J. Hortl. Sci.
Vol. 17(2) : 543-548, 2022

Short Communication

Diversity assessment of Nerium accessions for growth and flower yield

Rajiv G.[1]*, Jawaharlal M.[2], Allen J.J.[3] and Ganesh S.[2]
[1]Assistant professor, SRM College of Agricultural Sciences, Chengalpattu, Tamil Nadu, India
[2]Dean, SRM College of Agricultural Sciences, Chengalpattu, Tamil Nadu, India
[3]Kerala Agricultural University, Thrissur, Kerala, India
*Corresponding author Email : florirajiv91@gmail.com

ABSTRACT

Thirty nerium accessions were evaluated for growth and flower yield. Each accession had specific vegetative and flowering traits, among them ACC- 19 (Rasipuram pink double) recorded the maximum plant height (236.84 cm) and flower yield per plant (333.09g). ACC-2 (Panamarathanpatty white single) recorded the maximum number of primary branches (6.80), leaf area (33.61 cm^2), early flower bud initiation (90.47), flower bud length (3.40), number of inflorescences per plant (24.17), number of flowers per plant (10.67) were maximum in ACC- 12. Accessions 12 (Rasipuram pink single) displayed profuse blooming and long-lasting blooming characteristics, which made them an excellent choice for commercial cultivation and landscaping.

Keywords : Commercial, evaluation, flower, genotype, landscape and nerium

Nerium (*Nerium oleander* L.) is an evergreen shrub belongs to the Apocynaceae family native to Northern Africa and the Mediterranean region. Globally, it is well acclaimed as ornamental due to its abundant and long-lasting flowering habit and for its heat, salinity and drought tolerance capacity (Adome *et al.*, 2003). *Nerium oleander* L. is one of the important ornamental flowering shrubs which finds a place in all gardens. This ornamental shrub is suitable for commercial cultivation all over the tropical region. The nerium is used as loose flowers for religious purposes, garland making and worship in home and temples. In addition, they are preferred for growing as shrubs in the garden along a boundary wall to mask some areas of lawn. In recent days, nerium has great demand in landscape architecture for the beautification of home gardens, industrial gardens, public gardens, road dividers in highways, railway stations, airport surroundings and historical monuments. The ornamental plant market is extremely dynamic and demands constant novelties. To meet such needs, advances in genetic improvement programs aligned with the demands of consumers are crucial. These flowering plants exhibit considerable diversity with respect to growth habits, flower colors, shape, size and color patterns. These flowers are relatively easy to grow, begin flowering as young plants, continue to produce flowers throughout the year. The proper selection of nerium cultivars is critical for success and expected to increase yield by enhancing the number and size of flowers. Cultivars that respond well in local climatic conditions protect themselves from the depredation of insect, pest and diseases and as result, vigorous growth occurs to face the seasonal hazards. The selection of suitable cultivars depends on the purpose for which crop has to be grown (i.e.) used for loose flowers, ornamental shrubs and pot culture and also adaptability to specific growing places.

The present study was conducted at the Department of Floriculture and Landscaping, Horticultural College and Research Institute, Tamil Nadu Agricultural University, Coimbatore. The experiment was laid out in a randomized block design with two replications and thirty genotypes as treatments. Five plants from each genotype for each replication were randomly selected for recording observation on growth, flowering and flower yield parameters. The variability among nerium accessions is presented in Fig.1. The data collected under field experiment in randomized block design subjected to analysis of variance (ANOVA) using AGRES 3.01 and AGDATA software. The mean values of the treatments were compared using LSD at 5 per cent level of significance.

