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Morphological characterization of crossandra [*Crossandra infundibuliformis* (L.) Nees.] genotypes using DUS descriptors

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Abstract

Morphological characters at both vegetative and flowering stages were determined and categorized by using DUS descriptors and have clearly brought out differences among the genotypes. The parameter stem thickness was recorded maximum in PCC-1 (74.71 cm²). As regard to flower quality parameters, rachis length and peduncle length were recorded maximum in genotype Arka Shrivya (12.64 and 11.63 cm, respectively). Flower diameter was noticed maximum in Arka Shreeya (4.06 cm) and corolla tube length was noticed highest in ACC-2 (2.64 cm). The genotypes Arka Shrivya, ACC-2 and *Crossandra nilotica* were revealed spreading type of plant growth habit. The genotype Arka Shrivya observed pinkish brown stem colour and inflorescence peduncle colour compared to all other genotypes were green in colour. As regard to leaf venation genotype Arka Ambara was recorded not prominent type, while other 9 genotypes were prominent. The flowers of ACC-2 and *Crossandra nilotica* were depicted plain petal margin. The data presented indicated that the genotypes haven't differ significantly where parameters stem hairiness and leaf lamina margin were taken into consideration. The spikes of Arka Shrivya, ACC-2 and *Crossandra nilotica* were witnessed loose type of flower arrangement. The study successfully demonstrated that flower petal colour was Orange red group in 6 genotypes, Orange group 24-A in Arka Kanaka, Yellow-orange group 23-B in PCC-2 and Blue-green group 123-A in *Crossandra nilotica*.

Keywords: Crossandra, DUS, morphology, quantitative, quantitative, RHS

Introduction

Crossandra is a popular traditional flower crop in India, belongs to the family Acanthaceae and originated from South India and Sri Lanka. It is commercially produced as loose flower in Southern parts of India, it is mainly grown in Coimbatore, Madurai, Chennai, Hyderabad, Chittoor, Chitradurga, Kolar, Mysore, Shivamogga and Belagavi. Karnataka plays a key role in loose flower production in South India (Das *et al.*, 2022) [5]. The word 'crossandra' is derived from Greek word 'krossi' means 'fringe', 'Aner' means; male', *i.e.*, 'fringed anthers'. In South India, it is popularly known as *kanaka-ambara*, meaning golden fabric in Kannada, *kanaka-ambaram* in Tamil, Malayalam and Telugu on account of its strong yellow color and *Aboli* in Maharashtra. Though it is not fragrant, its flowers are very popular due to their attractive bright color and light weight. It has a very high market demand, at the peak time of occasions in the Indian flower market (Priyanka *et al.*, 2017) [11]. Crossandra consists of five coloured forms namely orange, yellow, red, deep orange and bluish flowered forms. The orange coloured is the only variety commercially grown. Plants are hardy and can be grown in beds, as border plants, as pot plants and landscape plants. The loose flowers especially used in temple offerings, ceremonial functions, for making gajras and venis to utilize as hair adornments (Bharathi *et al.*, 2018) [3].

The leaves of crossandra are entire or undulate, subdentate glabrous and whorled in nature. The inflorescence is hairy, spikes are linear oblong. Bracts are imbricate and prominent. Flowers are in dense sessile spikes, red or yellow in colour. Calyx is 5 ovate, acute and two inner are much smaller. Corolla tube is linear and incurved. Corolla is cylindrical, more or less curved, somewhat enlarged at the throat, with a flat or spreading oblique limb. Stamens are 4, in pairs and anthers 1-celled.

The seeds of many species are covered with scales, which spread out and become sticky when wetted. The seedpods are 4 seeded (Bhattacharjee and De, 2003) [4].

Material and Methods

The experiment was carried out at KRCCCH, Arabhavi during the year 2021-2022 with an objective to categorize the vegetative and flowering characteristics by using DUS guidelines of crossandra (Anon., 2019) [1]. The experiment was laid out in RCBD (Randomized Complete Block Design) with 10 genotypes and replicated thrice. The observations on plant characteristics were recorded from five randomly selected tagged plants in each plot. The parameters include stem thickness, flower diameter, rachis length, corolla tube length, peduncle length, plant growth habit, stem hairiness, stem colour, leaf lamina margin, leaf venation, inflorescence peduncle colour, flower colour (RHS colour chart), flower petal margin, flower arrangement. The two-month-old healthy cuttings are transplanted at spacing of 60 x 60 cm and regular cultural practices were followed.

