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Performance of Alstroemeria (*Alstroemeria aurea* L.) Genotypes for Flowering, Flower Quality and Yield Attributing Characters under Hill Zone of Karnataka

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ABSTRACT: An experiment entitled "Performance of *Alstroemeria aurea* L. for Flowering, Flower quality and Yield attributing characters under polyhouse condition" was conducted at the College of Horticulture, Mudigere, 2023-24. The experiment consisted of 12 genotypes *viz.*, Capri, Piantum, Riana, Pluto, Pink Panther, Ooty Collection-1, Ooty Collection-2, Ooty Collection-3, Ooty Collection-4, Darjeeling Collection-1, Darjeeling Collection-2 and Darjeeling Collection-3, which were replicated thrice in a Randomized complete block design (RCBD). The results revealed that the genotype Ooty Collection -3 recorded minimum days for flower bud initiation (70.07) and maximum bud diameter (11.78 mm), the genotype Capri took minimum days for first floret opening (11.20), flower stalk harvesting (88.20) and showed maximum bud length (4.75 cm), the genotype Pluto recorded maximum duration of flowering (104.20 days). The maximum stalk length was observed in the genotype Pink Panther (88.29 cm). The maximum flower length (7.15 cm), flower diameter (54.92 mm), number of flowers/spike (12.03), stalk girth (8.05 mm), stalk weight (30.40 g), number of spikes/m² (20.80) and number of spikes/1000 m² (20,280) were recorded in Ooty Collection-1. Among the genotypes under study, the best performing in order of merit are Ooty Collection -1, Ooty Collection -3, Capri and Pluto. Hence, these genotypes may be recommended for commercial cultivation under polyhouse condition.

Keywords: Alstroemeria, Alstromeriaceae, Performance, Cut flower and Genotype.

INTRODUCTION

Alstroemeria (*Alstroemeria* spp.) commonly known as the Lily of Incas or lily of Perus or Peruvian lily or red parrot beak or New Zealand Christmas bell, are lily-like flowers belonging to the flowering plant genus of the family Alstroemeriaceae. It was named in honour of Klas Van Alstroemer, who in 1754 brought rhizomes of Alstroemeria to his father Linnaeus, a plant taxonomist. It is native flower of South America. The Netherlands ranks first among the producers of Alstroemeria (Monya *et al.*, 2021).

In India, it is recently introduced as a new cut flower, its cultivation is started around Bangalore, Pune and Hyderabad. It was also introduced in Palampur, Solan, Srinagar and Ooty to popularize the crop among growers for domestic and export markets. It is gaining popularity in Indian flower market due to its long stem flowers, prolonged vase life and various colours and shades of petals, generally having lavender, maroon, white, orange, yellow, pink, red and purple colours. They are used as cut flowers or as potted or garden plants and also as filler flowers which are perfect addition to a "wildflower" arrangement (Singh and Dhyani 2015).

Alstroemerias are monocot rhizomatous perennials, consisting of sympodial fleshy and multi-stemmed rhizomes. Depending on the environmental conditions, the shoots are either reproductive or vegetative. The inflorescence is a whorled cymose. Each cyme is sympodially branched upto four florets per cyme Sankari *et al.* (2011). Alstroemeria typically produces 2 or 3 flushes of blooms in a year. This perennial plant blooms in cycles, with each flush lasting several weeks. There are several studies revealing the performance of different varieties of different crop at specific regions *viz.*, in Carnation, the variety Hillary (174.99) recorded

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maximum flower length (5.4cm) and maximum flower diameter (6.27 cm). Maximum bud length (3.17cm), bud diameter (2.23cm), flower stalk girth (21.33 mm) and maximum vase life (10.67 days) were recorded in the variety Cinderella. Minimum days taken to bud opening was in the variety Kino (15.67) discoursed by Medeo *et al.* (2019). Anand *et al.* (2024) reported that the cultivar Pink Panther recorded maximum flower diameter (6.28 cm) and Aladdin recorded maximum vase life in water (6.43 days) in Alstroemeria. The maximum number of buds per plant (16.59), number of stalks per plant (2.62), number of stalks per sq. m (41.92) and maximum number of stalks per 560 sq. m (20,960) was recorded in Echo Lavender.

There is a constant demand for new flower crops over the existing varieties. Therefore, it is essential to assess the performance of different genotypes in specific regions.

