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Evaluation of different crossandra genotypes under ghataprabha command area

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Abstract

An investigation on evaluation of ten genotypes of crossandra (*Crossandra undulaefolia* Salisb.) with respect to vegetative and yield parameters of crossandra flowers was carried out at Kittur Rani Channamma College of Horticulture, Arabhavi during 2014-2015. The results revealed that among the genotypes at 90 DAT the maximum plant height Arka Shravya (60.18 cm) stem girth Arka Shravya (5.12 mm and 6.92 mm), East-West plant spread 49.26 cm, highest North-South plant spread 49.31 cm, maximum number of primary branches ACC-1 4.73, The highest number of leaves Arka Shravya (290.17), maximum leaf area was recorded in Arka Shravya (1023.03 cm²), more number of spikes per plant and more number of flowers/spike was recorded in ACC-1 (171.53 and 61.40 respectively), Arka Ambar recorded maximum 100 flowers weight (9.68 g), significantly higher flower yield per plant and per ha (110 g/plant and 6.04 t/ha) was recorded in Arka Shravya and was on par with the genotype ACC-1 (109.00 g/plant and 5.80 t/ha).

Keywords: Crossandra, Evaluation, Genotypes, ACC (Arabhavi crossandra collection)

Introduction

Fire cracker plant (*Crossandra undulaefolia* Salisb.) is native of India. It is an important group of flowering plants cultivated on a commercial scale (orange varieties) and is being grown extensively in South India. The plants are quite hardy and can be grown for flowerbeds and /or for loose flowers. The word crossandra is derived from Greek words 'krossoi' meaning fringe and 'aner' meaning male, thus word crossandra means fringed stamens. This flower is also a valuable ornamental pot flower in Sweden, Denmark and Hungary (Ottosen and Christensen, 1986). It is an evergreen shrub of minor importance. It belongs to the family Acanthaceae. It consists of five cultivars, namely, orange, yellow, red, deep orange and bluish flowered forms. The bright orange coloured flowers are widely used in temple offerings and for making gajras and venis to use as hair adornments.

Materials and methods

The present investigation was carried out in the field experiment of Department of Floriculture and Landscape Architecture, Kittur Rani Channamma College of Horticulture, Arabhavi, during the period from 2014-2015. Arabhavi is situated in Northern dry zone (zone-3) of Karnataka state geographically lies at 16021' North latitude and 75054' East longitude with an altitude of 640 m above mean sea level. The experiment was laid out in randomized block design having three replications and ten genotypes as treatment. The ten genotypes of crossandra viz., Arka Ambar, Arka Kanaka, Arka Shravya, Arka Shreeya, ACC-1, ACC-2, ACC-3, ACC-4, ACC-5 and ACC-6 were grown in 3 row system at 60 X 30cm. Five plants from each genotype and from each replication were randomly selected for recording observation on growth, flowering and flower yield parameters.

Results and discussions

The results obtained from the present investigation are summarized in Table 1.

Growth parameters

The data on plant height, stem girth, plant spread (East West and North South), primary branches, secondary branches, number of leaves and leaf area at different stages of plant growth in different crossandra genotypes were recorded. At 90 DAT the plant height was found highest in Arka Shravya (60.18 cm) which was on par with ACC-1 (55.49 cm). The lowest was recorded in ACC-6 (46.47 cm) and was found on par with Arka Shreeya (50.69 cm), ACC-4 (49.89 cm), ACC-5 (49.60 cm), ACC-3 (48.69 cm) and ACC-2 (47.87 cm). The results are in line (Ramachandru and Thangam, 2010) [10]. In crossandra and