Results and Discussion

Quantitative parameter

The data pertaining to the quantitative parameters viz., stem thickness, rachis length, peduncle length, flower diameter and corolla tube length are presented in Table 1. The

genotypes under study for this parameter stem thickness had significant variation. The maximum stem thickness was recorded in genotype Arka Ambara (7.24 mm), followed by ACC-1 (7.16 mm) and least in PCC-1 (6.57 mm) and Arka Shreeya (6.59 mm). The mean performance of parameter flower diameter showed significant variation among the different genotypes. The genotype Arka Shreeya recorded the maximum flower diameter of 4.06 cm, followed by Arka Ambara i.e., 3.96 cm and Arka Chenna (3.93 cm). The least flower diameter was recorded in *Crossandra nilotica* (2.81 cm) followed by ACC-2 (2.89 cm). With concern to rachis length, maximum was noticed in genotype Arka Shrivya i.e., 12.64 cm, followed by *Crossandra nilotica* (10.86 cm) and least was noticed in Arka Ambara i.e., 6.87 cm, followed by ACC-1 (7.33 cm).

With respect to peduncle length concerned, maximum was recorded in genotype Arka Shrivya (11.63 cm) and followed by ACC-2 (10.92 cm). While the minimum was recorded in Arka Kanaka (5.59 cm) followed by Arka Chenna (5.72 cm). Among the various genotypes, there was no significant difference in the length of the corolla tube. However, corolla tube length recorded maximum in genotype ACC-2 (2.64 cm) followed by Arka Shrivya (2.48 cm) and *Crossandra nilotica* (2.48 cm). While the least was recorded in PCC-2 (2.16 cm). Similar variation was observed by Gowsika *et al.* (2019) [7], Prasanth *et al.* (2020) [10] and Hosgoudar *et al.* (2022) [8] in crossandra.

Table 1: Quantitative parameters of crossandra genotypes

Sl. No.	Genotype	Stem thickness (mm)	Flower diameter (cm)	Rachis length (cm)	Peduncle length (cm)	Corolla tube length (cm)
1	Arka Ambara	7.24	3.96	6.87	7.32	2.13
2	Arka Chenna	6.91	3.93	9.26	5.72	2.28
3	Arka Kanaka	6.60	3.70	9.40	5.59	2.25
4	Arka Shrivya	6.99	3.11	12.64	11.63	2.48
5	Arka Shreeya	6.59	4.06	7.61	7.20	2.31
6	ACC-1	7.16	3.61	7.33	6.52	2.22
7	ACC-2	6.87	2.89	8.09	10.91	2.64
8	PCC-1	6.91	3.79	9.49	9.41	2.36
9	PCC-2	6.57	3.50	9.11	6.92	2.16
10	<i>Crossandra nilotica</i>	6.91	2.81	10.86	5.96	2.48
	Mean	6.91	3.54	9.06	7.72	2.32
	S.Em±	0.12	0.21	0.18	0.22	0.05
	C.D. @5%	0.38	0.64	0.53	0.65	0.16

Qualitative characteristics

A. Vegetative parameters

The evaluation for DUS testing was done as per the description prescribed by the PPV&FR guidelines, ICAR-IIHR, Hessaraghatta, Bangalore for DUS guidelines in crossandra (Anon., 2019) [1] and hence the genotypes of crossandra were grouped accordingly as given in the Table 2 and fig. 1. The qualitative character plant growth habit observed by visual assessment by a single observation of a group of plant. Based on the observations recorded, genotypes were grouped into two categories viz., erect, semi-erect and spreading. The genotypes Arka Shrivya, ACC-2 and *Crossandra nilotica* were grouped into spreading type of plant growth habit. Whereas the maximum of the cultivars was grouped into semi-erect type.

Based on the observations recorded qualitative character stem hairiness was grouped into presence or absences of hairiness. All the genotypes recorded absences of stem hairiness. The parameter stem colour observed by visual assessment by single observation of group of plant. With

respect to observation characteristic was categorised into green and pinkish brown group. The genotype Arka Shrivya noted pinkish brown stem colour compared to all other genotypes which are grouped into green in colour. The qualitative trait leaf lamina margin was noted by visual assessment by individual plants leaves. Concerning observation, the characteristic was divided into two groups viz., entire and wavy. All the genotypes witnessed wavy type of leaf lamina margin. The qualitative character leaf venation recorded maximum of genotypes are grouped prominent type and Arka Ambara was recorded not prominent type of leaf venation.

