



International Journal of Research in Agronomy

E-ISSN: 2618-0618
P-ISSN: 2618-060X
© Agronomy
NAAS Rating (2026): 5.20
www.agronomyjournals.com
2026; 9(8): 538-542
Received: 14-05-2026
Accepted: 18-06-2026

Venkataramareddy EN
PG Scholar, Department of
Floriculture and Landscaping,
School of Post Graduation Studies,
Iruvakk, KSNUAHS,
Shivamogga, Karnataka, India

Chandrashekar SY
Professor and Head, Department
of Floriculture and Landscaping,
Iruvakk, KSNUAHS,
Shivamogga, Karnataka, India

Hemla Naik B
Director of Education and Senior
Professor (HAG), Department of
Horticulture, Iruvakk,
KSNUAHS, Shivamogga,
Karnataka, India

Ganapati
Professor & Head, Department of
Soil Science, College of Agricultural
Sciences, Iruvakk, Karnataka,
India

Mahiboobsa M
Assistant Professor, Department of
Genetics and Plant Breeding,
College of Agricultural Sciences,
Iruvakk, Karnataka, India

Archana B
Assistant Professor, Department of
Horticulture, College of
Agricultural Sciences, Iruvakk,
Karnataka, India

Corresponding Author:
Chandrashekar SY
Professor and Head, Department
of Floriculture and Landscaping,
Iruvakk, KSNUAHS,
Shivamogga, Karnataka, India
Mobile: +918310480588
Email: venkataramareddy@ua-hs.edu.in

Performance evaluation of cosmos (*Cosmos* spp.) genotypes for flowering and flower quality traits in the hill zone of Karnataka

**Venkataramareddy EN, Chandrashekar SY, Hemla Naik B, Ganapati,
Mahiboobsa M and Archana B**

DOI: <https://www.doi.org/10.33545/2618060X.2026.v9.i8g.6286>

Abstract

An experiment was conducted in the Experimental Block, Department of Floriculture and Landscaping, School of Post-Graduation Studies, Iruvakk under Keladi Shivappa Nayaka University of Agricultural and Horticultural Sciences, Shivamogga during 2025–26 to assess the performance of 16 *Cosmos* genotypes viz., Ladybird Scarlet, Ladybird Orange, Ladybird Yellow, Cosmic Yellow, Limara Lemon, Bright Light, Sagara Collection-1, Bagalkot Collection, Sensation, Sonata Pink, Casanova, Sagara Collection-2, Sonata White, Sonata Red Shade, Mandarin and Opus Dwarf for flowering and flower quality attributes. The experiment was laid out in a Randomized Complete Block Design (RCBD) with three replications. Significant variation was observed among the genotypes for all the characters studied. Among the genotypes, Sensation was the earliest genotype for flower bud initiation (33.13 days), flower opening (37.27 days) and 50 per cent flowering (45.33 days). Casanova produced the maximum number of flowers per plant (28.67), Sensation recorded the largest flower diameter (77.71 mm), Sagara Collection-1 had the highest average flower weight (1.41 g), while Sagara Collection-1 recorded the highest number of petals per flower (26.73). Opus dwarf exhibited the longest vase life (6.20 days) while Sagara Collection-1 recorded the maximum shelf life (65.60 hours). Based on the present study, in order of merit the genotypes Sensation, Sagara Collection-1, Sagara Collection-2 were found to be superior and suitable for landscaping.

Keywords: Cosmos., performance, genotypes, flower quality, landscaping

Introduction

Cosmos (*Cosmos* spp.) is a popular ornamental flowering plant belonging to the family Asteraceae. The name *Cosmos* is derived from the Greek word *Kosmos*, meaning beauty or ornament. Native to Mexico and Central America (Moshawih *et al.*, 2017) ^[11]. *Cosmos* is widely grown for landscaping, bedding and cut-flower purposes because of its attractive flowers, long flowering period and ease of cultivation. The two most important species are *Cosmos bipinnatus*, which bears pink, white, red and violet flowers and *Cosmos sulphureus*, which produces yellow, orange and scarlet flowers.