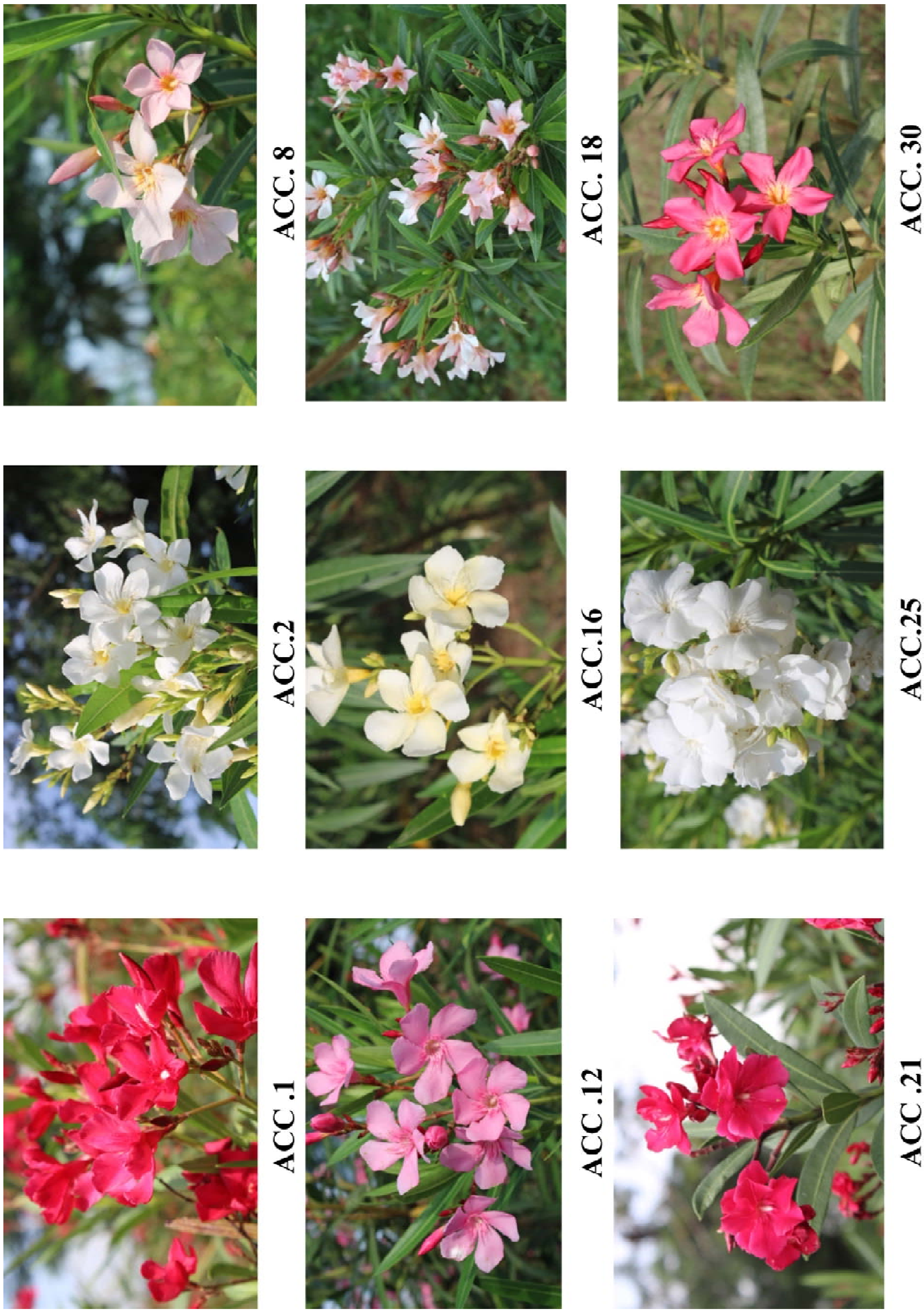

Fig. 1 : Diversity in flower colour of different nerium accessions

The vegetative growth was measured in terms of plant height (cm), number of primary branches, leaf length (cm), plant spread and leaf area (cm^2). Significant differences were observed in plant height during crop growth of nerium accessions at 12th month after planting. The plant height ranged between 74.63 to 236.84 cm. Acc.19 recorded the maximum plant height of about 236.84 cm and it was on par with Acc.20 (234.67 cm) and minimum plant height (74.63 cm) was recorded in Acc.18. The variation in plant height among the accessions could be due to genetically controlled factors, which varies among the genotypes as well as influenced by the growing environmental conditions. This result was in accordance with Sharova *et al*. (1977) and further reported that the increased plant height in certain accessions might be associated with the rapid meristematic activity, probably due to rapid cell division and elongation during the growth period. Similar variation in plant height among cultivars was also observed in Nerium (Rajiv *et al*., 2018), Crossandra (Bhosale *et al*., 2018; Priyanka *et al*., 2017) .With respect to the number of branches per plant, Acc.2 recorded a maximum number of primary branches (6.80) which was on par with Acc.3 (6.58 Nos.). Whereas, Acc.18 recorded the minimum number of primary branches (3.65). Increased number of branches leads to the production of more leaves which in turn enhances the yield of flowers by increasing the source and sink relationship. A similar trend was noticed by Chowdhuri *et al.* (2016) in different China aster genotypes, Gupta *et al.* (2015) in Dahlia; Ramachandrudu and Thangam (2010) in Crossandra. Among the accessions highest leaf length was recorded in Acc.9 (27.80 cm) followed by Acc.11 (24.79 cm). The lowest leaf length was registered in Acc.18 (8.89 cm). The highest leaf area was observed in Acc.12 (33.61 cm^2) which was on par with Acc.16 (33.39cm^2). The lowest leaf area was observed in Acc.18 (9.38 cm^2). The differences in the length and leaf area might be due to the genetic influences of the genotypes and this variability may be associated with adaptability to the climatic conditions (Costa *et al*., 2009). Similar observations were made by Pal *et al*. (2018) in Balsam, Priyanka *et al.