B. Flowering parameters

As regard to the observations recorded qualitative character peduncle colour was grouped into green and pinkish brown group. The genotype Arka Shrivya was grouped into pinkish brown type and all the genotypes were grouped into green inflorescence peduncle colour. Concerning the observations recorded qualitative character flower petal

margin was grouped into plain and wavy group. ACC-2 and *Crossandra nilotica* were grouped into plain and all the genotypes were observed to be wavy type of petal margin. The flower arrangement was categorized viz., compact and loose group. The genotypes Arka Shravya, ACC-2 and *Crossandra nilotica* were witnessed in loose type of flower arrangement. All the genotypes were grouped into compact type of arrangement.

Flower colour is an essential pseudo qualitative characteristic to be observed by visual assessment by a single observation of a group of plants or parts of plants viz., petals. Regarding the DUS characteristics the Royal

Horticultural Society (RHS) colour chart reference number for petal colour of different genotypes were Arka Ambara (Orange-red group 31-B), Arka Chenna (Orange-red group 33-B) Arka Kanaka (Orange group 24-A), Arka Shravya (Orange-red group 35-B), Arka Shreeya (Orange-red group 32-C), ACC-1 (Orange-red group 31-B), ACC-2 (Red group 39-B), PCC-1 (Orange-red group 31-A), PCC-2 (Yellow-orange group 23-B) and *Crossandra nilotica* (Blue-green group 123-A). The results of the present investigation were in accordance to those reported by Das (2017) [6], Asha *et al.* (2016) [2] in chrysanthemum and by Kumar *et al.* (2014) [9] in bougainvillea.

Table 2: DUS characterization of crossandra genotypes

Sl. No.	Genotype	Plant growth habit	Stem hairiness	Stem colour	Leaf lamina margin	Leaf venation	Inflorescence Peduncle colour	Flower Petal margin	Flower Arrangement	Flower colour
1	Arka Ambara	Semi-erect	Absent	Green	Wavy	Not prominent	Green	Wavy	Compact	Orange-red group 31-B
2	Arka Chenna	Semi-erect	Absent	Green	Wavy	Prominent	Green	Wavy	Compact	Orange-red group 33-B
3	Arka Kanaka	Semi-erect	Absent	Green	Wavy	Prominent	Green	Wavy	Compact	Orange group 24-A
4	Arka Shravya	Spreading	Absent	Pinkish brown	Wavy	Prominent	Pinkish brown	Wavy	Loose	Orange-red group 35-B
5	Arka Shreeya	Semi-erect	Absent	Green	Wavy	Prominent	Green	Wavy	Compact	Orange-red group 32-C
6	ACC-1	Semi-erect	Absent	Green	Wavy	Prominent	Green	Wavy	Compact	Orange-red group 31-B
7	ACC-2	Spreading	Absent	Green	Wavy	Prominent	Green	Plain	Loose	Red group 39-B
8	PCC-1	Semi-erect	Absent	Green	Wavy	Prominent	Green	Wavy	Compact	Orange-red group 31-A
9	PCC-2	Semi-erect	Absent	Green	Wavy	Prominent	Green	Wavy	Compact	Yellow-orange group 23-B
10	<i>Crossandra nilotica</i>	Spreading	Absent	Green	Wavy	Prominent	Green	Plain	Loose	Blue-green group 123-A