Cosmos grows well under warm and sunny conditions and adapts to a wide range of soils, performing best in neutral to slightly alkaline soils. It is a hardy, low-maintenance crop suitable for gardens and landscapes. This is an important ornamental flowering crop valued for its attractive blooms, extended flowering period, adaptability to diverse environmental conditions and low maintenance requirements (Paniagua *et al.*, 2015) ^[14].

The availability of diverse genotypes offers opportunities for selecting superior types with desirable growth, flowering and seed yield traits. Several studies revealing the performance of different varieties of different crop at specific agro-climatic regions viz., in China aster the variety Phule Ganesh White recorded early flower bud initiation (52.05 days), minimum days to 50 per cent flowering (61.63 days), largest flower diameter (7.00 cm), highest number of flowers per plant (48.70). Arka Poornima exhibited the longest vase life (6.00 days), whereas Phule Ganesh White recorded the highest shelf life of loose flowers (3.20 days) (Swathi *et al.*, 2023) ^[20]. In *Chrysanthemum*, Kolar Local exhibited early flowering, recording the minimum days to first flower appearance (90.59 days) and 50 per cent flowering (99.66 days), along with the longest

flowering duration (149.33 days) and crop duration (239.55 days) (Roopa *et al.*, 2018) ^[17].

Materials and Methods

The investigation was carried out using 16 Cosmos genotypes viz., Ladybird Scarlet, Ladybird Orange, Ladybird Yellow, Cosmic Yellow, Limara Lemon, Bright Light, Sagara Collection-1, Bagalkot Collection, Sensation, Sonata Pink, Casanova, Sagara Collection-2, Sonata White, Sonata Red Shade, Mandarin and Opus Dwarf (Plate 1), with three replications in a Randomized Complete Block Design (RCBD), carried out under an open-field conditions at the Experimental Block, School of Post Graduation Studies, Iruvakkki under Keladi Shivappa Nayaka University of Agricultural and Horticultural Sciences, Shivamogga during 2025-26. Standard cultural practices were followed throughout the crop period. The objective of this investigation was to assess the performance of cosmos genotypes for flowering and flower quality traits under the hill zone of Karnataka. The seedlings were transplanted onto raised beds with a spacing of 30×30 cm. Observations were recorded in each genotype for days taken for flower bud initiation, days taken for flower opening, days taken for 50% flower opening, number of flowers per plant, flower diameter (mm), Average flower weight (g), Number of petals per flower, Number of whorls per flower, disc diameter (mm), disc length (mm), petal length (cm), petal width (cm), shelf life (hours), vase life (days).

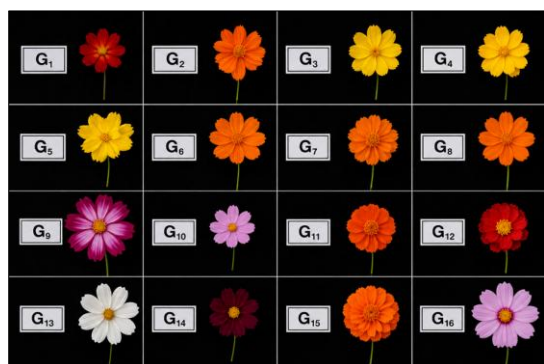


Plate 1: Pictorial Representation of Cosmos Genotypes evaluated in the study

Results and Discussion

The findings of the present investigation were interpreted and are presented in Tables 1 and 2 based on the observations recorded during the study.

A. Mean performance of genotypes for flowering traits

The analysis of variance revealed significant differences among the sixteen Cosmos genotypes for all flowering parameters, indicating the existence of substantial genetic variability. The mean performance of the genotypes for flowering traits is presented in Table 1.