* (2017) in crossandra and in hibiscus (Seeruttun and Ranghoo-Sanmukhiya, 2013). Significant results were obtained for plant spread in different nerium accessions. Acc.3 recorded maximum plant spread 152.18 cm (N-S) and 156.77 cm (E-W) which was on par with the Acc.12 (151.36 cm and 153.66 cm) and the minimum plant spread was recorded with Acc.18 (76.28 cm and 79.47 cm). An increase in plant spread might be due to the production of more number of branches and by the genetic nature of the plant. Variation in plant spread is due to additive gene effects (Vidalie *et al*., 1985). The data related to flowering and flower yield parameters of different Nerium accessions are presented in (Table.1). The number of days taken for flower initiation varied significantly among the accessions. The earliest flower buds appeared in Acc.12 (90.47 days), while Acc.24 recorded the maximum number of 115.75 days. The difference in flower initiation indicated that supplementary dry matter accumulation during favorable climatic conditions might be the reason for earliness. Similar results were obtained in china aster (Rai and Chaudhary, 2016) and chrysanthemum (Srilatha *et al*., 2015).

Significant differences were observed in flower weight, the maximum flower weight (0.94 g) was recorded by Acc.20 which was statistically on par with Acc.19 (0.90 g) and the minimum flower weight (0.15 g) was recorded in Acc.18. The variation in flower weight might be primarily determined by the size of the flower head and number of whorls of the variety, which may be influenced by the inherent characteristics of the particular cultivar and the environment. Similar variation was also observed in China aster (Rai and Chaudhary, 2016) and Chrysanthemum (Talukdar *et al.,* 2003) With respect to flower diameter, the Acc.20 recorded maximum flower diameter (5.15 cm) followed by Acc.19 (5.13 cm). The minimum flower diameter was recorded in Acc.18 (2.49 cm). With regard to flower bud length, it was observed that Acc.12 (3.40 cm) recorded maximum flower bud length, which was statiscally on par with Acc.14 (3.34 cm) and Acc.28 (3.30 cm). Minimum flower bud length was recorded by Acc.18 (2.62 cm). Number of inflorescences per plant and number of flowers per inflorescence varied significantly among the accessions which directly influenced the yield of the plant. The number of inflorescences per plant ranged from 7.17 to 24.17. The highest number of inflorescence (24.17 Nos.) was recorded in Acc.12 followed by Acc.3 (24.04) and Acc.14 (23.0 Nos.), while the lowest number of inflorescences per plant was recorded in Acc.24 (5.34). Number of flowers per inflorescence ranged from 3.87 to 10.67. The highest number of