(Nandakishor and Ragahava, 2001) ^[5]. in marigold. At 60 DAT and 90 DAT, the maximum stem girth was recorded in genotype Arka Shrivya (5.12 mm and 6.92 mm respectively) which was on par with Arka Shreeya (4.92 mm and 6.86 mm respectively), ACC-1 (4.97 mm and 6.23 mm respectively), Arka Ambar (4.88 mm and 6.16 mm respectively) and minimum was recorded in ACC-4 (4.30 mm) at 60 DAT and ACC-3 (5.27 mm) at 90DAT. The results are in line (Singh and Singh, 2008). The genotype Arka Shrivya recorded highest East-West plant spread at 60 DAT and 90 DAT (41.47 cm and 49.26 cm respectively) and the lowest was recorded in ACC-3 (36.87 cm) at 90 DAT. The highest North-South plant spread was recorded at 60 DAT and 90 DAT (42.97 cm and 49.31 cm resp.) in Arka Shrivya which was on par with Arka Kanaka (45.43 cm) and the least North-South was noted in the genotype ACC-3 (38.36 cm) at 90DAT. Nandakishor and Ragahava (2001) in marigold, reported similar results. At 60 DAT and 90 DAT significantly maximum number of primary branches were recorded in genotype ACC-1 (4.07 and 4.73 respectively). The minimum number was recorded in Arka Ambar at 60 DAT (2.87) and ACC-4 (3.20) at 90 DAT. The results are in line (Kulkarni and Reddy, 2004) in china aster and (Peddilaxmi *et al.*, 2009) in chrysanthemum.

The variation in plant height, stem girth and increased number of branches in some genotypes may be attributed to the genetic makeup of the cultivars. The increase in plant spread was mainly due to production of increased number of branches and wider angle between primary and secondary branches at the coupling point.

The highest number of leaves registered in the genotype ACC-1 (100.53) followed by Arka Kanaka (99.67) at 60 DAT whereas lowest was registered in the genotype Arka Shreeya (59.80). At 90 DAT the number of leaves were found significantly maximum in Arka Shrivya (290.17) followed by Arka Kanaka (278.93) and minimum was found in Arka Ambar (189.73) which was at par with ACC-2 (193.30). The results are in line (Deepti and Anil, 2005) ^[1]. in marigold. Leaves are the functioning units for photosynthesis particularly the chlorophyll content of leaf which influences more on the growth and flower yield. Significant differences were recorded among the genotypes, maximum leaf area was

recorded in Arka Shrivya (1023.03 cm²) which was at par with Arka Kanaka (1010.33 cm²). This was due to the increased number of leaves. The minimum leaf area was recorded in ACC-3 (806.17 cm²) and it was due to lesser number of leaves and smaller size of leaves. Since genotypes varied for their number of leaves accordingly their leaf area also varied. The results are in line (Deepti and Anil, 2005) ^[1]. in marigold.

Flowering and Flower Yield parameters

The data related to flowering and flower yield parameters of different crossandra genotypes are presented in Table 2 and Fig 1.

Ultimate aim of crop improvement is to achieve higher yields with good quality. Significantly the more number of spikes per plant and more number of flowers/spike was recorded in ACC-1 (171.53 and 61.40 respectively) followed by Arka Shrivya (147.27 and 43.40). The less number of spikes per plant and flowers/spike was recorded in Arka Ambar (58.73) which was at par with ACC-3 (62.50), ACC-2 (61.23) and ACC-4 (61.00) at 60 DAT and less number of flowers/spike was recorded in ACC-3 (24.13) and which was at par with Arka Kanaka (24.87) and ACC-4 (24.67) at 90 DAT. The genotype Arka Ambar recorded maximum 100 flowers weight (9.68 g) followed by Arka Kanaka (8.18g) and Arka Shreeya (8.16 g) whereas the minimum was noted in ACC-3 (3.54 g). The perusal of data revealed significantly higher flower yield per plant and per ha (110 g/plant and 6.04 t/ha respectively) was recorded in Arka Shrivya and was on par with the genotype ACC-1 (109.00 g/plant and 5.80 t/ha). However, the genotype ACC-4 recorded less yield (50.60 g per plant 2.81 t/ha).

