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CORRELATION AND PATH COEFFICIENT ANALYSIS FOR GROWTH, FLOWERING, FLOWER QUALITY AND YIELD TRAITS OF ALSTROEMERIA GENOTYPES

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ABSTRACT

The path analysis and correlation in twelve distinct Alstroemeria 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, were studied during the academic year 2023-2024 at the department of Floriculture and Landscaping, College of Horticulture, Mudigere. The correlation studies revealed that the number of leaves per plant (0.878), leaf length (0.765), leaf width (0.785), leaf area (0.914), number of flowers per spike (0.907), flower diameter (0.876) and stalk weight (0.889) showed significantly high positive correlation with number of spikes per square meter. It showed significantly high negative correlation with days taken for flower bud initiation (-0.774). Path analysis for spike yield per m^2 showed that plant height (0.523), stalk length (0.328), leaf area (0.982), number of flowers per spike (0.971), number of leaves (0.182), leaf width (0.059), flower diameter (0.037) and stalk weight (0.118) have positive direct effect. This suggests the potential for enhancing spike yield by directly selecting these traits. Consequently, more focus is placed on these characteristics when choosing genotypes for crop improvement.

Keywords: Alstroemeria, Genotypes, Correlation, Path analysis, Cut Flower, Spike yield per m^2

Introduction

Alstroemeria (*Alstroemeria* spp.), commonly referred to as the Lily of the Incas, Peruvian lily, red parrot beak, or New Zealand Christmas bell, is a genus of flowering plants within the Alstroemeriaceae family. This flower is named in honor of Klas Van Alstroemer, who introduced rhizomes of Alstroemeria to the renowned plant taxonomist Carl Linnaeus in 1754. It is a native species of South America. Notably, the Netherlands is the leading producer of Alstroemeria (Monya *et al.,* 2021).

In India, a new cut flower has recently been introduced, with cultivation beginning in regions such as Bangalore, Pune and Hyderabad. Efforts to promote this crop among growers for both domestic and export markets have also expanded to locations like Palampur, Solan, Srinagar and Ooty. This flower is gaining traction in the Indian floral market thanks to its long-stemmed blooms, extended vase life and a variety of petal colors, including lavender, maroon, white, orange, yellow, pink, red and purple. It is versatile, serving as cut flowers, potted plants, or garden

specimens and it also makes an excellent filler for "wildflower" arrangements (Singh and Dhyani, 2015).

Alstroemerias are perennial plants that belong to the monocot category and possess rhizomatous growth characteristics. They feature fleshy, multi-stemmed rhizomes that exhibit a sympodial structure. Depending on the surrounding environmental conditions, the shoots can be either vegetative or reproductive. The plant's inflorescence is arranged in a whorled cymose pattern, with each cyme branching sympodially to produce up to four florets (Sankari *et al.,* 2011). Alstroemeria generally yields two to three blooming cycles annually. Each flush of blooms occurs in a cyclical manner, with each cycle lasting for several weeks.

Character association, or correlation, measures the extent of the relationship between two traits. Correlation studies are valuable for understanding the associations between highly heritable traits and economically important traits, providing insights into how each trait contributes to the genetic composition of crops. Genotypic correlations specifically offer an estimate of the inherent relationships among the genes that govern two traits. This information is crucial for developing effective selection strategies. Due to the often complex interactions among various components and overall yield. Path coefficient analysis offers a clearer understanding of the influential factors. Consequently, utilizing the path analysis technique is vital, as it allows for the examination of correlation within a network of related variables (Irani *et al*., 2016).

The existence and degree of genetic diversity within a gene pool are essential prerequisites for a successful breeding program (Bhujbal *et al*., 2013). Additionally, both correlations and path coefficients serve as valuable tools for selecting desirable traits, thereby improving the quality and yield of Alstroemeria. The primary goal of a plant breeder is to develop varieties that exhibit both high quality and high yield. Consequently, it is important for breeders to understand the relationships between quality, yield and their respective components, which will enable them to make selections based on these component traits (Prasad *et al*., 2011). In light of these considerations, the current study was conducted to analyze and identify traits that have significant interrelationships with growth, flowering, quality and yield traits by utilizing correlation and path analysis, ultimately assisting breeders in enhancing Alstroemeria.