Table 1 : Evaluation of nerium accessions for flowering parameters

Accession No.	Days taken for flower initation (days)	Single flower weight (g)	Flower diameter (cm)	Flower bud length (cm)	Number of inflore-scences per plant	Number of flowers per inflore-scences	Yield (g/Plant)
Acc. 1	100.82	0.27	4.79	3.08	16.73	9.58	197.33
Acc. 2	96.17	0.24	4.86	3.08	18.12	8.89	183.75
Acc. 3	97.53	0.27	4.80	3.29	24.04	10.09	262.52
Acc. 4	109.89	0.30	4.89	3.20	11.17	9.51	151.57
Acc. 5	97.28	0.24	4.03	2.88	14.67	10.67	171.02
Acc. 6	94.37	0.27	4.97	3.38	10.83	8.83	140.63
Acc. 7	114.08	0.24	4.62	3.12	14.67	9.00	172.17
Acc. 8	107.83	0.21	4.86	3.26	11.83	8.50	120.89
Acc. 9	113.98	0.25	4.91	3.20	12.17	8.83	135.47
Acc. 10	104.73	0.27	4.46	3.12	14.67	9.35	136.05
Acc. 11	113.58	0.23	4.39	3.14	13.50	9.89	172.61
Acc. 12	90.47	0.29	4.80	3.40	24.17	10.67	265.37
Acc. 13	98.10	0.23	4.84	3.26	10.00	7.51	115.65
Acc. 14	93.87	0.27	4.74	3.34	23.00	10.00	258.33
Acc. 15	98.89	0.23	4.60	3.26	9.33	8.33	126.23
Acc. 16	109.09	0.24	4.13	3.26	12.00	8.00	127.87
Acc. 17	120.12	0.23	4.42	3.06	9.83	7.67	134.03
Acc. 18	91.14	0.15	2.49	2.62	8.13	6.30	98.87
Acc. 19	100.63	0.90	5.13	3.00	18.83	4.83	333.09
Acc. 20	101.41	0.94	5.15	2.96	17.98	4.67	329.49
Acc. 21	104.37	0.67	4.26	2.94	15.42	4.33	281.29
Acc. 22	103.65	0.24	4.84	3.18	12.51	9.67	148.01
Acc. 23	95.82	0.27	4.59	3.24	14.67	8.67	160.12
Acc. 24	115.75	0.67	4.56	2.92	9.17	4.33	191.02
Acc. 25	120.89	0.57	4.17	2.90	11.93	4.83	209.45
Acc. 26	104.13	0.24	4.79	3.14	12.00	9.33	136.81
Acc. 27	119.82	0.50	4.20	2.85	11.31	3.85	193.33
Acc. 28	92.00	0.29	4.99	3.30	14.67	9.17	216.18
Acc. 29	106.79	0.70	5.08	2.88	10.17	4.17	290.45
Acc. 30	98.37	0.25	4.87	3.00	9.35	8.90	156.78
Mean	103.85	0.36	4.61	3.11	13.90	7.95	187.21
SE(D)	4.37	0.02	0.18	0.13	0.60	0.35	7.83
CD (p=0.05)	12.66	0.05	0.52	0.36	1.74	1.02	22.71
CV (%)	5.95	6.74	5.54	5.71	6.12	6.24	5.92

flowers per inflorescence (10.67) was recorded in Acc.5 and Acc.12 followed by Acc.3 (10.09). Acc.27 (3.85) recorded the lowest number of flowers per inflorescence. Number of inflorescences per plant and number of flowers per inflorescence, this might be due to the transport of photosynthetic assimilates to the developing floral buds which might be triggered by the amount of endogenous growth regulators in the flower (Halevy, 1987). Variations in the number of flowers per plant are related to recurrent blooming habit due to their genetic makeup (Manjula, 2005). The variation in the number of flowers may be due to the genetic nature of the cultivar and also the effect of agro-climatic conditions. The varietal differences for yield potential may also be due to attributed additive gene effect. This was in accordance with the findings of Prashanta *et al.* (2016) in tuberose and Ramachandrudu and Thangam, (2010) in crossandra. Flower yield per plant per year showed significant differences among the Nerium accessions. The highest flower yield was recorded by Acc.19 (333.09 g) followed by Acc. 20 (329.49g) and the lowest flower yield per plant per year were recorded by Acc.18 (98.87 g). The variation among the accessions with respect to flower yield might be due to increased flower size with a number of whorls in nerium. Further, being a genetic factor, variations were expected among the accessions of nerium. The higher yield might be due to increased morphological parameters *viz.,* plant height, more branches and leaf area which attributes in production of more photosynthates resulting in greater accumulation of dry matter which in turn leads to the production of more flowers per plant. Similar results were observed in crossandra (Ramachandrudu and Thangam, 2010), Priyanka *et al.* (2017), Rose (Shahrin *et al.*, 2015) and China aster (Tirakannanavar *et al.*, 2015).