MATERIAL AND METHODS

The investigation consisted of 12 genotypes *viz.*, Capri, Piantum, Riana, Pluto, Pink Panther, Ooty Collection-1, Ooty Collection-2, Ooty Collection-3, Ooty Collection-4, Darjeeling Collection-1, Darjeeling Collection-2 and Darjeeling Collection-3 (Plate 1), which were replicated thrice in a Randomized Complete Block Design (RCBD), carried out under a naturally ventilated polyhouse at College of Horticulture, Mudigere, under Keladi Shivappa Nayaka University of Agricultural and Horticultural Sciences, Shivamogga during 2023-24. Standard cultural practices were followed throughout the crop period. The objective of this investigation was to study the performace of Alstroemeria (Alstroemeria aurea L.) genotypes for flowering, flower quality and yield attributing characters under the hill zone of Karnataka. The rooted rhizomes were transplanted onto raised beds with a spacing of 50×50 cm. Observations were recorded in each genotype for days taken for flower bud initiation, days taken for first floret opening, days taken for flower stalk harvesting, duration of flowering (days), bud length (cm), bud diameter (mm), number of flowers per spike, flower length (cm), flower diameter (mm), stalk length (cm), stalk girth (mm), stalk weight (g), vase life (days), number of spikes per plant, per square meter and per 1000 square meter.



RESULTS AND DISCUSSION

The findings were considerably interpreted and listed in Table 1-3 based on the observations recorded in the present research.

A. Mean performance of cultivars for flowering traits

All flowering traits varied significantly among the cultivars. The mean performance of 12 Alstroemeria genotypes for different flowering characters is presented in Table 1.

The genotype Ooty Collection -3 recorded minimum days to flower bud initiation (70.07), followed by Capri (76.93) and Ooty Collection -1 (82.40), whereas genotype Darjeeling Collection -3 recorded maximum days to flower bud initiation (132.73). This variation might be mainly governed by genetic makeup of the genotypes. Similar variations were also reported by Rupali et al. (2018) in Chrysanthemum, Anitha et al. (2013); Ahmad et al. (2017) in Lisianthus. The genotype Capri took minimum days to flower opening (11.20), which is on par with Ooty Collection -3 (11.40) and Ooty Collection -1 (11.53), while Darjeeling Collection -3 took maximum days to flower opening recorded by the genotype (16.73). The genotype Capri recorded minimum days taken for flower stalk harvesting (88.20), followed by Ooty Collection -1 (99.20), while maximum days to flower stalk harvesting recorded by the genotype Darjeeling Collection -3 (150.40). The maximum duration of flowering was observed in the genotype Pluto (104.20), followed by Ooty Collection -1 (98.20) and Ooty Collection -4 (92.87), whereas minimum duration of flowering was recorded by the genotype Darjeeling Collection -3 (30.40). The variation in duration of flowering is represented in Fig. 1. This variation might be mainly governed by genomic constitution of the genotypes. Similar results were also reported by Bhargav et al. (2020); Ahmad et al. (2017) in Lisianthus.

B. Mean performance of cultivars for flower quality traits

All flower quality traits varied significantly among the cultivars. The mean performance of 12 Alstroemeria genotypes for different flower quality characters is presented in Table 2.

The maximum bud length in the genotype Capri (4.75 cm), which stood on par with Ooty Collection -3 (4.32 cm), whereas minimum bud length in the genotype Piantum (2.69 cm). The variation might be due to the differences in the genetic makeup. Similar findings on differences in bud length were found in Singh (2006) and Kashyap *et al.* (2018) in Alstroemeria. The genotype Ooty Collection -3 (11.78 mm) recorded maximum bud diameter, followed by Capri (10.21 mm). However, the minimum bud diameter was found in Darjeeling Collection -2 (6.08 mm). The variation in bud diameter of the Alstroemeria genotypes might be due to the differences in the genetic constitution. These results are in conformity with Medeo *et al.* (2019) in Carnation.