Numerous studies illustrate the correlation and path analysis of various crops across specific regions. For instance, Sanketh *et al.* (2023) examined character associations and path analysis in 11 distinct Gilly flower genotypes. Their findings indicated a significant positive correlation between plant height (0.885), leaf length (0.700), leaf area (0.670) and the number of florets per stalk (0.691) with stalk length. In contrast, negative correlations were observed for plant height (-0.782), number of leaves (-0.657), leaf length (-0.778) and leaf area (-0.874) concerning the number of days taken for stalk emergence. Path analysis demonstrated that the number of cut flowers per square meter had a strong positive direct effect with plant height (0.479), leaf area (1.001), number of florets per stalk (0.417) and stalk girth (0.448).

In another study by Namratha (2021) on 15 Lisianthus genotypes, the flower stalk yield showed a significant positive correlation with several factors: plant height (0.873), leaf area (0.655), number of leaves (0.839), number of branches (0.942), internodal length (0.705) and flower bud length (0.875). The path analysis for stalk yield per plant revealed a high positive effect from plant height (0.434), number of branches (0.107), internodal length (0.099), flower length (0.084) and individual flower weight (0.272). Similarly, Roopa *et al.* (2018b) conducted correlation and path coefficient analysis on 15 Chrysanthemum genotypes. Their results highlighted that flower yield per plant showed significant positive correlations with leaf area, flower weight, the number of primary and secondary branches per plant, flower diameter, number of leaves per plant, duration of flowering, number of flowers per plant, stem girth and plant height, at both genotypic and phenotypic levels. Additionally, at the genotypic level, flower yield per plant exhibited a strong positive direct effect with the number of primary branches per plant, internodal length and flower weight.

Material and Methods

The study involved 12 genotypes, namely 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 (as shown in Plate-1). This investigation was replicated three times using a Randomized Complete Block Design (RCBD) and was conducted inside a naturally ventilated polyhouse at the College of Horticulture, Mudigere, associated with Keladi Shivappa Nayaka University of Agricultural and Horticultural Sciences in Shivamogga during the 2023-24 academic year. Standard cultural practices were adhered to throughout the growing period. The aim of this research was to examine the correlation and path coefficient analysis related to

growth, flowering, quality and yield traits of Alstroemeria genotypes. The rooted rhizomes were transplanted into raised beds with a spacing of 50 cm × 50 cm. Observations were documented for each genotype regarding plant height (cm), number of leaves per plant, leaf length (cm), leaf width (cm), leaf area (cm²/plant), days required for flower bud initiation, number of flowers per spike, stalk length (cm), flower diameter (mm), stalk weight (g), vase life (days) and number of spikes per square meter.

Results and Discussion

The results were thoroughly analyzed and presented in Tables 1 and 2, based on the observations documented in the current study.

(A) Correlation analysis

Correlation means the association of one character with the other characters. The genotypic correlation coefficients between different characters in Alstroemeria are presented in Table 1.

(a) Growth parameters

The correlation studies revealed that the plant height exhibited highly significant positive correlation with stalk length (0.835) and significant positive correlation with leaf length (0.676), while the significant negative correlation with days taken for flower bud initiation (-0.615). Correlation with other characters were non-significant. Number of leaves per plant showed highly significant positive correlation with leaf length (0.907), leaf width (0.813), leaf area (0.996), number of flowers per spike (0.844), flower diameter (0.995), stalk weight (0.929) and number of spikes per m^2 (0.878). It showed highly significant negative correlation with days taken for flower bud initiation (-0.883). Leaf length recorded highly significant positive correlation with number of leaves per plant (0.907), leaf width (0.796), leaf area (0.861), number of flowers per spike (0.827), flower diameter (0.945), stalk weight (0.841) and number of spikes per m^2 (0.765), while significant positive correlation with plant height (0.676) and stalk length (0.632). It showed highly significant negative correlation with days taken for flower bud initiation (-0.863). Leaf width showed highly significant positive correlation with number of leaves per plant (0.813), leaf length (0.796), leaf area (0.865), number of flowers per spike (0.781), flower diameter (0.825) and number of spikes per m^2 (0.785). It showed highly significant negative correlation with days taken for flower bud initiation (-0.786). Leaf area observed highly significant positive correlation with number of leaves per plant (0.996), leaf length (0.861), leaf width (0.865), number of flowers per spike (0.876), flower diameter (0.982), stalk weight (0.915) and number of spikes per m^2 (0.914). It showed highly significant negative correlation with days taken for flower bud initiation (-0.867). Similar findings were reported by Tarannum and Naik (2014) in Carnation, Roopa *et al.* (2018b) in Chrysanthemum, Prakash *et al.* (2017) in Chrysanthemum and Sanketh *et al.* (2023) in Stock.

