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Suitability evaluation of crossandra genotypes under Hyderabad conditions

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Abstract

The present investigation was carried out at Floricultural Research Station, SKLTSHU under AICRP scheme for testing of new genotypes of crossandra for three consecutive years. The experiment was carried out from 2014-2017 laid out in RBD with five genotypes as treatments viz., Arka Shrivya, Arka Ambara, Arka Kanaka, Arka Shreeya and local cultivar as check and replicated four times. The results revealed that among the genotypes maximum plant height (95.84 cm), plant spread (126.60 sq.cm), number of branches per plant (9.34) was recorded in Arka Shrivya and minimum was recorded by Arka Kanaka. Similarly Arka Shrivya recorded longest spike length (20.84 cm), rachis length (10.04 cm), number of flowers per spike (17.34) and number of pickings per month (18.34). However, flower length (4.24 cm) and 100 flowers weight (7.67 g) was recorded maximum in Arka Shreeya and maximum flower diameter was recorded in Arka Ambara. Based on RHS colour chart Arka Ambara, Arka Shreeya and Local cultivar comes under orange group, Arka Kanaka is a Yellow orange group one and Arka Shrivya comes under red group category. It can be concluded that Arka Shreeya and Arka Ambara can be replaced with local variety for loose flower cultivation and Arka Shrivya as both loose flower and garden display and Arka Kanaka for garden display and landscaping.

Keywords: Crossandra, Arka, genotypes, flowering, testing

Introduction

Crossandra (*Crossandra undulaefolia* Salisb) also called as fire cracker plant is a perennial evergreen shrub belongs to Acanthaceae family. Crossandra species are native to Arabian peninsula, tropical Africa and Madagascar. It is one of the most commercial loose flower crop grown in south india particularly Karnataka, Andhra Pradesh, Tamil Nadu and Telangana. Commercially grown Crossandra have unique bright orange colour flowers that are light in weight and makes a good contrast with fragrant jasmine flowers. The flowers are used in religious offerings, hair adornments, garland, venis and also suitable for garden display. Crossandra flowers are available in the market all through the year and fetches high price during the festive seasons.

In Telangana state, farmers are growing local variety of crossandra which has orange colour flowers of medium size and thin flower stalk. New varieties of crossandra has been released by IIHR which distinctive colours and growth habits. There is a need to study the suitability and performance of new crossandra genotypes that are released by IIHR at Hyderabad conditions so that suitable genotypes can be commercialized in Telangana State to benefit the farmers. Keeping the above objective in mind the present study was carried out.

Materials and Methods

The experiment titled "Suitability evaluation of crossandra genotypes under Hyderabad conditions" was carried out at Floricultural Research Station, ARI, Rajendranagar for three consecutive years from 2014-2017. The experiment was designed in RBD with four replications consisting of five treatments out of which four genotypes are from IIHR and one is local variety as check. The treatments include viz., Arka Shrivya, Arka Ambara, Arka Kanaka, Arka Shreeya and Local variety. Rooted cuttings of genotypes and seedlings of local variety are planted at a spacing of 60X45 cm in double row planting with drip irrigation facility. All the recommended cultural practices were followed and five plants from each replication were chosen randomly and observations were recorded.

The data was collected for the vegetative and flower parameters viz., plant height, plant spread, Number of branches, spike length, rachis length, flower colour, flower length, flower width, number of flowers per spike, 100 flower weight and number of pickings per month. The data of three years was analysed in ANNOVA using statistical software OPSTAT at five per cent level of significance and presented in the tables.

Results and Discussion

The results are discussed under growth, flowering and yield attributing parameters

Mean performance of genotypes for growth characters

Plant vegetative characters like plant height, plant spread, branching will determine the overall growth habit of the genotypes. The data from the table 1 reveals that there is a significant difference among the genotypes in growth parameters. Plant height showed a gradual increase from first year to third year of study. During the first year plant height was recorded maximum in local cultivar (21.56 cm) followed by Arka kanaka (16.85 cm) but then by the end of third year contrary to first year maximum plant height was recorded in Arka Shravya (62.79 cm) followed by Arka Shreeya (72.5 cm) which was on par with all other genotypes. This could be due to the fact that all the IIHR genotypes were propagated by cuttings and local variety was a seedling of 3 months old, so this might be the reason for its dominance during the first year. Further, Arka Shravya has a longer intermodal length

which could be a varietal character. Resulting in maximum plant height (Dimri *et al.*, 2017) [3]. The findings are in line with Ramachandrudu and Thangam, (2010) [8]; Priyanka *et al.* (2017) [6] and Tejaswi *et al.* (2019) [9] in crossandra.

