bud initiation is closely related to lateness and earliness of the flower opening. This difference in days taken to bud initiation may be influenced by the genetic makeup of genotypes and environmental factors temperature during the growing period. These findings are supported by earlier conducted studies by Sindhuja *et al.* (2020) and Navas-López *et al.* (2019).

Flower diameter

The data on number of flower diameter given in Table 2. significantly bigger flower diameter (7.71 cm) was observed in genotype G6 (R116) which was found at par with genotype G3 (R59, 7.37 cm), G10 (R160, 7.37 cm), G9 (R151, 7.31 cm), G2 (R19, 7.25 cm), G4 (R76, 7.01 cm) and G8 (R142, 6.80 cm) while smaller flower diameter (5.59cm) was observed in genotype G7 (R141).

Variation in flower diameter in different genotypes of adenium might be due to genetic diversity and wide range in nature of growth studies by Hastuti *et al*. (2009), Verella et al. (2015), Singh *et al*. (2017), Singh *et al*. (2019), Sindhuja *et al.* (2020), and Singh *et al*. (2023) in adenium. Difference in flower size have been earlier reported in various ornamental pot plants like chrysanthemum (Mohapatra *et al*., 2000 and Bala 2015), rose Shahrin *et al*. (2015) and Orchids Sugapriya *et al*. (2012).

Self-life

The data of self-life of flowers in all the genotypes were recorded and mentioned in Table 2. That significantly longer self-life (15.0 days) was observed in genotype G3 (R59) followed by G10 (R160, 13.5 days), while shorter self-life (9.8 days) was observed in genotype G9 (R151).

Difference in self-life of flowers in different genotypes of adenium might be due to both genetic and environmental factors. When various genotypes are grown under identical conditions with uniform management practices, differences in flower longevity indicate genetic diversity among the genotypes. Parallel observations have also been earlier recorded by Varella *et al*. (2015), Singh *et al.* (2017) in adenium.

Conclusion

It is concluded from the present research that the 10 different adenium hybrids under study showed significant difference in all seven parameters observed. The genotype G3 (R59) reported significantly better performance in parameters like plant height, scion length, graft diameter, days taken to bud initiation and self-life followed by G2 (R19) in following parameters plant height, graft diameter and flower diameter under Prayagraj agro-climatic conditions.

Table 2 : Flowering parameters of different genotypes of rosy adeniums

Genotype	Days taken to bud initiation	Petals per flower	Flower diameter (cm)	SELF LIFE (days)
G1 (R12)	140	15	5.95	10.9
G2 (R19)	134	15	7.25	11.9
G3 (R59)	129	10	7.37	15
G4 (R76)	133	10	7.01	12
G5 (R111)	132	15	5.86	13.2
G6 (R116)	140	15	7.71	12.1
G7 (R141)	131	5	5.59	11.6
G8 (R142)	134	15	6.8	11.5
G9 (R151)	130	15	7.31	9.8
G10 (R160)	137	15	7.37	13.5
F-test	**S**	**-**	**S**	**S**
$CD_{0.05}$	5.249	-	1.053	0.515
SE(d)±	2.499	-	0.501	0.245
CV (%)	2.283	-	8.998	2.471

References

Bala, M. (2015). Evaluation of Chrysanthemum (*Chrysanthemum morifolium Ramat*.) Genotypes for Morphological Traits. *Journal of Horticulture Science*, **10**(2): 242-244.

Chavan, S, Singh A, Bhandari A.J and Patel B.N. (2016) Management of potted adeniums. *Floriculture Today*. **21**(2):10-13.

Colombo, R.C., Favetta, V., Silva, M.A.A.E. and Faria, R.T.D. (2018). Substrates and irrigation levels for growing desert rose in pots. *Ciênciae Agrotecnologia*, **42**(1): 69-79.

Dimmit, M.A. and Hanson, C. (2009). The genus adenium in cultivation (*A. obesum* and multiflorum). *Cactus and Succulent Journal*, **63**(5): 223-225.

Dimmitt, M., Joseph, G. and Palzkill, D. (2009). Adenium: Sculptural elegance, floral extravagance. Scathingly Brilliant Idea. Tucson, AZ.

Hastuti, D.W.I., Suranto, S. and Setyono, P. (2009). Variation of morphology, karyotype and protein band pattern of adenium (*Adenium obesum*) varieties. *Nusantara Bioscience*, **1**(2): 78-83.

Kalpana and Fatmi, U. (2021). Evaluation of different adenium hybrids in shadenet under Prayagraj agro-climatic conditions. *Journal of Pharmacognosy and Phytochemistry*, **10**(1): 1926-1927.

Mamilla, S., Singh, A., Kapadia, C., Bhandari, A. and Patel, A. (2020). Evaluation of Adenium genotypes for physio-chemical and flowering characters. *International Journal of Chemical Studies*, **8**(4): 3840-3844.

Mohapatra, A., Arora, J.S. and Sidhu, G.S. (2000). Evaluation of chrysanthemum varieties for pot culture. *Journal of Ornamental Horticulture*, **3**(2): 79-82.

Navas-López, J. F., León, L., Rapoport, H. F., Moreno-Alías, I., Lorite, I. J., & de la Rosa, R. (2019). Genotype, environment and their interaction effects on olive tree flowering phenology and flower quality. *Euphytica*, **215**: 1-3.

Paul, D., Biswas, K. and Sinha, S.K. (2015). Biological activities of *Adenium obesum* (Forssk.) Roem. & Schult.: A concise review. *Malaya Journal of Biosciences*, **2**(4): 214-220.

Shahrin, S., Roni, M.Z.K., Taufique, T., Mehraj, H. and Jamal Uddin, A.F.M. (2015). Study on flowering characteristics and categorization of rose cultivars for color, fragrance and usage. *Journal of Bioscience and Agriculture Research*, **4**(01): 20-30.

Sindhuja, M., Singh, A., Kapadiya, C., Bhandari, A.J., Shah, H.P. and Patel, A.I. (2020). Evaluation of Adenium genotypes for physio-chemical and flowering characters. *International Journal of Chemical Studies*, **8**(4): 3840-3844.

Singh, A., Bhandari, A.J., Chavan, S., Patel, N.B., Patel, A.I. and Patel, B.N. (2017). Evaluation of *Adenium obesum* for Potted Ornamental sunder Soilless Growing System. *International Journal of Current Microbiology and Applied Sciences,* **6**(12): 2141-2146

Singh, A., Chavan, S., Bhandari, A.J., Parekh, V., Shah, H.P. asindhujand Patel, B.N. (2019). New Multipetalous Variety G. Ad.1 of *Adenium obesum*. *International Journal of Current Microbiology and Applied Sciences*, **8**(07): 197–203.

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.

Sugapriya, S., Mathad, J.C., Patil, A.A., Hegde, R.V., Lingaraju, S. and Biradar, M.S. (2012). Evaluation of Dendrobium orchids for growth and yield grown under greenhouse. *Karnataka Journal of Agricultural Science*, **25**(1): 104-107.

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): 227-234.

Wannakrairoj, S. (2008). Status of ornamental plant in Thailand. *Acta Horticulturae*, **788**: 29-36.