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EVALUATION OF CROSSANDRA (*CROSSANDRA INFUNDIBULIFORMIS* L. NEES.) GENOTYPES FOR FLOWER YIELD AND YIELD ATTRIBUTING CHARACTERS

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ABSTRACT

An investigation on evaluation and yield performance of crossandra genotypes was conducted in Kittur Rani Chennamma College of Horticulture, Arabhavi. Significant variation was noticed for various flower yield and yield attributing parameters among the 10 genotypes evaluated. Early flower spike initiation was Arka Shravya (61.33 days) and days taken to flower harvest recorded maximum in *Crossandra nilotica* recorded (164.73 days). Duration of flowering was recorded maximum in genotype Arka Shravya (48.74 days). As regard to flower quality parameters, rachis length and peduncle length was recorded maximum in genotype Arka Shravya (12.64 and 11.63 cm, respectively). Shelf life of flowers was noticed maximum in Arka Shreeya (3.23 days). The genotype Arka Shravya recorded maximum number of spikes/plant (136.67) and number of flowers/spike (41.22). The weight of 100 flowers was recorded greatest in Arka Ambara (9.42 g). As regard to flower yield g/plant, flower yield kg/plant and flower yield t/hectare were recorded maximum in genotype Arka Shravya (257.41 g/plant, 6.44 kg/plant and 6.60 t/hectare, respectively). While least was recorded in *Crossandra nilotica* (57.49 g/plant, 1.44 kg/plant and 1.47 t/hectare).

***Keywords*:** Crossandra, evaluation, yield, flowering, spikes, genotypes, *Crossandra infundibuliformis*

Introduction

Crossandra is a traditional flower crop grown commercially in Karnataka, Tamil Nadu, Andhra Pradesh and Telangana, which yields beautiful flowers in dense sessile spike with amazing colours almost throughout the year. It is mainly grown for loose flower purpose which has very high market demand, fetching a high value at the peak time of occasions in the Indian flower market (Das *et al*., 2022). Crossandra consists of five coloured forms namely orange, yellow, red, deep orange and bluish flowered forms. Though the flowers are not fragrant, they are very popular because of their attractive bright colour, light weight and good keeping quality. Flowers are used for making venis, gajra, garland, either alone or in combination with jasmine flowers and in temple offerings and ceremonial functions. The plants are hardy and can be grown in beds, as border plants, as a pot plant and landscape plants. Crossandra belongs to the family Acanthaceae and it is native to South India and Srilanka. There are around 50 species but only few species are cultivated like *Crossandra infundibuliformis*, *Crossandra undulaefolia*, *Crossandra guineensis*, *Crossandra mucronata* and

Crossandra subacaulis. Among them, the species *Crossandra infundibuliformis* is commercially cultivated (Bhattacharjee and De, 2003).

Crossandra is tropical hardy plant and sensitive to low temperature and frost. It is a free flowering quick growing shrub to 90 cm tall, flower scarlet orange in dense spikes, can be grown in sunny or semi-shade location. There is always a high demand and popularity for traditional flowers in different locations of our country due to its diverse cultural heritage and festive traditions. Both commercial varieties as well as local varieties are extensively cultivated to meet the demand (Priyanka *et al*., 2017). The variability in genotype performance is mostly determined by agro-climatic factors like soil, temperature, and rainfall. Thus, assessing the genotypes that are now accessible will aid in determining which genotypes perform best in a particular region. Moreover, introducing novel colours, forms, good shelf life and biotic stress-resistant cultivars is helpful in crop improvement of crossandra.

Material and Methods

The experiment was carried out at Department of Floriculture and Landscape Architecture, Kittur Rani Chennamma College of Horticulture, Arabhavi. Experiment was laid out in RCBD (Randomized Completely Block Design) with 10 treatments and replicated thrice. The genotypes (Fig. 1) include, T1-Arka Ambara, T2-Arka Chenna, T3-Arka Kanaka, T4-Arka Shravya, T5-Arka Shreeya, T6-ACC-1, T7-ACC-2, T8-PCC-1, T9-PCC-2 and T10-*Crossandra nilotica*. Two-month-old, healthy and uniformly rooted cuttings were planted at 60 cm x 60 cm spacing and light irrigation was provided shortly after transplanting. The plot was maintained clean by regular hand weeding, gap filling, fertilizer application and irrigation.