REFERENCES

Adome, R.O., Gachihi, J.W., Onegi, B., Tamale, J. and Apio, S.O., 2003. The cardiotonic effect of the crude ethanolic extract of Nerium oleander in the isolated guinea pig hearts. *Afr. health sci.*, **3**(2): 77-82.

Bhosale, P.B., Kadam, M.B., Katwate, S.M., & Pawar, B.G. 2018. Evaluation of different genotypes of crossandra. *Int. J. Appl. Res.*, **4**(3): 204-206

Chowdhuri, T., Rout, B., Sadhukhan, R., & Mondal, T. 2016. Performance evaluation of different varieties of china aster (*Callistephus chinensis* L. Ness) in sub-tropical belt of West Bengal. *Int. J. Pharm. Sci. Invent.,* **5**(8): 15-18.

Costa, A.S., Loges, V., Castro, A.C.R., Guimaraes, W.N.R.,and Nogueira, L.C. 2009. Heliconia genotypes under partial shade: I. shooting and blooming. *Acta Horti.*, **813:** 609-614.

Halevy, A. H. 1987. Assimilate allocation and flower development In J. G. E. Atherton (Ed.), Manipulation of flowering. London, Butterworths pp. 363-378.

Manjula, G. 2005. Performance of rose cultivars under naturally ventilated polyhouse. (MSc. Thesis), UAS, Dharwad.

Prashanta, M., Parul, P., and Guy, A. 2016. Evaluation of tuberose genotypes for vegetative, floral and bulb yielding attributes under the valley conditions of Garhwal Himalayas. *Int. J. Agri. Sci.*, **8**(62): 3522-3524.

Priyanka, Kamble B.S., Anuradha R.W., Naveenakumar and Am, S. 2017. Evaluation of different crossandra genotypes under Ghataprabha command area. *J. Pharmacogn. Phytochem.*, **6**(6): 252-254.

Rai, T. and Chaudhary, S. 2016. Evaluation of China aster (*Callistephus chinensis* Nees) cultivars under mid-hill conditions of Himachal Pradesh. *The Bioscan*, **11**(4): 2367-2370.

Rajiv, G., Jawaharlal, M., Subramanian, S., Sudhakar, D., Uma, D. 2018. Studies on morphological characteristics and categorization of nerium accessions based on utility. *Electronic J. Plant Breed.*, **9**(3): 1100 -1106.

Ramachandrudu, K., and Thangam, M. (2010). Characterization and evaluation of local germplasm of crossandra (*Crossandra undulaefolia* Salisb.). *J. Ornam. Hortic.*, **13**(2): 138-141.

Seeruttun, B., and Ranghoo-Sanmukhiya, V. (2013). Molecular characterisation of some *Hibiscus* species cultivated in Mauritius. Int. J. *Life Sci. Biotechnol. Pharma Res.,* **2**(3): 358-366.

Sharova, N.L., Rybak, Y.G. and Marins, W.E., 1977. Development of gladiolus under the influence of micronutrients. *Kishinev, Moldavian SSR, Stiinca*, pp.11-17.

Srilatha, V., Kumar, K. S., and Kiran, Y. D. 2015. Evaluation of chrysanthemum (*Dendranthema grandiflora* Tzvelev) varieties in southern zone of Andhra Pradesh. *Agric. Sci. Digest-A Res. J.*, **35**(2): 155-157.

Pal,S., Singh, A.K., Sisodia,A., Pal A.K., and Tiwari, A. 2018. Evaluation of double whorled balsam (*Impatiens balsamina* L.) genotypes for growth, flowering and seed attributes. *J. Pharmacogn. Phytochem.*, **7**(2): 2901-2904

Talukdar, M. C., Mahanta, S., Sharma, B., and Das, S. 2003. Extent of genetic variation for growth and floral characters in chrysanthemum cultivars under Assam condition. *J.Ornam. Hortic.,* **6**(3): 207-211.

Tirakannanavar, S., Katagi, A., Jagadeesha, R., and Halesh, G. 2015. Studies on genotypic evaluation and correlation studies in China aster (*Callistephus chinensis* (L.) Nees). *Indian Res. J. Genet. Biotech/,* **7**(2): 179-186.

Vidalie, HL., Rivera, LM., and Charperiter, S. 1985. First result of performance of gerbera cultivated on rock wool. *Revue Horticoley*, **262:**13-18.

(Received : 14.06.2021; Revised : 21.04.2022; Accepted : 10.06.2022)