(b) Flowering parameters

Days taken for flower bud initiation had a high significant negative correlation with plant height (-0.615), number of leaves per plant (-0.883), leaf length (-0.863), leaf width (-0.786), leaf area (-0.867), number of florets per spike (-0.759), stalk length (-0.621), flower diameter (-0.879), stalk weight (-0.782) and number of spikes per m^2 (-0.782). The results are in consonance with Dalwai and Naik (2014).

(c) Flower quality parameters

Number of flowers per spike exhibited high significant positive correlation with number of leaves per plant (0.844), leaf length (0.827), leaf width (0.781), leaf area (0.876), flower diameter (0.894), stalk weight (0.808) and number of spikes per m^2 (0.907). It showed highly significant negative correlation with days taken for flower bud initiation (-0.759). Stalk length observed highly significant positive correlation plant height (0.835), while significant negative correlation with days taken for flower bud initiation (-0.621). Flower diameter showed highly significant positive correlation with number of leaves per plant (0.995), leaf length (0.945), leaf width (0.825), leaf area (0.982), number of flowers per spike (0.894), stalk weight (0.955) and number of spikes per m^2 (0.876). It showed highly significant negative correlation with days taken for flower bud initiation (-0.879). Stalk weight recorded highly significant positive correlation with number of leaves per plant (0.929), leaf length (0.841), leaf area (0.915), number of flowers per spike (0.808), flower diameter (0.955) and number of spikes per m^2 (0.889). It showed highly significant negative correlation with days taken for flower bud initiation (-0.782). The results agree with Dhiman *et al.* (2020) in Lisianthus and Sanketh *et al.* (2023) in Stock.

Vase life had non-significant negative correlation with days taken for flower bud initiation (-0.429) and stalk weight (-0.01), while correlation with other characters were non-significant. Similar findings were observed by Manjula and Nataraj (2016) in Dahlia.

(d) Yield parameters

Number of spikes per square meter observed highly significant positive correlation with number of

leaves per plant (0.878), leaf length (0.765), leaf width (0.785), leaf area (0.914), number of flowers per spike (0.907), flower diameter (0.876) and stalk weight (0.889). It showed highly significant negative correlation with days taken for flower bud initiation (-0.782). Tarannum and Naik (2014) in Carnation, Hebbal *et al.* (2018b) in Chrysanthemum and Dhiman *et al.* (2020) in Lisianthus.

(B) Path co-efficient analysis

(a) Growth parameters

The plant height had positive direct effect (0.523) on spikes per square meter, while indirect positive effect on number of leaves per plant (0.608), leaf width (0.038), leaf area (0.164), number of flowers/spike (0.306), stalk length (0.291) and flower diameter (0.018), while negative indirect effect on leaf length (0.494), days taken for flower bud initiation (-0.397), stalk weight (-0.263), vase life (-0.286). The results are in accordance with reports Prakash *et al.* (2017) in Chrysanthemum for plant height. The number of leaves per plant had positive direct effect (0.182) on spikes per square meter, while indirect positive effect on plant height (0.162), leaf width (0.072), leaf area (0.664), number of flowers/spike (0.272), stalk length (0.226), flower diameter (0.028) and stalk weight (0.110), while negative indirect effect on leaf length (-0.103), days taken for flower bud initiation (-0.225) and vase life (-0.510). Leaf length had negative direct effect (-0.657) on spikes per square meter, while indirect positive effect on plant height (0.253), number of leaves per plant (0.157), leaf width (0.071), leaf area (0.645), stalk length (0.242), flower diameter (0.025), stalk weight (0.099) and number of flowers per spike (0.624) Besides, it had indirect negative effect on days taken for flower bud initiation (-0.354) and vase life (-0.340). The leaf width had positive direct effect (0.059) on spikes per square meter, while indirect positive effect on plant height (0.125), number of leaves per plant (0.285), leaf area (0.651), number of flowers/spike (0.572), stalk length (0.156), flower diameter (0.031) and stalk weight (0.082), while negative indirect effect on leaf length (-0.741), days taken for flower bud initiation (-0.247) and vase life (-0.192). Leaf area showed positive direct effect (0.982) on spikes per square meter, while indirect positive effect on plant height (0.129), number of leaves per plant (0.112), leaf width (0.077), number of flowers/spike (0.622), stalk length (0.124), flower diameter (0.037) and stalk weight (0.084), while negative indirect effect on leaf length (-0.777), days taken for flower bud initiation (-0.421) and vase life (-0.053). The results are in accordance with Beeralingappa *et al.* (2016b) in Chrysanthemum for leaf area, Tarannum and Naik (2014) for leaf area and number of leaves per plant.