Results and Discussion

Flowering attributes

The data pertaining to the flowering parameters *viz*., days to flower spike initiation, days taken to first harvest and duration of flowering of crossandra genotypes was recorded and presented in Table 1. The parameter days taken to flower spike initiation depicted a wide range of variability among the genotypes, Arka Shravya was first to notice flowering after 61.33 days, followed by ACC-2 of 72.33 days and *Crossandra nilotica* was last to recorded flower initiation at 99.66 days after transplanting. The spike initiation is heavily influenced by genetic factors and temperature. The mean performance of the parameter days taken to first harvest revealed significant variation among the genotypes. *Crossandra nilotica* recorded maximum days of 164.73 days for flower harvest and least was recorded by the genotype Arka Shravya (120 days), followed by Arka Ambara *i.e.*, 122.53 days after transplanting. The data pertaining to the parameter duration of flowering was recorded maximum in Arka Shravya (48.74 days) followed by PCC-2 (47.51 days) and least was noticed in *Crossandra nilotica* (164.73 days).

Table 1: Floral attributes of crossandra genotypes

Sl. No.	Genotype	Days to flower spike initiation	Days taken to first harvest	Duration of flowering (days)	Shelf life (days)
1	Arka Ambara	76.00	122.53	37.70	3.17
2	Arka Chenna	84.66	131.53	40.56	3.10
3	Arka Kanaka	83.66	128.20	35.08	3.10
4	Arka Shravya	61.33	120.00	48.74	2.70
5	Arka Shreeya	82.53	140.80	41.37	3.23
6	ACC-1	75.93	154.40	36.15	3.07
7	ACC-2	72.06	132.33	36.51	2.67
8	PCC-1	80.06	143.80	43.11	3.23
9	PCC-2	84.40	139.13	47.51	2.97
10	*Crossandra nilotica*	99.66	164.73	32.52	2.47
Mean		80.03	137.74	39.92	2.96
S.Em±		2.70	8.47	1.60	0.10
C.D. @5%		8.02	25.18	4.77	0.28

The shelf life of loose flowers is an important quality factor, as it signifies the duration that the flowers remain fresh and viable after their harvest. Maximum shelf life of flowers observed in genotype Arka Shreeya and PCC-1 *i.e*., 3.23 days, followed by Arka Ambara (3.17 days). The least days were recorded in *Crossandra nilotica* (2.47 days), followed by ACC-2 (2.67 days). The variation in shelf life might be attributed to inherent genetic character of the cultivars. Similar variation was observed by Gowsika *et al*. (2019), Prasanth *et al*. (2020) and Hosgoudar *et al*. (2022) in crossandra.

Yield and its attributing parameters

There was significant difference was noticed in yield and its attributing characters among the cultivars was presented in Table 2 and Fig. 2. With respect to number of spikes per plant depicted high variability among genotypes. The maximum number of spikes was recorded in genotype Arka Shravya (136.67), followed by Arka Shreeya (96.44) and least was noticed in *Crossandra nilotica* (47.40).

Concerned to number of flowers per spike, maximum number was recorded in genotype Arka Shravya (41.22), followed by PCC-1 (40.00) and PCC-2 (40.56). While least number of flowers was recorded in *Crossandra nilotica* (23.46). With respect to weight of 100 flowers showed highest significant difference among the genotypes. The genotype Arka Ambara (9.42 g) recorded maximum weight of 100 flowers, followed by Arka Chenna (8.67 g) and Arka Shreeya (8.45 g). This was due to the maximum diameter of the flower, longer and thicker corolla tube length. The least was noted in *Crossandra nilotica* (5.26 g), followed by ACC-2 (5.35 g) due to less flower diameter and thin corolla tube. The results are in concurrence with the findings of Das *et al.* (2022) in crossandra and Patel *et al*. (2017) in jasmine.

The data pertaining to flower yield g/plant depicted high range of variability. The maximum flower yield g/plant was recorded in genotype Arka Shravya (257.41 g), followed by Arka Shreeya (207.64 g) and least was recorded in *Crossandra nilotica* (57.49 g). With respect to flower yield kg/plot was recorded in the genotype Arka Shravya (6.44 kg), followed by Arka Shreeya (5.19 kg) and least was recorded in *Crossandra nilotica* (1.44 kg).

Concerning the parameter flower yield t/hectare was recorded maximum in the genotype Arka Shravya (6.60 t/ha), followed by Arka Shreeya (5.32 t/ha) and least was recorded in *Crossandra nilotica* (1.47 t/ha). This is a result of heightened morphological characteristics such as increased plant height, a greater number of branches, and a larger leaf area, all of which contribute to the production of a greater amount of photosynthetic substances. Consequently, this leads to a higher accumulation of dry matter, ultimately resulting in the production of a greater number of spikes and flowers per plant.