The data from table 1 revealed that plant spread also followed the same trend as plant height in the first year may be due to the same reason mentioned earlier. And then by the end of third year plant spread was recorded maximum in Arka Shravya (126.60 sq.cm) followed by Arka Shreeya (71.77 sq.cm) and minimum was recorded in Arka Kanaka (44.97 sq.cm). This may be due to the peculiar branching habit of Arka Shravya giving spikes only on one side of the branch and the intermodal length was longer with wider crotch angle between the branches giving it a wider spread. Similar findings were suggested by Tejaswi *et al.* (2019) [9] in crossandra.

The data regarding number of branches per plant represented in table no 1 showed that there was significant difference among the genotypes under study during second and third year, whereas it was found statistically non-significant in the first year. Number of branches per plant were on par among all the genotypes with Arka Shreeya showing maximum of 9.33 except Arka Ambara and Arka Kanaka (5.67) which recorded least and were on par with each other. The results are similar to the findings of Aswath *et al.* (2007) [1] and Bhosale *et al.* (2018) [2] in crossandra and may be due to inherent genetic factor responsible for such behavior as suggested by Priyanka *et al.* (2017) [6] and Kulakarni and Reddy (2004) [5].

Table 1: Mean performance of crossandra genotypes for growth parameters at Hyderabad conditions

Variety	Plant height (cm)			Plant spread (sq.cm)			No. of branches/plant			Color of floret (RHS Color chart)
	2014-15	2015-16	2016-17	2014-15	2015-16	2016-17	2014-15	2015-16	2016-17	
Arka Shravya	12.84	79.68	95.84	10.82	86.18	126.60	1.60	8.06	9.34	40C (red group)
Arka Ambara	11.52	59.43	69.64	13.10	46.51	49.50	1.40	6.53	7.84	29B (orange group)
Arka Kanaka	16.85	61.94	63.84	13.01	42.64	44.97	1.27	5.20	5.67	17A (yellow orange group)
Arka Shreeya	12.46	67.23	72.54	13.81	59.11	71.77	1.80	9.07	9.33	29A (orange group)
Local variety (c)	21.56	68.81	69.57	17.91	47.48	51.30	1.33	8.80	9.00	24B (orange group)
SE(m±)	0.93	3.45	4.078	1.09	1.34	4.277	--	0.51	0.28	
CD(P=0.05)	2.79	11.42	13.51	3.295	4.43	14.165	NS	1.697	0.94	

Mean performance of flower quality parameters

Flowering characters like spike and rachis length, flower colour and flower dimensions were studied and presented in the table 2. The flowers from crossandra spikes are harvested two or four at a time acropetally, as observed from the data there was a significant difference among the genotypes with regard to flower quality parameters. Arka Shravya recorded longest spike length in all the three years with maximum in the third year (20.84 cm) followed by Arka Kanaka (16.20 cm). Shortest spike length was recorded in Arka Ambara (9.34 cm). The findings are confounded by Bhosale *et al.*, (2018) [2]. Rachis Length was non significant in the second year of study and significant in first and third years with longest in Arka Shravya (10.04 cm) followed by Arka Kanaka (7.70 cm) and shortest recorded in Arka Ambara (5.77 cm) but was on par with the remaining genotypes. These findings are in accordance with Bhosale *et al.*, (2018) [2] and similar variation was reported by Tejaswi *et al.* (2019) [9] in crossandra.

The flower colour of florets was categorized and represented in table 01 based on RHS colour chart. The most popular colour commercially is orange colour. The local cultivar,

Arka Ambara as well as Arka Shreeya comes under orange group, whereas Arka Shravya and Arka Kanaka categorized under red group and yellow orange group respectively. Arka Shravya and Arka Kanaka can be explored in garden displays and landscaping owing to their unique colours creating contrasts. Orange colour types are popular for commercial loose flower production due to its popularity and demand.

