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Compendium and assessment of *Crossandra* (*Crossandra infundibuliformis* (L.) (Nees.) Genotypes under Rayalaseema zone of Andhra Pradesh

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Abstract
The study was conducted at Horticultural Research Station, Anantharajupeta by collecting 5 genotypes of Crossandra during the year 18-19. Two lines of crossandra germplasm, i.e. Ratanaboli (Yelllow), Pishiaboli (yellow) collected from ICAR-Central Coastal Agricultural Research Institute, Goa and similarly nine local selections from Pakala, B.N. Kandrika, Nagiri, Bynapalli, perur, and obulapalli and one green coloured wild type from Railway Kodur region and three selections (Orange, Yellow, Green) from different locations of Kadium. Highest yield per hectare (1975.50 kg) was found in ACS-11 which stood at a par with Ratan Aboli (1903.56 kg) whereas lowest yield per hectare (1146.63 kg) was recorded in ACS-9.

Keywords: Crossandra, genotypes, germ plasm, Aboli

Introduction
Crossandra is commonly called as "Fire cracker plant" belongs to the family Acanthaceae. In India, it is grown in an area of 3003 ha mainly in the states of Tamil Nadu, Karnataka and Andhra Pradesh. In Andhra Pradesh, it is cultivated in districts of Chittoor, Ananthapur, East Godavari and Kurnool districts. There are triploids and tetraploids available in different colours. Triploid are propagated through stem cuttings, whereas tetraploids through seeds. Though it doesn't have fragrance, it is of great demand in making garlands mainly along with jasmine. There are different colours available i.e light red, orange, yellow and bluish colours. The plants are commercially cultivated in many areas, so it is necessary to collect and evaluate different genotypes and their suitability to particular geographical location. Hence, the experiment was conducted on collection and evaluation of Crossandra genotypes for growth, flowering and yield traits under rayalaseema conditions.

Materials and Methods
Collected two lines of crossandra germplasm, i.e. Ratanaboli (Yelllow), Pishiaboli (yellow), from ICAR-Central Coastal Agricultural Research Institute, Goa and similarly nine more local selections from Pakala, B.N. Kandrika, Nagiri, Bynapalli, perur, and obulapalli and one green coloured wild type from Railway Kodur region and three selections (Orange, Yellow, Green) from different locations of Kadium. The experiment was conducted at Horticultural Research Station, Anantharajupeta, Kadapa district during 2018-19 in a randomised block design with 15 genotypes and three replications. The fifteen genotypes of crossandra *viz.*, ACS-1, ACS-2, ACS-3, ACS-4, ACS-5, ACS-6, ACS-7, ACS-8, ACS-9, ACS-10, ACS-11, ACS-12, ACS-13 and Ratanaboli (Yelllow), Pishiaboli (yellow). In each replication, five plants from each genotype were selected for recording observations. The morphological and flowering parameters were presented in the table 1.

Results and Discussion
Morphological and physiological parameters
The results of present investigation on the growth and morphological characters were shown significant differences and are presented in Table 1. The genotype ACC-11 recorded highest plant height (124.83 cm) which was on par with Ratan Aboli, ACS-10, ACS-6, ACS-3, ACS-1, ACS-8, ACS-2, ACS-4. The genetic composition of the genotypes has influence on increased plant height. Similar findings are observed by Ramachandrudu and Thangam (2010) [11],

Priyanka (2017) [10] and Tejaswi *et al.* (2019) [13] in Crossandra. Regarding plant spread(E-W) and (N-S), maximum plant spread (104.33 cm in E-W and 112.27 cm in N-S) was noted in the genotype ACS-3 (Green flower) which was almost on par with ACS-6 (Green flower), ACS-1, ACS-2, ACS-11, Pishi aboli, ACS-8 and ACS-7. Here one interesting thing is that ACS-3, ACS-6 are wild types with thick leaves and green coloured flowers. More number of branches per plant, internodal length and leaf area are mainly the the varietal traits which influence the plant spread. Similar results also reported by Kulkarni and Reddy (2004) [5], Prashanth *et al.* (2020) [9] and Bala (2015) [1] in Chrysanthemum.

Highest number of branches (17.33) were found in ACS-11 which was found onpar with ACS-12, ACS-10, ACS-3 and Ratan Aboli.

Flowering and yield parameters

The Crossandra genotypes which are evaluated, recorded significant results regarding flowering and yield parameters were furnished in the Table 1.

Number of spikes per branch (35.50) was recorded maximum in ACS-11 which stood on par with Ratan Aboli, ACS-2, ACS-3, ACS-7 and ACS-8. Highest number of flowers per spike (37.60) was found in ACS-3 followed by ACS-6, ACS-11, Ratan Aboli, ACS-2 and ACS-8. Similar variation was also recorded by Ramachandrudu and Thangam (2010) [11] in Crossandra and Madhumathi *et al.* (2018) [6] in tuberose.