Table 2: Flower yield and yield attributing parameters

Sl. No.	Genotype	Number of spike/plant	Number of flowers/spike	Weight of 100 flowers (g)	Flower yield g/plant	Flower yield kg/plot	Flower yield t/ha
1	Arka Ambara	60.86	30.60	9.42	172.05	4.30	4.41
2	Arka Chenna	69.51	39.54	8.67	198.15	4.95	5.08
3	Arka Kanaka	66.23	38.33	8.39	176.24	4.41	4.52
4	Arka Shravya	136.67	41.22	5.57	257.41	6.44	6.60
5	Arka Shreeya	96.44	37.12	8.45	207.64	5.19	5.32
6	ACC-1	61.80	33.00	5.88	107.92	2.70	2.77
7	ACC-2	56.73	38.53	5.35	122.94	3.07	3.15
8	PCC-1	58.93	40.00	6.26	154.56	3.86	3.96
9	PCC-2	63.46	40.56	6.41	171.06	4.28	4.39
10	*Crossandra nilotica*	47.40	23.46	5.26	57.49	1.44	1.47
Mean		71.80	36.33	6.97	162.55	4.06	4.17
S.Em±		0.40	0.09	0.09	0.86	0.02	0.02
C.D. @5%		1.18	0.26	0.28	2.55	0.06	0.07

Fig. 1: Crossandra genotypes used in experiment

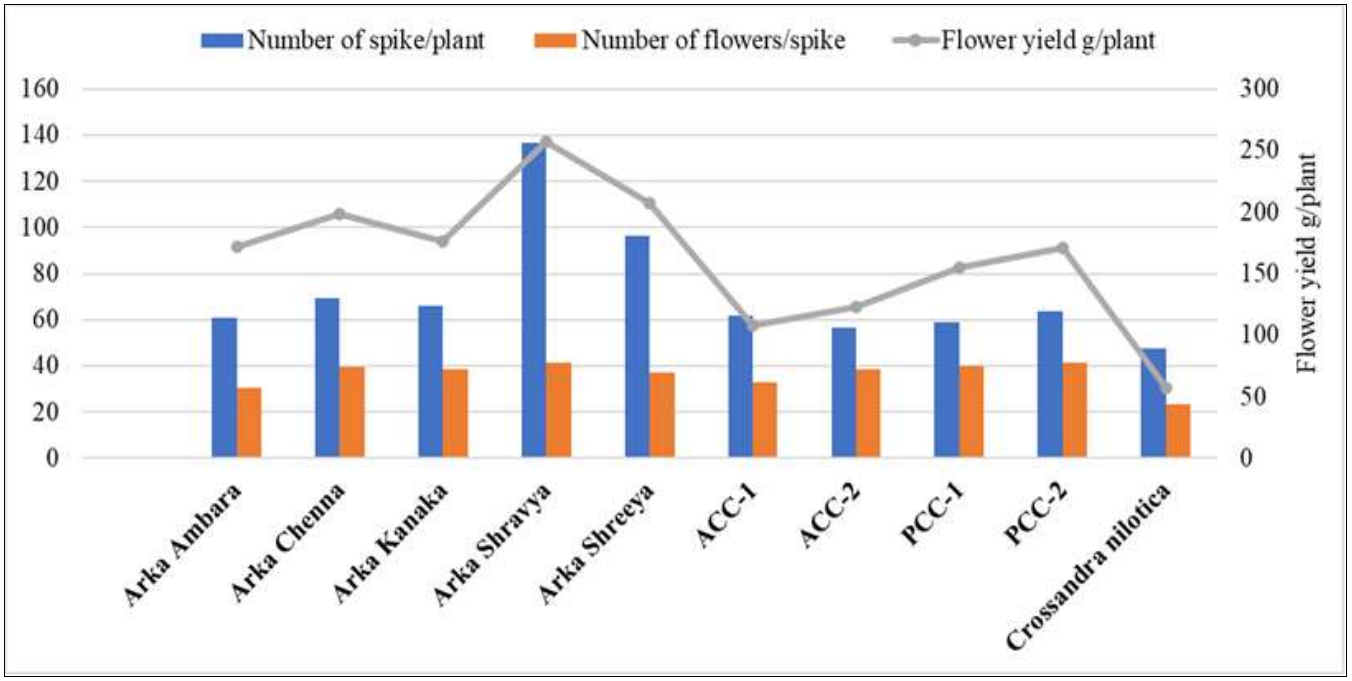

Fig. 2 : Number of spikes per plant, number of flowers per spike and flower yield per plant of different crossandra genotypes

Conclusion

The genotype Arka Shravya performed excellent with respect to flower quality and yield parameters, followed by Arka Shreeya and these genotypes can be recommended for commercial production of crossandra in northeastern regions of Karnataka. Evaluation of crossandra genotypes for yield and its attributing characters is key factor in identifying potential genotypes for further use in breeding programs.

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