The genotype Sensation recorded the minimum days taken for flower bud initiation (33.13 days), followed by Sonata Pink (38.80 days) and Limara Lemon (42.80 days), whereas Mandarin (59.13 days) and Bright Light (58.00 days) required the maximum number of days for flower bud initiation. This variation might be mainly governed by genetic makeup of the genotypes. Similar variation in flowering behaviour has been reported by Dharmendra *et al.* (2019) ^[2] and Kolar *et al.* (2022) ^[9] in China aster, Patil *et al.* (2022) and Sharma and Topno (2024) ^[18] in Chrysanthemum, Kharjana and Fatmi (2022) ^[8] in Zinnia and Jyothilaxmi (2019) ^[7] in Gaillardia. The genotype Sensation also recorded the earliest flower opening (37.27 days), followed by

Sonata Pink (43.20 days) and Bagalkot Collection (46.87 days). In contrast, Mandarin (62.27 days), Bright Light (61.73 days) and Sagara Collection-1 (61.73 days) required significantly more days for flower opening. Earliness in flower opening is mainly controlled by the genetic makeup of the genotype and is desirable for early market availability. Similar findings were reported by Dharmendra *et al.* (2019) ^[2] in China aster, Patil *et al.* (2022) in Chrysanthemum and Girange *et al.* (2017) ^[3] in Gaillardia. The minimum number of days to 50 per cent flowering was recorded in Sensation (45.33 days), followed by Sonata Pink (50.27 days) and Bagalkot Collection (50.80 days), whereas Bright Light (75.27 days) recorded the maximum days to 50 per cent flowering, followed by Sagara Collection-1 (72.07 days) and Mandarin (69.67 days). The observed variation could be due to inherent genetic differences among the genotypes and their differential response to environmental conditions. Similar results were reported by Swathi *et al.* (2023) ^[20] in China aster, Patil *et al.* (2022) in Chrysanthemum, Saniya *et al.* (2021) ^[19] in Gaillardia and Naik *et al.* (2019) ^[13] in Marigold.

B. Mean performance of genotypes for flower quality traits

Significant differences were observed among the Cosmos genotypes for all flower quality parameters studied. The mean performance is presented in Table 2.

The maximum number of flowers per plant was recorded in Casanova (28.67) followed by Sagara Collection-1 (25.13) and Sagara Collection-2 (24.93), whereas Sonata White (12.13) produced the minimum number of flowers. Higher flower production may be attributed to better vegetative growth and efficient translocation of assimilates towards reproductive organs. Similar findings were reported by Mughali *et al.* (2024) in China aster, Hosalliet *et al.* (2025) ^[5] in Chrysanthemum, Patel *et al.* (2023) ^[15] in Gaillardia and Thakur and Kaur (2023) ^[21] in Marigold.

The maximum flower diameter was observed in Sensation (77.71 mm), followed by Bright Light (69.84 mm) and Opus Dwarf (61.44 mm), whereas Sonata White (29.93 mm) recorded the minimum flower diameter. Larger flower size is mainly a varietal characteristic and depends upon petal size and expansion. Similar observations were reported by Kolar *et al.* (2022) ^[9] in China aster, Patil *et al.* (2022) in chrysanthemum, Hegde *et al.* (2022) ^[4] in dahlia and Kharjana and Fatmi (2022) ^[8] in zinnia. The highest average flower weight was recorded in Sagara Collection-1 (1.41 g) followed by Mandarin (1.02 g) and Bright Light (0.98 g), whereas Sonata Pink (0.07 g) recorded the lowest flower weight. Increased flower weight may be attributed to larger flower size and greater accumulation of dry matter. Similar results were reported by Mughali *et al.* (2024) in China aster, Hegde *et al.* (2022) ^[4] in dahlia, Arulmani *et al.* (2015) ^[11] in Gaillardia and Manukumar *et al.* (2025) ^[10] in Marigold.