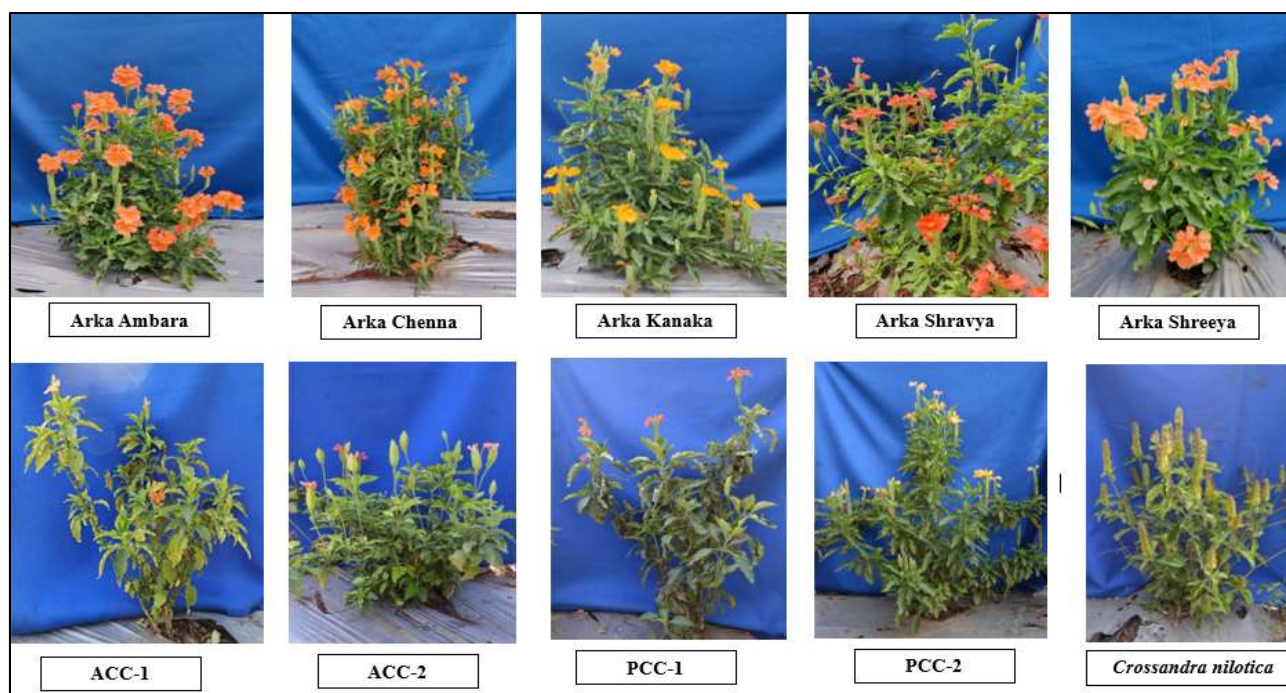


Fig 1: Crossandra genotypes used in the experiment

Conclusion

All the genotypes depicted significant difference in qualitative and quantitative parameters. The investigation suggests that existence of wide variability for vegetative and floral parameters in 10 genotypes of crossandra would be helpful in selecting desirable parents for further breeding. This will assist breeders in comprehending the performance of various varieties and selecting reliable parameters to develop superior genotypes. Data on characterization of different parameters could be used as reference collection for identification of crossandra cultivars. This information

could aid breeders in applying for protection of their new varieties under PPV and FRA in New Delhi.

References

- Anonymous. Guidelines for the conduct of test for distinctiveness, uniformity and stability on crossandra [*Crossandra infundibuliformis* (L.) Nees.]. PPV & FR Authority. ICAR-Indian Institute of Horticultural Research, Hesaraghatta, Bangalore; c2019.
- Asha KM, Sane A, Rajiv K. Characterization of chrysanthemum (*Dendranthema grandiflora*) genotypes

- as per DUS guidelines. Indian Journal of Agricultural Sciences. 2016;86(1):103-112.
3. Bharathi TU, Rao TM, Aswath C. Assessing the suitability of crossandra (*Crossandra infundibuliformis* (L.) Nees) as potted plant. International Journal of Current Microbiology and Applied Sciences. 2018;7(12):1028-1035.
 4. Bhattacharjee SK, De LC. Advanced commercial floriculture. Aavishkar publishers distributors. 2003;2:397-400.
 5. Das R. Evaluation of crossandra (*Crossandra undulaefolia* Salisb.) genotypes under eastern dry zone of Karnataka. M.Sc. (Hort.) Thesis, University of Horticultural Sciences, Bagalkot, India; c2017.
 6. Das R, Munikrishnappa PM, Seetharamu GK, Rajesh AM, Kumar P. Evaluation of crossandra (*Crossandra undulaefolia* Salisb.) genotypes under Eastern dry zone of Karnataka. Journal of Pharmacy Innovation. 2022;11(4):1950-1954.
 7. Gowsika S, Kavitha M, Sankari A, Vetrivelkalai P. Evaluation of crossandra [*Crossandra infundibuliformis* (L.) (Nees.)] genotypes for morphological and yield traits. International Journal of Chemical Studies. 2019;7(3):3394-3396.
 8. Hosagoudar AS, Champa BV, Naveen PM. Evaluation of crossandra genotypes for vegetative, floral and yield parameters for commercial production. Journal of Pharmacy Innovation. 2022;11(6):2554-2557.
 9. Kumar PP. Studies on morphological and molecular diversity for cultivars identification in bougainvillea. Ph.D. Thesis, Indian Agricultural Research Institute, New Delhi; c2014.
 10. Prasanth P, Girwani A, Salma Z, Kumar SP. Suitability evaluation of crossandra genotypes under Hyderabad conditions. International Journal of Chemical Studies. 2020;8(6):484-486.
 11. Priyanka TK, Kamble BS, Anuradha RW, Naveenakumar, Shirol AM. Evaluation of different crossandra genotypes under Ghataprabha area. Journal of Pharmacognosy and Phytochemistry. 2017;6(6):252-254.