International Journal of Advanced Biochemistry Research

ISSN Print: 2617-4693
ISSN Online: 2617-4707
NAAS Rating (2025): 5.29
IJABR 2025; SP-9(10): 729-733
www.biochemjournal.com
Received: 13-07-2025
Accepted: 17-08-2025

Gagana DU
PG Scholar, Department of Floriculture and Landscaping, College of Horticulture, Mudigere, Keladi Shivappa Nayaka University of Agriculture and Horticultural Sciences, Shivamogga, Karnataka, India

Chandrashekar SY
Professor and Head, Department of Floriculture and Landscaping, Keladi Shivappa Nayaka University of Agriculture and Horticultural Sciences, Iruvakki, Shivamogga, Karnataka, India

Hemanthkumar P
Associate Professor Department of Floriculture and Landscaping, Subject Matter Specialist (Horticulture), Extension education unit, Madikeri, Karnataka, India

Kencharaddi RN
Associate Professor and Head, Department of Entomology, College of Forestry, Ponnampet, Karnataka, India

Jayaprakash SM
Professor, Department of Soil Science, College of Agriculture, Shivamogga, Keladi Shivappa Nayaka University of Agricultural and Horticultural Sciences, Shivamogga, Karnataka, India

Corresponding Author:
Gagana DU
PG Scholar, Department of Floriculture and Landscaping, College of Horticulture, Mudigere, Keladi Shivappa Nayaka University of Agriculture and Horticultural Sciences, Shivamogga, Karnataka, India

Anatomization of dracaena for morpho-physiological attributes under hill zone of Karnataka

Gagana DU, Chandrashekar SY, Hemanthkumar P, Kencharaddi RN and Jayaprakash SM

DOI: https://www.doi.org/10.33545/26174693.2025.v9.i10Si.5911

Abstract
An experiment entitled performance studies on dracaena for morphological attributes under hill zone of Karnataka was carried out at the experimental block of Department of Floriculture and Landscaping, College of Horticulture, Mudigere, under Keladi Shivappa Nayaka University of Agricultural and Horticultural Sciences, Shivamogga during 2024-2025. The experiment was conducted in Randomized Complete Block Design (RCBD) with thirteen treatments *viz.,* T_1 - *Dracaena reflexa*, T_2 - *Dracaena warneckii*, T_3 - *Dracaena sanderiana*, T_4 - *Dracaena marginata* "Green", T_5 - *Dracaena marginata* "Red", T_6 - *Dracaena terminalis* "Mahatma", T_7 - *Dracaena terminalis* "Green", T_8 - *Dracaena massangeana*, T_9 - *Dracaena fragrans*, T_{10} - *Dracaena surculosa* "Gold dust", T_{11} - *Dracaena terminalis* "My Darling Yellow", T_{12} - *Dracaena deremensis* "Limelight" and T_{13} - *Cordyline fruticosa*, each replicated thrice. The results revealed that *Dracaena terminalis* "Mahatma" recorded the maximum plant height (119.60 cm), plant spread in E-W (75.10 cm) and N-S (78.50 cm) directions, internodal length (4.13 cm), leaf length (46.26 cm), leaf width (9.26 cm), leaf area per plant (9798.66 cm^2), leaf area index per plant (15.66), petiole length (12.60 cm), chlorophyll a (0.99 mg/g fresh weight), chlorophyll b (0.56 mg/g fresh weight), total chlorophyll (1.55 mg/g fresh weight) and carotenoid content (0.27 mg/g fresh weight). The study indicated that *Dracaena terminalis* "Mahatma" was the most promising species for its morphological growth attributes under hill zone of Karnataka.

Keywords: Dracaena, performance, cut foliage, shelf life, vase life and hill zone

Introduction
Cut greens known as cut foliage or florist's greens are the vegetative parts of plants such as leaves and stems used for decorative purposes either alone or in association with flowers in bouquets and arrangements. These foliages are generally green in colour possess attractive form and texture along with a long-lasting freshness, which make them highly suitable as ornamental fillers. They are widely utilized in floral decorations for creating contrast background or lining thereby enhancing the overall appeal of floral arrangements.