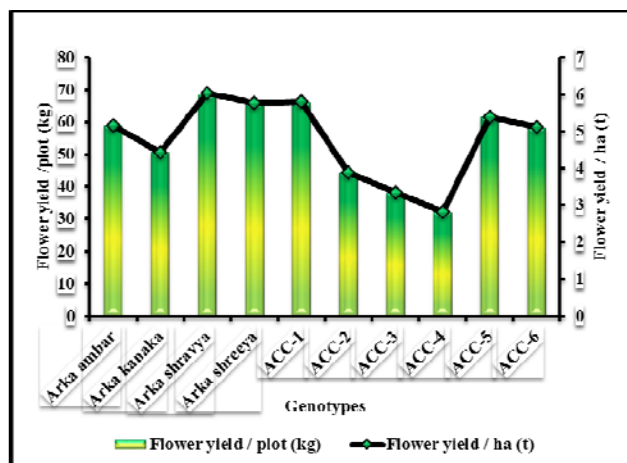
The higher yield might be due to increased morphological parameters like plant height, more number of leaves and leaf area which help in production of more photosynthates resulting in greater accumulation of dry matter which inturn leads to production of more number of flowers per plant. The results are in line (Ramachandrudu and Thangam, 2010) in crossandra, (Nandakishor and Ragahava, 2001; Deepti and Anil, 2005) ^[1]. in marigold, (Dhiman, 2003; Joshi *et al.*, 2009) ^[2,3]. in chrysanthemum.

Table 1: Evaluation of crossandra genotypes for growth parameters at different growth stages

Genotypes	Plant height (cm)		Stem girth (mm)		Primary branches		Number of leaves		Plant spread E-W (cm)		Plant spread N-S (cm)		Leaf area (cm ²)
	60 DAT	90 DAT	60 DAT	90 DAT	60 DAT	90 DAT	60 DAT	90 DAT	60 DAT	90 DAT	60 DAT	90 DAT	
Arka Ambar	42.39	52.61	4.88	6.16	2.87	4.67	71.53	189.73	32.53	39.42	31.98	41.75	964.30
Arka Kanaka	44.47	53.33	4.74	6.41	3.70	4.33	99.67	278.93	33.49	43.45	35.07	45.43	1010.33
Arka Shrivya	47.10	60.18	5.12	6.92	3.00	3.47	74.00	290.17	41.47	49.26	42.97	49.31	1023.03
Arka Shreeya	38.41	50.69	4.92	6.86	2.87	3.60	59.80	276.07	36.71	40.08	37.19	41.16	991.57
ACC-1	49.55	55.49	4.97	6.23	4.07	4.73	100.53	254.63	36.71	39.83	40.51	42.05	987.67
ACC-2	42.33	47.87	4.57	5.63	3.00	3.27	61.67	193.30	34.13	38.99	32.27	39.71	1001.43
ACC-3	41.80	48.69	4.37	5.27	3.27	3.47	73.83	265.37	33.80	36.87	35.83	38.36	806.17
ACC-4	39.33	49.89	4.30	5.94	3.03	3.20	68.20	213.30	36.53	38.13	36.63	39.48	980.80
ACC-5	40.67	49.60	4.37	5.60	3.13	4.30	69.13	197.83	32.77	39.40	37.77	39.50	888.73
ACC-6	39.43	46.47	4.77	5.93	3.20	4.10	71.70	165.40	33.47	40.70	38.12	39.50	986.00
S. Em (±)	1.22	1.81	0.11	0.33	0.23	0.28	1.66	3.38	1.14	1.44	1.68	1.84	5.05
CD at 5%	3.65	5.40	0.32	0.99	0.70	0.85	4.95	10.05	4.29	4.29	4.99	5.48	15.00

Table 2: Evaluation of crossandra genotypes for flower yield parameters.

Genotypes	Number of spikes / plant	Number of flowers / spike	100 flower weight (g)	Flower yield / plant (g)	Flower yield / ha (t)
Arka Ambar	58.73	28.33	9.68	93.03	5.16
Arka Kanaka	72.53	24.87	8.18	79.63	4.42
Arka Shrivaya	147.27	43.40	5.84	110.00	6.04
Arka Shreeya	108.80	42.00	8.16	103.87	5.77
ACC-1	171.53	61.40	4.37	109.00	5.80
ACC-2	61.23	29.33	3.93	70.00	3.89
ACC-3	62.50	24.13	3.54	60.20	3.34
ACC-4	61.00	24.67	3.79	50.60	2.81
ACC-5	78.00	35.67	5.50	97.03	5.38
ACC-6	98.00	26.67	4.80	92.00	5.11
S. Em (\pm)	1.71	1.32	0.18	0.67	0.06
CD at 5%	5.09	3.92	0.53	1.99	0.18

**Fig 1:** Flower yield per plot and flower yield per hectare of different crossandra genotypes

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