The maximum number of whorls per flower was observed in Mandarin (3.20) followed by Sagara Collection-1 (3.00), whereas most other genotypes possessed one or two whorls. Likewise, Sagara Collection-1 (26.73) recorded the highest number of petals per flower, followed by Mandarin (24.60), while Sonata Pink (8.00) and Opus Dwarf (8.13) recorded the lowest values. These variations are mainly governed by the genetic constitution of individual genotypes. The longest petal length was recorded in Sensation (2.83 cm) followed by Sonata Pink (2.66 cm) and Opus Dwarf (2.55 cm), whereas Ladybird Scarlet (1.47 cm) exhibited the shortest petals. Maximum petal width was recorded in Sensation (2.52 cm) followed by Sonata Pink (1.57 cm) and Opus Dwarf (1.54 cm), while Ladybird Orange (0.91 cm) recorded the minimum width. Similar genotypic variation in floral dimensions has been reported by Roopa *et al.* (2018) ^[17] in Chrysanthemum,

Rashmi *et al.* (2016) ^[16] in *Gladiolus*, Hegde *et al.* (2022) ^[4] in *Dahlia* and Jaseena *et al.* (2024) ^[6] in *China aster*.

The maximum shelf life was observed in Sagara Collection-1 (65.60 hours) followed by Mandarin (60.80 hours) and Bright Light (59.20 h), whereas Opus Dwarf (27.20 hours) exhibited the minimum shelf life. Similarly, Opus Dwarf (6.20 days) recorded

the longest vase life, followed by Mandarin (5.67 days) and Sagara Collection-1 (5.47 days). Longer shelf and vase life may be due to slower senescence, greater carbohydrate reserves and better moisture retention. Similar observations have been reported by Roopa *et al.* (2018a) ^[17] in *Chrysanthemum*, Kolur *et al.* (2022) ^[9] in *China aster* and Hegde *et al.* (2022) ^[4] in *Dahlia*.

Table 1: Performance of *Cosmos* genotypes for flowering traits under Hill zone of Karnataka

Genotype No.	Genotypes name	Days taken for flower bud initiation	Days taken for flower opening	Days taken for 50% flowering
G ₁	Ladybird Scarlet	43.27	48.33	62.13
G ₂	Ladybird Orange	43.13	54.60	61.00
G ₃	Ladybird Yellow	44.93	56.33	60.80
G ₄	Cosmic Yellow	45.73	52.33	62.40
G ₅	Limara Lemon	42.80	47.27	61.07
G ₆	Bright Light	58.00	61.73	75.27
G ₇	Sagara Collection-1	57.53	61.73	72.07
G ₈	Bagalkot Collection	42.53	46.87	50.80
G ₉	Sensation	33.13	37.27	45.33
G ₁₀	Sonata Pink	38.80	43.20	50.27
G ₁₁	Casanova	49.47	55.80	69.80
G ₁₂	Sagara Collection-2	45.73	52.73	62.87
G ₁₃	Sonata White	44.53	52.87	60.87
G ₁₄	Sonata Red Shade	47.13	51.13	56.53
G ₁₅	Mandarin	59.13	62.27	69.67
G ₁₆	Opus Dwarf	43.20	47.47	53.53
	S. Em±	0.77	0.75	1.13
	CD@5%	2.21	2.17	3.26

Table 2: Performance of *Cosmos* genotypes with respect to flower quality traits under Hill Zone of Karnataka