The genotype Ooty Collection -1 (7.15 cm) recorded maximum flower length, which was on par with Pluto

(6.79 cm), Capri (6.70 cm) and Ooty Collection -3 (6.49 cm). However, the minimum flower length was recorded by Darjeeling Collection -3 (4.39 cm). The variation in the flower length might be due to the genotypic expression of the genotypes. These results are in conformity with Chandrashekar et al. (2018) in Asiatic Lily and Medeo et al. (2019) in Carnation. The maximum flower diameter was observed in the genotype Ooty Collection -1 (54.92 mm), followed by Ooty Collection -3 (51.20 mm) and Capri (47.20 mm), whereas the minimum flower diameter was recorded in the genotype Darjeeling Collection -2 (25.36 mm). The differences in the flower diameter might be due to inherent character of individual genotypes and bigger sized flowers. These results are in conformity with Medeo et al. (2019) in Carnation, Chandrashekar et al. (2018) in Asiatic lily and Roopa et al. (2018a) in Chrysanthemum. The maximum number of flowers per spike was recorded by the genotype Ooty Collection -1 (12.03), followed by Ooty Collection -3 (10.33), whereas minimum number of flowers per spike was recorded by Darjeeling Collection -2 (6.93). The variation in number of flowers might be due genetic constitution of the individual genotypes. Similar results were observed by Medeo et al. (2019) in Carnation, Ahmad et al. (2017) in Lisianthus and Rai and Rana (2019) in Alstroemeria.

The genotype Pink Panther recorded maximum stalk length (88.29 cm), followed by Ooty Collection -4 (84.00 cm) and Riana (83.87 cm). However, the minimum stalk length was recorded by Darjeeling Collection -2 (42.80 cm). The variation might be due to increase in plant height. These results are in conformity with Anand et al. (2024); Rai and Rana (2019) in Alstroemeria and Medeo et al. (2019) in Carnation. The genotype with Ooty Collection -1 (8.05 mm) recorded maximum stalk girth, which was on par with Pluto (7.98 mm) and Ooty Collection -3 (7.89 mm). However, the minimum stalk weight was recorded by Darjeeling Collection -3 (6.12 mm). The stalk girth decides the stalk strength, decreased stalk girth is due to increased stalk length. Because, plant directs more resources towards increasing stalk length, then fewer resources available to increase stalk girth. Similar results were observed by Rai and Rana (2019) in Alstroemeria, Roopa et al. (2018a) in Chrysanthemum and Medeo et al. (2019) in Carnation. The maximum stalk weight was observed in the genotype Ooty Collection -1 (30.40 g), followed by Ooty Collection -3 (27.30 g). The minimum stalk weight was observed in the genotype Darjeeling Collection -2 (15.50 g). This variation in stalk weight (Fig. 2) might mainly be due to stalk girth and less likely due to stalk length. Similar results were noticed in Singh et al. (2013) in Carnation. The maximum vase life was recorded in the genotype Pluto (7.60 days), followed by Ooty Collection -2 (6.40 days), while minimum vase life was recorded in the genotype Darjeeling Collection -3 (5.20 days). This variation among the different genotypes in vase life might be due to both stalk girth and stalk length. Similar results were noticed in Singh (2006); Anand et al. (2024) in Alstroemeria.

C. Mean performance of cultivars for yield traits

The yield traits varied significantly among the cultivars. The mean performance of 12 Alstroemeria genotypes for the yield characters is presented in Table 3.

The maximum number of spikes per plant, per m^2 and per 1000 sq. m was recorded in the genotype Ooty Collection -1 (5.07, 20.28 and 20,280 respectively), followed by Ooty Collection -3 (4.47, 17.88 and 17,880 respectively), whereas the minimum number of spikes per plant, per m^2 and per 1000 sq. m was recorded in the genotype Darjeeling Collection -2 (1.53, 6.12 and 6,120 respectively). The increase in stalk yield can be attributed to a greater number of leaves, which produces and accumulates higher amounts of photosynthetic material, ultimately resulting in increased output. Similar variation for spike yield was also observed by Medeo *et al.* (2019) in Carnation, Bhargav *et al.* (2020); Sanketh *et al.* (2023) in Stock.