Dracaena belongs to the family Asparagaceae and is native to tropical and subtropical regions of Africa, Asia and Australia. The genus comprises about 40 species, among which *D. deremensis*, *D. fragrans*, *D. marginata*, *D. reflexa*, *D. sanderiana*, *D. colorama* and *D. massangeana* are widely cultivated as foliage plants. These species are particularly favoured in the international market as cut foliage and as indoor ornamental plants due to their attractive shapes, diverse colours and ability to thrive under low-light conditions with minimum care (Chen *et al.,* 2002) [2]. The ornamental foliage not only adds aesthetic value but also meets the growing demand of the floriculture industry for high-quality cut greens.

Among the different cut foliage plants, Dracaena has gained immense commercial importance in the international florist greenery market due to its beautiful and varied foliage, low cost of production, year-round availability and versatile design qualities in terms of form, texture and colour (Gowthami *et al*., 2021) [4]. The foliage is highly valued for its adequate vase life, natural freshness and ability to provide an attractive appearance in flower arrangements. Along with asparagus, ferns and philodendron, dracaena is extensively used as a filler, lining and background material in bouquets and floral decorations. The leaves are usually harvested when they attain a length of about 75-85 cm ensuring uniformity and quality (Patil *et al*., 2020) [5].

Keeping the above points in view, the present investigation entitled performance studies on dracaena for its morphological attributes under shade house conditions was undertaken.

Material and methods

The experiment was carried out at the Department of Floriculture and Landscape Architecture, College of Horticulture, Mudigere (Under University of Agricultural and Horticultural Sciences, Shivamogga) during 2024-25. The experiment was laid out in Randomized Completely Block Design (RCBD) with 13 treatments and 3 replications. (T_1: *Dracaena reflexa*, T_2: *Dracaena warneckii*, T_3: *Dracaena sanderiana*, T_4: *Dracaena marginata* "Green", T_5: *Dracaena marginata* "Red", T_6: *Dracaena terminalis* "Mahatma", T_7: *Dracaena terminalis* "Green", T_8: *Dracaena massangeana*, T_9: *Dracaena fragrans*, T_{10}: *Dracaena surculosa* "Gold dust", T_{11}: *Dracaena terminalis* "My Darling yellow", T_{12}: *Dracaena deremensis* "Limelight" and T_{13}: *Cordyline fruiticosa*). The rooted cuttings of Dracaena were transplanted onto raised beds of 1 m width and convenient length at a spacing of 50 × 40 cm.