Genotype No.	Genotypes name	Number of flowers per plant	Number of whorls per flower	Flower diameter (mm)	Average flower weight (g)	Disc diameter (mm)	Disc length (mm)	Number of petals per flower	Petal length (cm)	Petal width (cm)	Shelf life (hours)	Vase life (days)
G ₁	Ladybird Scarlet	13.40	2.00	43.95	0.68	11.57	0.87	13.33	1.47	0.92	54.40	3.80
G ₂	Ladybird Orange	12.80	2.00	43.25	0.61	12.44	1.13	12.80	1.50	0.91	52.00	3.13
G ₃	Ladybird Yellow	14.73	2.00	34.87	0.63	11.42	1.25	13.93	1.67	1.00	29.60	3.60
G ₄	Cosmic Yellow	22.27	2.00	44.15	0.65	12.39	0.95	15.67	1.81	1.21	41.60	2.80
G ₅	Limara Lemon	17.33	2.00	45.69	0.56	12.37	1.49	13.87	1.96	1.21	46.40	3.27
G ₆	Bright Light	20.67	2.00	69.84	0.98	15.15	1.55	13.27	2.11	1.65	59.20	4.80
G ₇	Sagara Collection-1	25.13	3.00	52.33	1.41	14.08	1.55	26.73	1.72	1.40	65.60	5.47
G ₈	Bagalkot Collection	22.53	2.00	46.28	0.03	12.34	1.54	15.20	1.84	1.33	49.60	3.33
G ₉	Sensation	17.73	1.00	77.71	0.08	15.41	1.09	8.00	2.83	2.52	33.60	5.73
G ₁₀	Sonata Pink	16.00	1.00	60.23	0.07	12.99	0.74	8.00	2.66	1.57	36.80	4.33
G ₁₁	Casanova	28.67	2.00	46.57	0.31	10.02	1.32	13.33	2.01	1.48	33.60	3.13
G ₁₂	Sagara Collection-2	24.93	1.00	49.01	0.65	14.30	1.21	12.47	1.89	1.25	32.80	3.60
G ₁₃	Sonata White	12.13	1.00	29.93	0.42	12.14	0.93	8.27	2.15	1.25	32.00	4.47
G ₁₄	Sonata Red Shade	16.13	1.00	44.47	0.37	10.18	0.76	9.40	1.62	1.43	35.20	5.33
G ₁₅	Mandarin	22.47	3.20	53.89	1.02	15.20	1.13	24.60	1.95	1.27	60.80	5.67
G ₁₆	Opus Dwarf	14.47	1.00	61.44	0.93	12.99	1.22	8.13	2.55	1.54	27.20	6.20
	S. Em±	2.23	0.03	3.92	0.12	1.08	0.09	0.86	0.20	0.18	2.41	0.21
	CD@5%	6.44	0.08	11.32	0.33	3.12	0.27	2.47	0.58	0.53	6.96	0.61

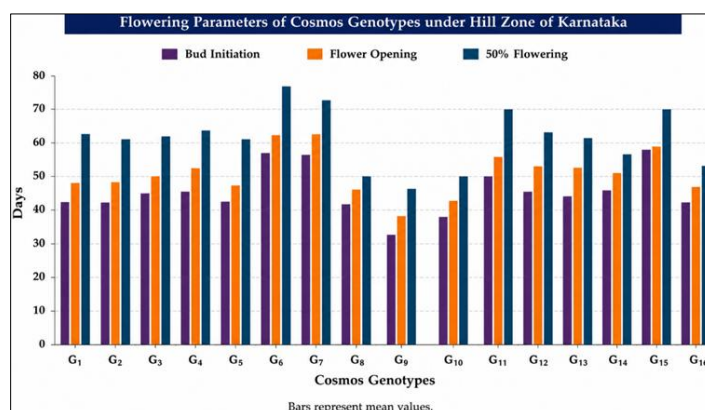


Fig 1: Performance of *Cosmos* genotypes for days taken for flower bud initiation, days taken for flower opening and days taken for 50 per cent flowering

G1:	Ladybird Scarlet	G6:	Bright Light	G11:	Casanova
G2:	Ladybird Orange	G7:	Sagara Collection-1	G12:	Sagara Collection-2
G3:	Ladybird Yellow	G8:	Bagalkot Collection	G13:	Sonata White
G4:	Cosmic Yellow	G9:	Sensation	G14:	Sonata Red Shade
G5:	Limara Lemon	G10:	Sonata Pink	G15:	Mandarin
				G16:	Opus Dwarf