Table 1: Mean	performance	of Alstroemeri	a genotypes f	or flowering traits.
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		Duration of				
Genotypes	Flower bud	First floret	Flower stalk	flowering		
	initiation	opening	harvesting	(days)		
G ₁ - Capri	76.93	11.20	88.20	78.20		
G ₂ - Piantum	113.07	12.57	127.47	64.07		
G ₃ - Riana	100.13	12.67	119.80	67.47		
G ₄ - Pluto	90.20	12.40	105.63	104.20		
G ₅ - Pink Panther	102.60	12.73	123.46	59.73		
G ₆ - Ooty Collection -1	82.40	11.53	99.20	98.20		
G ₇ - Ooty Collection -2	87.87	11.73	108.00	89.47		
G ₈ - Ooty Collection -3	70.07	11.40	106.40	75.87		
G ₉ -Ooty Collection -4	95.73	12.07	113.13	92.87		
G10 - Darjeeling Collection -1	123.87	13.60	141.00	42.40		
G ₁₁ - Darjeeling Collection -2	120.13	14.07	138.07	38.07		
G ₁₂ - Darjeeling Collection -3	132.73	16.73	150.40	30.40		
S. Em ±	0.66	0.19	1.56	1.18		
CD @ 5%	1.94	0.54	4.58	3.46		

Table 2: Mean performance of Alstroemeria genotypes with respect to flower quality traits.

Genotypes	Bud length (cm)	Bud diameter (mm)	Flower length (cm)	Flower diameter (mm)	Number of flowers per spike	Stalk length (cm)	Stalk girth (mm)	Stalk weight (g)	Vase life (days)
G ₁ - Capri	4.75	10.21	6.79	47.20	8.93	78.50	7.85	26.77	6.20
G ₂ - Piantum	2.69	7.31	5.04	29.15	8.00	63.55	6.44	18.37	5.40
G ₃ - Riana	4.07	7.75	5.51	31.70	7.23	83.87	6.88	21.27	5.60
G ₄ - Pluto	3.97	8.21	6.79	46.00	9.40	64.47	7.98	25.13	7.60
G ₅ - Pink Panther	3.25	8.75	5.22	41.12	8.80	88.29	7.24	24.60	5.60
G ₆ - Ooty Collection -1	4.15	10.59	7.15	54.92	12.03	75.51	8.05	30.40	5.90
G7 - Ooty Collection -2	3.33	9.70	6.41	34.51	8.47	78.73	7.66	20.13	6.40
G ₈ - Ooty Collection -3	4.32	11.78	6.49	51.20	10.33	79.85	7.89	27.30	6.00
G ₉ -Ooty Collection -4	3.01	7.62	5.87	43.80	7.47	84.00	7.89	25.97	5.60
G ₁₀ - Darjeeling Collection -1	2.97	6.97	5.42	29.49	7.00	61.67	6.53	19.23	5.90
G ₁₁ - Darjeeling Collection -2	2.91	6.08	5.35	25.36	6.93	42.80	6.26	15.50	5.40
G ₁₂ - Darjeeling Collection -3	2.91	6.21	4.39	27.79	7.03	60.77	6.12	16.40	5.20
S. Em ±	0.16	0.29	0.27	1.03	0.38	1.11	0.09	0.35	0.06
CD @ 5%	0.48	0.86	0.78	3.04	1.13	3.26	0.26	1.02	0.18

Table 3: Performance of Alstroemeria genotypes with respect to yield characters.

Constance	Number of spikes per			
Genotypes	plant	m ²	1000 m ²	
G ₁ - Capri	4.13	16.52	16520.00	
G ₂ - Piantum	1.73	6.92	6920.00	
G ₃ - Riana	2.00	8.00	8000.00	
G ₄ - Pluto	3.47	13.88	13880.00	
G ₅ - Pink Panther	2.07	8.28	8280.00	
G ₆ - Ooty Collection -1	5.07	20.28	20280.00	
G ₇ - Ooty Collection -2	2.67	10.68	10680.00	
G ₈ - Ooty Collection -3	4.47	17.88	17880.00	
G ₉ -Ooty Collection -4	2.40	9.60	9600.00	
G ₁₀ - Darjeeling Collection -1	1.87	7.48	7480.00	
G ₁₁ - Darjeeling Collection -2	1.53	6.12	6120.00	
G ₁₂ - Darjeeling Collection -3	1.67	6.68	6680.00	
S. Em ±	0.15	0.18	164.21	
CD @ 5%	0.43	0.53	481.61	



Fig. 1. The variation in stalk weight(g) and stalk length (cm) of 12 Alstroemeria genotypes under study.



Fig. 2. The variation in duration of flowering (days) of 12 Alstroemeria genotypes under study.