(b) Flowering parameters

Days taken for flower bud initiation had negative direct effect (-0.355) on spikes per square meter, while indirect positive effect on number of leaves per plant (0.397) and leaf area (0.951). Besides, it had indirect negative effect on plant height (-0.322), leaf length (-0.278), leaf width (-0.071), number of flowers per spike (-0.481), stalk length (-0.338), flower diameter (-0.033), stalk weight (-0.092) and vase life (-0.162).

(c) Flower quality parameters

The number of flowers per spike showed positive direct effect (0.971) on spikes per square meter, while indirect positive effect on plant height (0.161), leaf width (0.069), leaf area (0.895), stalk length (0.108), flower diameter (0.033) and stalk weight (0.095), while negative indirect effect on number of leaves per plant (-0.318), leaf length (-0.758), days taken for flower bud initiation (-0.194) and vase life (-0.154). Stalk length showed positive direct effect (0.328) on spikes per square meter, while indirect positive effect on plant height (0.112), number of leaves per plant (0.135), leaf area (0.504), leaf width (0.119), number of flowers per spike (0.311), flower diameter (0.051) and stalk weight (0.091). Besides, it showed indirect negative effect on leaf length (-0.765), days taken for flower bud initiation (-0.106) and vase life (-0.048). Flower diameter showed positive direct effect (0.037) on spikes per square meter, while indirect positive effect on plant height (0.157), number of leaves per plant (0.183), leaf width (0.073), leaf area (0.568), number of flowers per spike (0.589), stalk length (0.238) and stalk weight (0.021). Besides, it showed indirect negative effect on leaf length (-0.624), days taken for flower bud initiation (-0.296) and vase life (-0.069). Stalk weight showed positive direct effect (0.118) on spikes per square meter, while indirect positive effect on plant height (0.281), number of leaves per plant (0.171), leaf width (0.061), leaf area (0.004), number of flowers per spike (0.603), stalk length (0.276) and flower diameter (0.036) and vase life (0.004). Besides, it showed indirect negative effect on leaf length (-0.466) and days taken for flower bud initiation (-0.199). Vase life showed negative direct effect (-0.177) on spikes per square meter, while indirect positive effect plant height (0.219), number of leaves per plant (0.139), leaf width (-0.011), leaf area (0.016), number of flowers per spike (0.007), stalk length (0.172) and flower diameter (0.036) and stalk weight (0.011). Besides, it showed indirect negative effect on leaf length (-0.153), leaf width (-0.011), flower diameter (-0.028) and days taken for flower bud initiation (-

0.009). The results are in accordance with Suvija *et al.* (2016) in Chrysanthemum for diameter of flower, Geeta *et al.* (2014) in Gladiolus for number of flowers per spike, Manjula and Natraj (2016) in Dahlia for stalk length.

Table 1 : Genotypic correlation coefficients related to growth, flowering, quality and yield characteristics in various genotypes of Alstroemeria (*Alstroemeria aurea* L.).