Flower length and width showed significant variation among the genotypes as depicted from the data in the table 2. There was gradual increase in flower length and width over the three years in all the genotypes. Keen observation of the data revealed that flower length was maximum in Arka Shreeya (4.24 cm) and local check recorded least flower length (3.24 cm). whereas, Arka Ambara recorded maximum flower length as per (Bhosale *et al.*, 2018) [2]. Maximum flower width was recorded with gradual increase from first to third year in Arka Ambara (4.17 cm) followed by Arka Shreeya (3.67 cm). The flower quality parameter may be governed by the genetical makeup of the individual genotypes. Similar findings were documented by Bhosale *et al.* (2018) [2] and Priyanka *et al.* (2017) [7].

Table 2: Mean Performance of crossandra genotypes for flower parameters

Variety	Spike length (cm)			Rachis length (cm)			Flower length (cm)			Flower width (cm)		
	2014-15	2015-16	2016-17	2014-15	2015-16	2016-17	2014-15	2015-16	2016-17	2014-15	2015-16	2016-17
Arka shravya	10.25	20.54	20.84	5.19	11.72	10.04	3.17	4.10	4.07	2.18	3.10	3.10
Arka Ambara	5.90	10.99	9.34	3.55	4.61	5.77	3.72	4.20	4.00	3.34	3.96	4.17
Arka Kanaka	9.99	18.14	16.20	5.28	7.96	7.70	3.81	4.05	4.04	2.79	3.34	3.37
Arka shreeya	8.22	13.85	12.07	4.55	5.02	6.60	3.89	4.25	4.24	3.10	3.68	3.67
Local variety(c)	5.94	10.16	9.64	4.70	5.63	6.07	3.13	3.29	3.24	2.13	2.77	2.67
SE(m±)	0.63	0.16	0.65	0.377	1.978	0.30	0.19	0.126	0.043	0.11	0.03	0.05
CD(P=0.05)	1.88	0.55	2.16	1.133	NS	0.99	0.58	0.416	0.144	0.35	0.11	0.16

Mean performances of yield attributing parameters

Yield will determine the overall suitability of a crop for commercial purpose. Yield attributing characters like number of flowers per spike, 100 flower weight and number of pickings per month are represented in table 3. Maximum flowers per spike were recorded in Arka Shrivya in all the three years of study (15.7, 16.9, and 17.3 respectively) whereas minimum was recorded in Arka Kanaka (6.09, 7.0, and 8.67 respectively). There was no significant difference among the genotypes in the first two years of study. However, genotypes differed significantly during the third year with Arka Shreeya recording maximum weight of flowers (17.67

g) for 100 count followed by all other genotypes which were on par with each other. Variation among genotypes with regard to number of pickings per month was found to be significant in all the three years of study. Arka Shrivya recorded maximum number of pickings per month in all the three years (14.24, 15.0, 18.34 respectively followed by Arka Shreeya and Arka Kanaka which were on par with each other. Longer rachis length and more number of flowers per spike has ultimately resulted in highest number of pickings per month. Similar findings are also reported by Tejaswi *et al.* (2019)^[9] in crossandra.

Table 3: Mean Performance of crossandra genotypes for yield attributing parameters

Variety	No. of flowers/spike			100 Flowers wt (g)			No of pickings/month		
	2014-15	2015-16	2016-17	2014-15	2015-16	2016-17	2014-15	2015-16	2016-17
Arka Shrivya	15.70	16.9	17.34	5.54	6.2	5.67	14.24	15	18.34
Arka Ambara	10.87	11.33	12.67	5.67	6.26	6.34	6.78	7.25	8.67
Arka Kanaka	7.05	7.0	8.67	5.74	5.96	5.34	7.87	8.25	10.34
Arka Shreeya	6.09	7.9	11.34	6.12	6.68	7.67	6.94	8.5	10.34
Local variety (C)	15.41	16.0	11.67	5.41	5.63	5.34	7.52	8.75	9.0
SE (m±)	0.541	0.735	0.258	0.604	0.715	0.365	0.287	-	0.394
CD(P=0.05)	1.034	2.397	0.855	NS	NS	1.209	1.321	NS	1.306

Conclusion

Among the genotypes under study, Arka Shreeya and Arka Ambara can be replaced by local variety for commercial purpose and Arka Shrivya can also be introduced as loose flower owing to its superior flowering and yield characters. Further Arka Shrivya and Arka Kanaka can be used in garden display and landscaping.

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