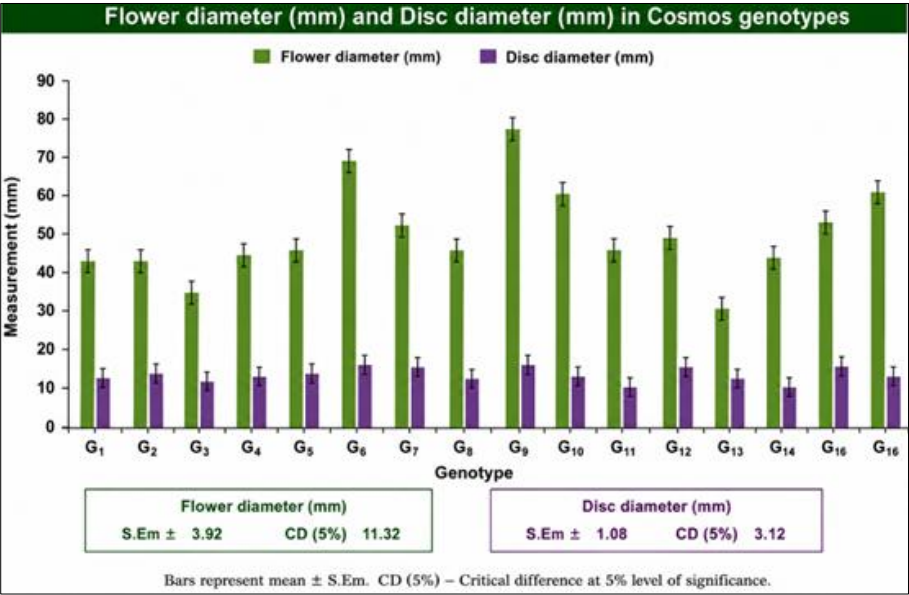


Fig 1: Performance of Cosmos genotypes for flower diameter (mm) and disc diameter percentage

G1:	Ladybird Scarlet	G6:	Bright Light	G11:	Casanova
G2:	Ladybird Orange	G7:	Sagara Collection-1	G12:	Sagara Collection-2
G3:	Ladybird Yellow	G8:	Bagalkot Collection	G13:	Sonata White
G4:	Cosmic Yellow	G9:	Sensation	G14:	Sonata Red Shade
G5:	Limara Lemon	G10:	Sonata Pink	G15:	Mandarin
				G16:	Opus Dwarf

Conclusion

The results of the experiment clearly confirmed that, the genotype Sensation was superior for flowering traits, followed by Sagara Collection-1 excelled in flower quality traits and Sagara Collection-2 found to be superior with regard to most of the flower parameters. Hence, these genotypes may be recommended for commercial cultivation were found to be superior and suitable for landscaping.

References

1. Arulmani K. Evaluation of gaillardia (*Gaillardia pulchella* Foug.) genotypes for growth, flowering and yield parameters under hill zone of Karnataka. Shivamogga, Karnataka (India): University of Agricultural and Horticultural Sciences; 2015. p. 45.

2. Dharmendra N, Kandpal K, Hugar A, Patil MG, Kulkarni V. Performance of China aster [*Callistephus chinensis* (L.) Nees] genotypes for flower quality and shelf life traits. *Journal of Pharmacognosy and Phytochemistry*. 2019;8(4):2386-2389.

3. Girange SS, Golliwar VJ, Panchbhai DM, Bhuyar SA. Evaluation of gaillardia (*Gaillardia pulchella* Foug.) genotypes for growth, flowering, yield and quality parameters. *International Journal of Chemical Studies*. 2017;5(6):2215-2218.

4. Hegde PP, Shirol AM, Kulkarni BS, Hanamashetti SI, Patil VS. Evaluation of different dahlia (*Dahlia variabilis* L.) genotypes for growth and development. *Pharma Innovation*

Journal. 2022;11(9):1806-1810.

5. Hosalli RS, Patil SR, Kulkarni BS, Kukanoor L, Gundale V. Evaluation of chrysanthemum (*Dendranthema grandiflora* Tzvelev) varieties for growth, quality and yield under Northern Dry Zone of Karnataka. *Journal of Krishi Vigyan*. 2025;13(2):332-338.

6. Jaseena P, Allen J, Markose AM, Musthafa K. Assessment of cultivars of China aster [*Callistephus chinensis* (L.) Nees] in Kerala's Northern laterite region. *International Journal of Advanced Biochemistry Research*. 2024;8(1):443-446.