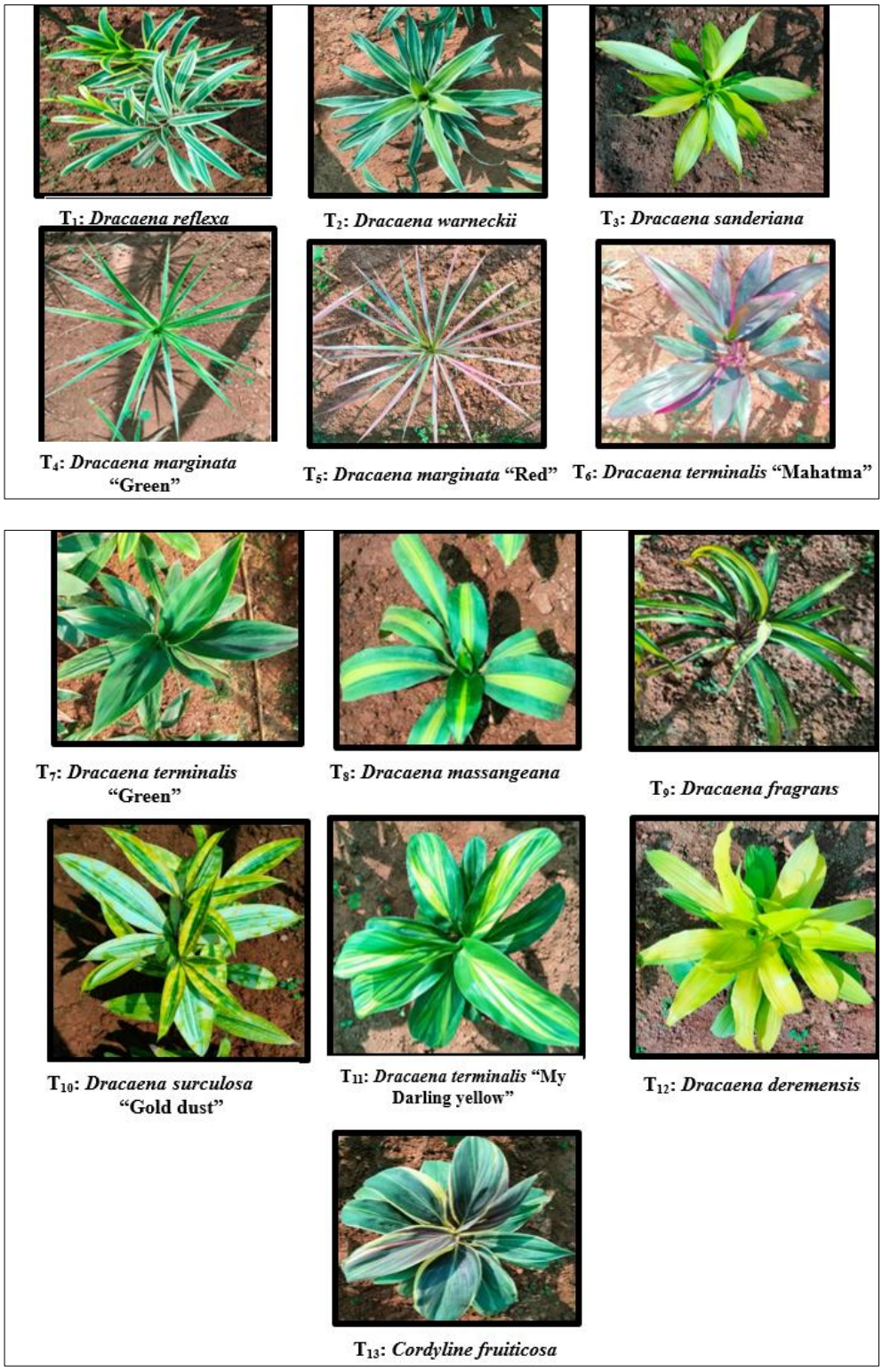

Plate 1: Close-up view of Dracaena species under study

Experimental results

Significant variations were observed among the different Dracaena species for the growth parameters (Table 1). The plant height recorded maximum in *Dracaena terminalis* "Mahatma" (119.60 cm), followed by *D. terminalis* "Green" (114.56 cm), while the minimum was observed in *D. terminalis* "My Darling yellow" (49.20 cm). The leaf length was maximum in *D. terminalis* "Mahatma" (46.26 cm), followed by *D. terminalis* "Green" (45.00 cm) whereas, the minimum was observed in *D. surculosa* "Gold dust" (28.23 cm). Leaf width was recorded maximum in *D. terminalis* "Mahatma" (11.50 cm), which was statistically comparable to *D. massangeana* (10.00 cm), while the minimum was noticed in *D. marginata* "Green" (3.30 cm). Internodal length varied from 4.28 cm in *D. terminalis* "Mahatma" to 2.43 cm in *D. marginata* "Red". Petiole length was maximum in *D. terminalis* "Mahatma" (12.60 cm), followed closely by *D. terminalis* "Green" (12.32 cm), whereas no petiole was recorded in *D. marginata* "Green" and *D. marginata* "Red".

Table 1: Performance of Dracaena for morphological growth parameters grown under shade house conditions

Treatments	Plant height (cm)	Leaf length (cm)	Leaf width (cm)	Internodal length (cm)	Petiole length (cm)
T_1- *Dracaena reflexa*	65.03	29.30	5.20	3.06	3.33
T_2- *Dracaena warneckii*	79.86	40.80	8.40	4.00	3.96
T_3- *Dracaena sanderiana*	57.80	25.73	7.76	3.43	6.43
T_4- *Dracaena marginata* "Green"	97.86	43.46	3.30	2.73	0.00
T_5- *Dracaena marginata* "Red"	91.63	41.96	3.66	2.43	0.00
T_6- *Dracaena terminalis* "Mahatma"	119.60	46.26	11.50	4.28	12.60
T_7- *Dracaena terminalis* "Green"	114.56	45.00	9.26	4.20	12.32
T_8- *Dracaena massangeana*	77.76	36.93	10.00	3.33	7.10
T_9- *Dracaena fragrans*	68.13	37.56	7.23	3.16	7.16
T_{10}- *Dracaena surculosa* "Gold dust"	72.23	28.23	7.20	2.86	3.36
T_{11}- *Dracaena terminalis* "My Darling yellow"	49.20	33.70	9.36	3.66	7.70
T_{12}- *Dracaena deremensis* "Limelight"	86.20	39.70	8.50	3.16	8.00
T_{13}- *Cordyline fruiticosa*	79.63	31.66	8.63	3.20	9.56
S. Em ±	0.62	0.13	0.14	0.08	0.30
CD @ 5%	1.83	0.39	0.43	0.23	0.89