	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
1	1 **	0.485	0.676*	0.431	0.438	-0.615*	0.308	0.835**	0.491	0.537	0.227	0.508
2		1 **	0.907**	0.813**	0.996**	-0.883**	0.844**	0.385	0.995**	0.929**	0.11	0.878**
3			1 **	0.796**	0.861**	-0.863**	0.827**	0.632*	0.945**	0.841**	0.37	0.765**
4				1 **	0.865**	-0.786**	0.781**	0.434	0.825**	0.691*	0.456	0.785**
5					1 **	-0.867**	0.876**	0.416	0.982**	0.915**	0.141	0.914**
6						1 **	-0.759**	-0.621*	-0.879**	-0.782**	-0.429	-0.782**
7							1 **	0.469	0.894**	0.808**	0.409	0.907**
8								1 **	0.216	0.662*	0.461	0.482
9									1 **	0.955**	0.183	0.876**
10										1 **	-0.01	0.889**
11											1 **	0.186
12												1 **

Where, * & ** indicates significant @ 5 % and 1 % level, respectively.

1. Plant height (cm)
2. Number of leaves per plant
3. Leaf length (cm)
4. Leaf width (cm)
5. Leaf area (cm^2/plant)
6. Days taken for flower bud initiation
7. Number of flowers per spike
8. Stalk length (cm)
9. Flower diameter (mm)
10. Stalk weight (g)
11. Vase life (days)
12. Number of spikes per m^2

Table 2 : Genotypic path coefficient analysis of Alstroemeria (*Alstroemeria aurea* L.) examining 12 distinct traits regarding their impact on the number of spikes per square meter, focusing on both direct and indirect effects.

	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**
1	**0.523**	0.162	0.253	0.125	0.129	-0.322	0.161	0.112	0.157	0.281	0.219
2	0.608	**0.182**	0.157	0.285	0.112	0.397	-0.318	0.135	0.183	0.171	0.139
3	-0.494	-0.103	**-0.657**	-0.741	-0.777	-0.278	-0.758	-0.765	-0.624	-0.466	-0.153
4	0.038	0.072	0.071	**0.059**	0.077	-0.071	0.069	0.119	0.073	0.061	-0.011
5	0.164	0.664	0.645	0.651	**0.982**	0.951	0.895	0.504	0.568	0.004	0.016
6	-0.397	-0.225	-0.354	-0.247	-0.421	**-0.355**	-0.194	-0.106	-0.296	-0.199	-0.009
7	0.306	0.272	0.624	0.572	0.622	-0.481	**0.971**	0.311	0.589	0.603	0.007
8	0.291	0.226	0.242	0.156	0.124	-0.338	0.108	**0.328**	0.238	0.276	0.172
9	0.018	0.028	0.025	0.031	0.037	-0.033	0.033	0.051	**0.037**	0.036	-0.028
10	-0.263	0.110	0.099	0.082	0.084	-0.092	0.095	0.091	0.021	**0.118**	0.011
11	-0.286	-0.510	-0.341	-0.192	-0.053	-0.162	-0.154	-0.048	-0.069	0.004	**-0.177**
12	0.508	0.878	0.765	0.785	0.914	-0.782	0.907	0.731	0.876	0.889	0.186
Partial R^2	0.266	0.956	-0.464	0.070	1.004	-0.199	1.013	0.003	0.033	-0.105	-0.070

Where, * & ** indicates significant @ 5 % and 1 % level, respectively.

1. Plant height (cm)
2. Number of leaves per plant
3. Leaf length (cm)
4. Leaf width (cm)
5. Leaf area (cm^2/plant)
6. Days taken for flower bud initiation
7. Number of flowers per spike
8. Stalk length (cm)
9. Flower diameter (mm)
10. Stalk weight (g)
11. Vase life (days)
12. Number of spikes per m^2

Conclusion

Research on correlation and path analysis has indicated that the traits of the number of leaves per plant, leaf width, leaf area, number of flowers per spike, flower diameter and stalk weight demonstrate a strong positive correlation and a direct positive influence on the number of spikes per square meter. This implies that spike yield can be increased by directly selecting for these characteristics. Therefore, greater emphasis should be placed on these traits when choosing genotypes for crop improvement.

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References

Beeralingappa., Kumar, H., Hegde, P. P. and Chandrashekhar, S. Y. (2016b). Correlation and path coefficient analysis for yield contributing parameters in Chrysanthemum (*Dendranthema grandiflora* Tzvelev.). *Int. J. Curr. Microbiol. App. Sci.,* **8**(7), 2564-2574.