Similarly, ACS-3 recorded highest spike length which stood on par with ACS-6, ACS-2 and ACS-7. Statistically flower length is almost similar in all genotypes except ACS-2. Whereas, flower width (3.20cm) was found maximum in ACS-9 which is comparable with ACS-3, ACS-2, ACS-6, ACS-10, ACS-12 and ACS-13. This is in conformity with observations of Ramachandrudu and Thangam (2010) [11] in Crossandra, Kulkarni and Reddy (2004) [5], Uddin *et al.* (2015) [14] in Chrysanthemum. The increased flower length might be due to genotypic differences which might be depend on food reserves in a plant. Similar variation were reported by Ranchana *et al.* (2013) [12] in tuberose and Tejaswi *et al.* (2019) [13] in crossandra and Naresh *et al.* (2015) [8] in gladiolus.

Weight of 100 flowers was more in the genotype ACS-11 which was significantly superior over other genotypes except ACS-10, ACS-1, ACS-2, Ratan Aboli and Pishi aboli while minimum 100 flowers weight was found in ACS-3.

Highest yield per hectare (1975.50 kg) was found in ACS-11 which stood at a par with Ratan Aboli (1903.56 kg) whereas lowest yield per hectare (1146.63 kg) was recorded in ACS-9. Individual genotypes has different capacity of production of different photosynthates. More photosynthates leads to more flowers might be due to more dry matter accumulation. Similar findings were reported by Nandakishor and Ragahava in 2001 [7], Deepti and Anil in marigold in 2005 [2]. Dhiman, 2003 [3], Joshi *et al*., 2009 [4]. in chrysanthemum and Ramachandrudu and Thangam, (2010) [11] in crossandra.

Table 1: Observations recorded in Crossandra

S. No.	Variety name	Plant height (cm)	Plant Spread (cm)		No. of Branches	No.of spikes per branch	Flower color	No. of florets per spike	Spike length (cm)	Floret Length (cm)	Floret width (cm)	Weight of 100 flowers (g)	Yield per hectare (Kg)
			E-W	N-S									
1	ACS-1	89.77	80.00	67.13	11.57	14.00	Light red	29.50	7.78	2.73	1.93	6.92	1181.36
2	ACS-2	87.73	76.80	72.53	12.00	23.50	Yellow	35.50	10.52	2.45	2.85	6.95	1554.96
3	ACS-3	93.50	104.33	112.27	15.20	20.25	green	42.67	13.28	3.66	3.03	4.59	1829.39
4	Ratan aboli	105.60	72.17	79.70	15.67	31.33	yellow	35.67	9.15	2.96	2.59	7.15	1903.56
5	Pishiaboli	86.53	75.63	69.85	12.68	19.67	yellow	29.50	7.18	2.81	2.59	7.05	1535.79
6	ACS-4	87.60	54.50	58.62	11.28	16.67	orange	28.67	6.90	3.63	2.17	6.72	1426.90
7	ACS-5	86.95	61.53	65.98	10.53	14.33	orange	25.80	6.71	2.94	2.53	6.05	1286.63
8	ACS-6	98.92	88.67	93.56	11.59	19.00	green	39.67	12.37	3.61	2.91	5.15	1784.67
9	ACS-7	85.83	72.83	95.30	10.33	25.33	orange	32.50	8.94	2.86	2.10	6.61	1356.91
10	ACS-8	89.55	74.13	80.60	12.33	22.44	orange	33.58	7.10	2.81	2.50	6.58	1214.13
11	ACS-9	66.50	58.10	56.90	11.50	15.50	orange	30.00	7.04	3.25	3.20	6.34	1146.63
12	ACS-10	101.56	69.28	59.64	13.56	15.33	orange	32.55	6.18	3.07	2.85	6.98	1509.40
13	ACS-11	124.83	76.27	86.90	17.33	35.50	orange	37.60	7.55	2.89	2.43	7.31	1975.50
14	ACS-12	72.50	64.50	60.30	15.52	17.50	Red	25.50	8.28	3.14	2.70	6.68	1379.96
15	ACS-13	82.77	81.65	70.20	11.67	19.67	Light red	28.20	6.92	3.38	2.87	6.19	1156.91
S.Em+		16.36	10.76	14.08	1.30	4.27		3.33	1.49	0.32	0.19	0.18	45.92
C.D @5%		47.56	31.53	41.27	3.81	12.52		9.78	4.37	0.95	0.58	0.55	134.55

Conclusion

Collected 15 genotypes from different parts from Pakala, Nagiri, perur, B.N. Kandrika, Kadium and Goa. Among the genotypes collected per hectare yield was highest in ACS-11 (Orange) type followed by Ratan aboli (Yellow) type.

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