Significant differences were recorded among the Dracaena species for plant spread, leaf area and leaf area index (Table 2). The maximum plant spread both in east-west (75.10 cm) and north-south (78.50 cm) directions was observed in *Dracaena terminalis* "Mahatma", followed by *D. terminalis* "Green" (74.23 cm and 76.70 cm, respectively), while the minimum was in *D. sanderiana* (46.23 cm and 45.21 cm, respectively). Leaf area per plant was maximum in *D. terminalis* "Mahatma" (9798.66 cm^2), followed by *D. terminalis* "Green" (8074.66 cm^2), whereas the minimum was observed in *D. reflexa* (2927.00 cm^2). Similarly, leaf area index per plant was maximum in *D. terminalis* "Mahatma" (15.66), followed by *D. terminalis* "Green" (14.92), while the minimum was recorded in *D. reflexa* (5.83).

Table 2: Performance of Dracaena for morphological growth parameters grown under shade house conditions

Treatments	Plant spread E-W (cm)	Plant spread N-S (cm)	Leaf area per plant (cm^2)	Leaf area index per plant
T_1- *Dracaena reflexa*	48.50	49.23	2927.00	5.83
T_2- *Dracaena warneckii*	65.23	64.76	4723.33	5.96
T_3- *Dracaena sanderiana*	46.23	45.21	5868.33	13.60
T_4- *Dracaena marginata* "Green"	61.26	59.23	7091.00	11.50
T_5- *Dracaena marginata* "Red"	58.00	56.23	3053.33	8.95
T_6- *Dracaena terminalis* "Mahatma"	75.10	78.50	9798.66	15.66
T_7- *Dracaena terminalis* "Green"	74.23	76.70	8074.66	14.92
T_8- *Dracaena massangeana*	67.43	72.83	3804.33	6.88
T_9- *Dracaena fragrans*	59.20	66.23	5006.66	7.54
T_{10}- *Dracaena surculosa* "Gold dust"	53.00	52.76	7929.33	12.56
T_{11}- *Dracaena terminalis* "My Darling yellow"	63.20	65.56	4688.33	9.80
T_{12}- *Dracaena deremensis* "Limelight"	60.00	67.90	4167.00	6.60
T_{13}- *Cordyline fruiticosa*	67.10	70.76	4485.66	7.38
S. Em ±	0.19	0.74	30.65	0.55
CD @ 5%	0.56	2.18	89.48	1.62

Significant differences were observed among the Dracaena species for chlorophyll and carotenoid contents (Table 3). The maximum chlorophyll "a" (0.99 mg/g fresh weight), chlorophyll "b" (0.56 mg/g fresh weight) and total chlorophyll (1.55 mg/g fresh weight) contents were recorded in *D. terminalis* "Green", while the minimum were recorded in D. marginata "Red" (0.55, 0.30 and 0.90 mg/g fresh weight, respectively). Carotenoid content was maximum in *D. terminalis* "Mahatma" (0.27 mg/g fresh weight) and minimum in *D. marginata* "Red" (0.09 mg/g fresh weight).

Table 3: Performance of Dracaena for physiological parameters grown under shade house conditions

Treatments	(mg/g fresh weight)			
	Chlorophyll a	Chlorophyll b	Total chlorophyll	Carotenoid content
T_1- *Dracaena reflexa*	0.71	0.39	1.05	0.12
T_2- *Dracaena warneckii*	0.73	0.40	1.17	0.14
T_3- *Dracaena sanderiana*	0.75	0.42	1.23	0.16
T_4- *Dracaena marginata* "Green"	0.60	0.48	1.30	0.21
T_5- *Dracaena marginata* "Red"	0.55	0.30	0.90	0.09
T_6- *Dracaena terminalis* "Mahatma"	0.96	0.54	1.51	0.27
T_7- *Dracaena terminalis* "Green"	0.99	0.56	1.55	0.23
T_8- *Dracaena massangeana*	0.92	0.50	1.42	0.25
T_9- *Dracaena fragrans*	0.77	0.38	1.12	0.10
T_{10}- *Dracaena surculosa* "Gold dust"	0.69	0.34	1.02	0.20
T_{11}- *Dracaena terminalis* "My Darling yellow"	0.86	0.46	1.32	0.23
T_{12}- *Dracaena deremensis* "Limelight"	0.66	0.36	1.10	0.18
T_{13}- *Cordyline fruiticosa*	0.79	0.45	1.20	0.19
S. Em ±	0.02	0.01	0.03	0.02
CD @ 5%	0.06	0.03	0.10	0.07