Bhujbal, G.B., Chavan, N.G. and Mehetre, S.S. (2013). Evaluation of genetic variability heritability and Genetic advances in gladiolus (*Gladiolus grandiflorus* L.) genotypes. *The Bioscan.*, **8**(4), 1515-1520.

Dalwai, B. and Naik, H. B. (2014). Correlation studies in Carnation (*Dianthus caryophyllus* L.). *J. Hortic. Sci.,* **6**(5), 38-45.

Dhiman, M. R., Bhatia, R. D., Chander, P., Sandeep, K. and Raj, K. (2020). Evaluation of Lisianthus genotypes for growth and flowering traits. *J. Ornam. Hortic.,* **23**(1), 12-19.

Geeta, S. V., Shirol, A. M., Nishani, S., Parvati, P. and Varuna, K. J. (2014). Path coefficient analysis studies in Gladiolus. *Plant Arch*., **14**(2), 1131-1133.

Hebbal, M., Mukund, S., Mahantesha, B. N., Seetharamu, G. K., Sandhyarani, N. and Patil, B. C. (2018b). Genotypic and Phenotypic path analysis for flower yield in Chrysanthemum (*Dendranthema grandiflora* Tzvelev.). *Int. J. Curr. Microbiol. App. Sci.,* **7**(8), 4515-4521.

Irani, S. F., Arab, M., Norouzi1, M. and Lotfi, M. (2016). Genetic diversity of stock (*Matthiola incana* L.) cultivars based on cytogenetic characteristics. *Asian J. Adv. Basic Sci.,* **4**(1), 65-73.

Manjula, B. S. and Nataraj, S. K. (2016). Studies on variability, heritability and genetic advance in Dahlia (*Dahlia variabilis* L.) genotypes under hill zone of Karnataka. *Int. J. Dev. Res.,* **6**(10), 9616-9618.

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.

Namratha, G. (2021). Genetic variability studies in Lisianthus for yield and yield attributing parameters. *M.Sc. Thesis* (*Unpub.*), *Univ. Agric. Horti. Sci. Shivamogga*.

Prakash, A., Kumar, M., Sirohi, U., Singh, M. K., Malik, S., Kumar, V., Rana, A. and Maurya, O. P. (2017). Assessment of genetic variability, heritability and genetic advance in Chrysanthemum (*Dendranthema grandiflora* Tzvelev.). *HortFlora Res. Spectrum.,* **6**(3), 212-214.

Prasad, Y., Kumar, K. and Mishra, S. B. (2011). Studies on genetic parameters and inter-relationships among yield and yield contributing traits in Pigeon pea (*Cajanus cajan* L. Millsp.). *The Bioscan.*, **8**(4), 207-211.

Roopa, S., Chandrashekar, S.Y., Shivaprasad, M., Hanumantharaya, L. and Kumar, H. (2018b). Characterization of Chrysanthemum (*Dendranthema grandiflora* Tzvelev) genotypes under hill zone of Karnataka. *J. Farm Sci.,* **31**(5), 620-621.

Sankari, A. M., Anand, S., Nagalakshmi. and Arulmozhiyan, R. (2011). Alstroemeria. *Rashtriya Krishi.*, **6**(2), 6-8.

Sanketh, M. R., Hemla naik, B., Chandrashekar, S.Y., Kanthraj, Y. and Ganapati, M. (2023). Correlation and Path Analysis for quality and yield traits in Gilly flower (*Matthiola incana* L.) genotypes. *Acta Sci Agric.,* **8**(1): 9-13.

Singh, M. and Dhyani, D. (2015). Growing Alstroemeria in the foothills of Himalaya, Institute of Himalayan Bioresource Technology, Palampur.

Suvija, N. V., Kannan, M., Suresh, J. and Subesh, R. K. (2016). Evaluation of Chrysanthemum (*Chrysanthemum morifolium* Ramat.) genotypes for loose flower, cut flower and pot mums. *Int. J. Innov. Res. Adv. Stud.*, **3**(4), 100-103.

Tarannum, M. S. and Naιĸ, H. B. (2014). Performance of Carnation (*Dianthus caryophyllus* L.) genotypes for qualitative and quantitative parameters to assess genetic variability among genotypes. *Am. Int. J. Res. Appl. Nat. Sci.,* **5**(1), 96-101.