CONCLUSIONS

The results of the experiment clearly confirmed that, the genotype Ooty Collection -1, followed by Ooty Collection -3, Capri and Pluto found to be superior with regard to most of the traits such as flowering, flower quality and yield parameters. Hence, these genotypes may be recommended for commercial cultivation under polyhouse condition.

FUTURE SCOPE

The promising genotypes might be utilized in the crop improvement programme. More genotypes may be added to know the extended variability of Alstroemeria. Characterization of Alstroemeria through molecular markers.

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REFERENCES

- Anand, M., Sankari, A., Velmurugan, M. and Kayalvizhi, K. (2024). Evaluation of Alstroemeria varieties for cut flower production. *International Journal of Research in Agronomy*, 7(5), 17-19.
- Anitha, K., Selvaraj, N., Jawaharlal, M. and Jegadeeswari, V. (2013). Studies on genetic variability, heritability and genetic advance in Lisianthus (*Eustoma* grandiflorum). Journal of Ornamental Horticulture, 16(3 and 4), 133-137.
- Bhargav, L., Singh, D. and Fatmi, U. (2020). Varietal Evaluation of Lisianthus (*Eustoma grandiflorum*)

under Naturally Ventilated Polyhouse Conditions in Prayagraj. International Journal of Current Microbiology and Applied Sciences, 9(12), 16-18.

- Chandrashekar, S. Y., Naik, H. B., Kulkarni, B. S. and Jagadeesha, R. C. (2018). Characterization of Asiatic lily genotypes for flowering and quality parameters under protected cultivation. *International Journal of Current Microbiology and Applied Sciences*, 7(9), 75-81.
- Kashyap, B., Dhiman, S. R., Sharma, P., Gupta, Y. C. and Sharma, M. (2018). Evaluation of different genotypes of Peruvian lily (*Alstroemeria hybrida* L.) under Nauni, Solan, Himachal Pradesh conditions. *International Journal of Farming and Allied Sciences*, 8(3), 17-21.
- Medeo, K., Fatmi, U. and Singh, D. (2019). Varietal evaluation of Carnation (*Dianthus caryophyllus* L.) under naturally ventilated polyhouse. *International Journal of Chemical Studies*, 7(5), 2235-2239.
- Monya, M., Ariina, M. M., Pertin, M., Anna, Y. and Lohe, V. (2021). Enhancing vase life of Alstroemeria through various treatments. *Just agriculture*, 2(2), 2582-8223.
- Rai, S. and Rana, M. (2019). Comparative Evaluation of Growth and Flowering Characteristics of Alstroemeria Varieties under Sikkim Condition. *International Journal of Current Microbiology and Applied Sciences*, 8(08), 929-933.
- Roopa, S., Chandrashekar, S.Y., Shivaprasad, M., Hanumantharaya, L. and Kumar, H. (2018a). Evaluation of Chrysanthemum genotypes for floral quality traits under Hill zone of Karnataka, India. *International Journal of Current Microbiology and Applied Sciences*, 7(8), 1874 -1879.

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- Rupali, S., Kumar, R. and Dahiya, D. S. (2018). Studies on the performance of Lilium varieties under polyhouse. *Journal of Pharmacognosy and Phytochemistry*, 7(4), 2711-2713.
- Sankari, A. M., Anand, S., Nagalakshmi. andArulmozhiyan, R. (2011). Alstroemeria. *Rashtriya Krishi*, 6(2), 6-8.
- Sanketh, M. R., Hemla naik, B., Chandrashekar, S. Y., Kanthraj, Y. and Ganapati, M. (2023). characterization of different Stock (*Matthiola incana* L.) Genotypes for Growth, Flowering and Yield Traits under the Hill Zone of Karnataka, *Biological Forum– An International Journal*, 15(10), 132-136.
- Singh, M. K. (2006). Performance of Alstroemeria cultivars Under Polyhouse Conditions at Palampur. International Journal of Horticulture, 63(2), 195-198.
- Singh, D. K., Balraj, S., Shailja, P. and Deepak, R. (2013). Evaluation of Carnation (*Dianthus caryophyllus* L.) varieties under naturally ventilated greenhouse in mid hills of Kumaon Himalaya. African Journal of Agricultural research, 8(9), 4111-4114.
- Singh, M. and Dhyani, D. (2015). Growing Alstroemeria in the foothills of Himalaya, Institute of Himalayan Bioresource Technology, Palampur.

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