7. Jyothilaxmi K. Genetic variability studies in gaillardia (*Gaillardia pulchella* Foug.) genotypes for growth, yield and quality Bagalkot, Karnataka (India): University of Horticultural Sciences; 2019. p. 115.

8. Kharjana E, Fatmi U. Performance of different varieties and hybrids of zinnia (*Zinnia elegans* L.) under Prayagraj agro-climatic conditions. *International Journal of Plant & Soil Science*. 2022;34(22):956-961.

9. Kolur SM, Hejjegar I, Patil SS. Evaluation of China aster (*Callistephus chinensis*) genotypes for cut flower production. *Biological Forum – An International Journal*. 2022;14(3):975-978.

10. Manukumar YD, Gupta P, Bhariya SK, Kumar V, Matawale T. Morphological characterization of marigold genotypes. *Plant Archives*. 2025;25(1):1379-1382.

11. Moshawih S, Cheema MS, Ahmad Z, Zakaria ZA, Hakim MN. A comprehensive review on *Cosmos caudatus* (Ulam Raja): Pharmacology, ethnopharmacology and

- phytochemistry. International Research Journal of Education and Sciences. 2017;1(1):14-31.
12. Mughali C, Sarkar I, Bellapakonda G, Dutta P. Evaluation of different China aster (*Callistephus chinensis* L. Nees) genotypes in the Terai region of West Bengal. Environment Conservation Journal. 2024;25:160-168.
 13. Naik PV, Seetarama GK, Tejaswani, Patil MG, Sadanand GK, Shivashankara KS, *et al.* Evaluation of marigold genotypes for flowering and quality parameters under Upper Krishna Project Command Area in Karnataka State. International Journal of Chemical Studies. 2019;7(4):1567-1571.
 14. Paniagua-Ibanez M, Lopez-Caamal A, Mussali-Galante P, Sanchez-Salinas E, Ortiz-Hernandez ML, Ramirez-Rodriguez R, *et al.* Morphological variation of *Cosmos bipinnatus* (Asteraceae) and its relation to abiotic variables in central Mexico. Revista Chilena de Historia Natural. 2015;88(1):14.
 15. Patel RK, Vala MB, Bhalodia AS, Vekaria LC. Evaluation of gaillardia (*Gaillardia pulchella* Foug.) genotypes and cultivars under Saurashtra region. Pharma Innovation Journal. 2023;12(5):1850-1855.
 16. Rashmi R, Reddy DCL, Chandrashekar SY, Sukanya TS. Evaluation of genetic diversity and relationships among gladiolus genotypes by using morphological traits and SRAP markers. Green Farming International Journal. 2016;7(6):1346-1351.
 17. Roopa S, Chandrashekar SY, Shivaprasad M, Hanumantharaya L, Kumar H. Evaluation of chrysanthemum (*Dendranthema grandiflora* Tzvelev) genotypes for floral and quality traits under hill zone of Karnataka, India. International Journal of Current Microbiology and Applied Sciences. 2018;7(8):1874-1879.
 18. Sharma Y, Topno SE. Performance of different varieties of chrysanthemum under Prayagraj agro-climatic conditions. International Journal of Environment and Climate Change. 2024;14(6):232-235.
 19. Saniya, Patil SR, Kumar PP, Mahesh YS. Evaluation of gaillardia (*Gaillardia pulchella* Foug.) genotypes for loose flower and garden display purpose. International Journal of Current Microbiology and Applied Sciences. 2021;10(2):3444-3453.
 20. Swathi G, Nalini N, Shankar A, Neelima TL, Kumar K. Evaluation of China aster (*Callistephus chinensis* L. Nees) cultivars for growth, yield and quality parameters under Southern Telangana zone. International Journal of Environment and Climate Change. 2023;13:444-450.
 21. Thakur T, Kaur DK. Evaluation of genotypes and correlation studies in marigold (*Tagetes* spp.) for growth and yield attributes. Environment Conservation Journal. 2023;24(1):198-203.