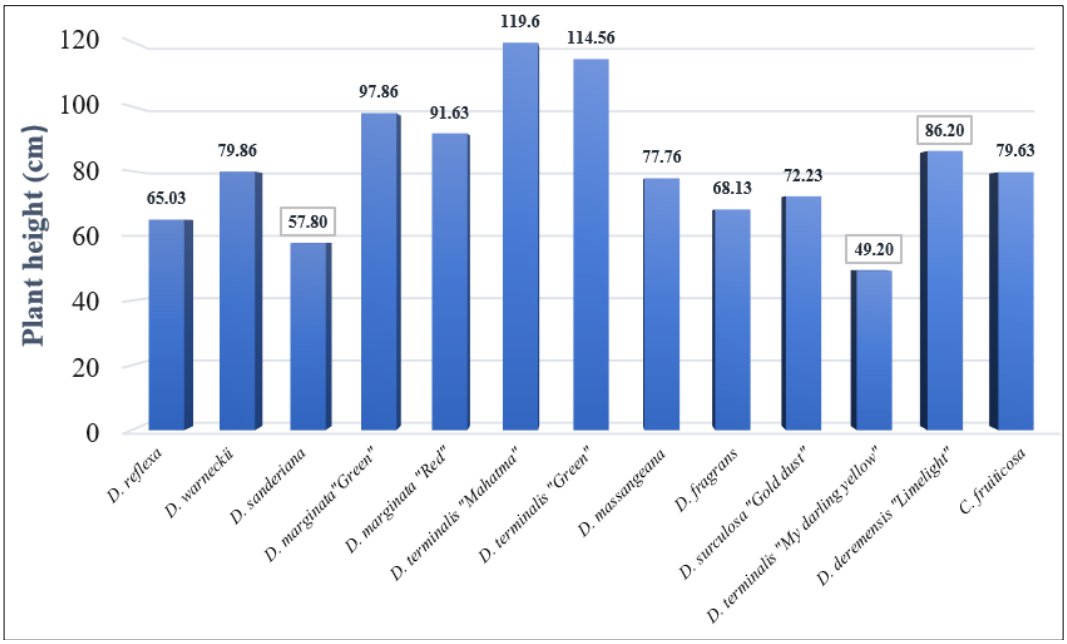

Fig 1: Performance of Dracaena for plant height at 180 days after transplanting of growth under shade house conditions

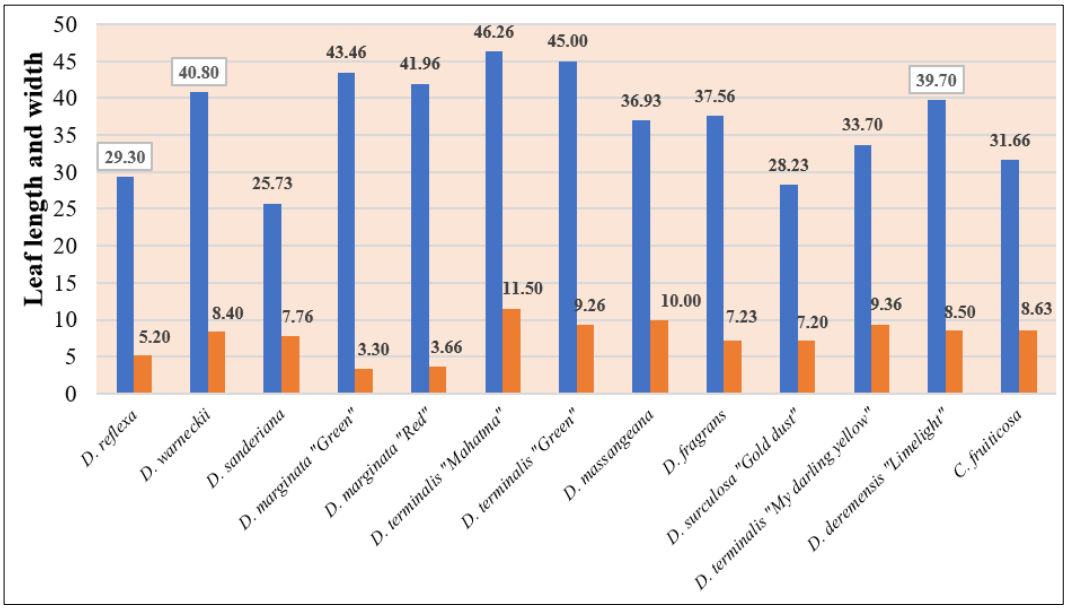

Fig 2: Performance of Dracaena for leaf length and width at 180 days after transplanting of growth under shade house conditions

Discussion

Plant height, leaf traits, internodal length, plant spread, petiole length, leaf area and leaf area index (LAI), chlorophyll and carotenoid content showed significant variation among the evaluated Dracaena species. The variation observed across species could be attributed to differences in internodal elongation, leaf morphology and inherent genetic makeup, which in turn influence photosynthetic capacity, light interception and overall vegetative vigor. Similar interspecific differences have also been documented in Dracaena and related ornamental foliage crops by Rasheed *et al*. (2018) [7], Santhosh *et al*. (2017) [10] and Chandrashekar *et al*. (2016) [8] in Liliums, Gaurav *et al*. (2016) [3], Patil *et al*. (2020) [5], Rashmi *et al*. (2016) [8] in gladiolus, Pratibha (2018) [6], Roopa *et al*. (2018) [9] in chrysanthemum and Suryapriya *et al*. (2015) [11] supporting the current findings.

Conclusion

The study revealed significant variation among Dracaena species for morphological traits, largely governed by genetic factors. Among the species evaluated, *Dracaena terminalis* "Mahatma" consistently demonstrated superior performance, exhibiting the tallest plants, largest leaves, greatest leaf area and highest leaf area index with higher photosynthetic efficiency highlighting its strong potential for commercial cut foliage production. In contrast, species such as *Cordyline fruticosa* and *D. marginata* "Red" exhibited comparatively lower performance across most parameters. The results showed that the critical importance of species selection in optimizing for commercial production of Dracaena under shade house conditions.

Acknowledgement

The facilities provided by college of Horticulture Mudigere are acknowledged by the writers.

References

1. Chandrashekar SY, Hemla Naik B, Kulkarni BS, Jagadish RC. Morphological characterisation of Asiatic lily genotypes under protected condition. Adv Life Sci. 2016;5(15):5704-8.
2. Chen J, Henny RJ, Connell DB. Development of new foliage plant cultivars. In: Trends in new crops and new uses. Portland (OR): Timber Press; 2002. p. 446-52.
3. Gaurav AK, Raju DVS, Janakiram T, Singh B, Jain R, Krishnan S. Effect of coloured shade net on production of *Dracaena fragrans*. Indian J Hortic. 2016;73(1):94-8.
4. Gowthami R, Anburani A, Vanitha G. Evaluation of different *Dracaena* species for their suitability as cut foliage. Int J Chem Stud. 2021;9(2):1164-8.
5. Patil RT, Patil BC, Seetharamu GK, Shiragur M, Nishani S, Ramanagoda SH, Mahantesha NBN. Influence of photoselective shade nets on growth and yield of *Asparagus*. Int J Chem Stud. 2020;8(6):2525-8.
6. Pratibha S. Evaluation of *Asparagus* and *Dracaena* species/varieties for production of quality cut foliage under shade net condition [MSc (Hort.) thesis]. Bagalkot (India): Univ. Hort. Sci.; 2018. p. 115.
7. Rasheed I, Seetharamu GK, Krishnamanoha R, Anilkumar S. Effect of different coloured shade nets on growth of ornamental indoor plants. Green Farming. 2018;9(6):1060-3.
8. Rashmi R, Chandrashekar SY, Arulmani N. Performance of gladiolus (*Gladiolus hybridus* L.) genotypes for growth, flowering and quality characters. Res Environ Life Sci. 2016;9(7):879-81.
9. Roopa S, Chandrashekar SY, Shivaprasad M, Hanumantharaya L, Hemanthkumar P. Evaluation of chrysanthemum (*Dendranthema grandiflora* Tzvelev) genotypes for floral and quality traits under hill zone of Karnataka, India. Int J Curr Microbiol Appl Sci. 2018;7(8):1874-9.
10. Santhosh N, Chandrashekar SY, Vidya C, Girish R. Variability studies in *Heliconia* genotypes. Green Farming. 2017;8(6):1421-3.
11. Suryapriya I, Arulmozhiya R, Sankari A, Anand M. Evaluation of cut-foliage plants for Eastern Ghats. J Hortic Sci. 2015;10(1):24-9.