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Correlation studies in crossandra (*Crossandra infundibuliformis*)

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Abstract
An investigation was undertaken on evaluation of different crossandra genotypes were carried out for their relationship between yield and yield contributing characters. Results of correlation analysis indicated that flower yield per plant was found to be highly significant and positively correlated with plant height, plant spread, number of primary branches, number of leaves, 100 flower weight, number of flowers per spike, number of spikes per plant and rachis length. Positively and significant correlation was recorded between number of primary branches, number of spikes per plant, rachis length and yield.

Keywords: Crossandra, correlation, number of spikes, flower yield

Introduction
Crossandra is botanically called *Crossandra infundibuliformis* (L.) (Nees) belongs to the family Acantheceae and native to India. It is an evergreen shrub, commonly called fire cracker plant and it is mostly grown in India, tropical Africa and Madagascar. It is derived from Greek words 'krossoi' meaning fringe and 'aner' meaning male, thus word crossandra means fringed stamens. It grows upto 1m height with glossy and wavy margined leaves with fan shaped flowers which yields throughout the year.

The performance of genotypes in different regions exhibits variability with the climatic condition, growth habitat and genetic potential of each genotype. So, it is necessary for the evaluation of different genotypes under different agro climatic conditions that would be useful for identifying the best genotype for its further development. Correlation among the yield components enhances the precision of selection. With this view, the present study was conducted to determine the association between yield and yield components traits of different crossandra accessions.

Materials and Methods
The present investigation was carried out to study the performance of crossandra genotypes for morphological, flowering, yield and quality at the Department of Floriculture and Landscape Architecture, Tamil Nadu Agricultural University, Coimbatore. Ten different genotypes of crossandra were assessed for their relationship between yield and yield component traits. Observations were recorded on single plant basis and the characters taken for observation were plant height, plant spread, number of primary branches, number of leaves, 100 flower weight, number of flowers per spike, number of spikes per plant and rachis length. The data was statistically analyzed and correlation coefficient analysis for yield and yield components was performed utilizing the formula suggested by Snedeer and Cochran (1967) [10].

Results
The genotypic correlation coefficient was estimated using dependent variable of yield and independent variable of yield components. The inter correlation among the yield components were presented.

Plant height
Plant height showed highly positive genotypic correlated with plant spread 120 DAT in N-S direction (0.637), plant spread 120 DAT in E-W direction (0.717), primary branches in 120 DAT (0.798), number of leaves per plant (0.977), 100 flower weight (0.346), number of

flowers per spike (0.366), number of spikes per plant (0.813), rachis length (0.539) and yield per plant (0.530).

Plant spread (N-S direction)
Plant spread exhibited positive genotypic correlation with plant spread 120 DAT in E-W direction (0.835), number of primary branches at 120 DAT (0.679), number of leaves per plant (0.649), 100 flower weight (0.107), number of flowers per spike (0.571), number of spikes per plant (0.682), rachis length (0.765) and yield per plant (0.591).

Plant spread (E-W direction)
Plant spread revealed positive genotypic correlation with primary branches at 120 DAT (0.593), number of leaves per plant at 120 days (0.664), 100 flower weight (0.006), number of flowers per spike (0.814), number of spikes per plant (0.758), rachis length (0.906) and yield per plant (0.619).

Primary branches in 120 DAT
Primay branches showed positive genotypic correlation with number of leaves per plant at 120 days (0.866), 100 flower weight (0.635), number of flowers per spike (0.379), number of spikes per plant (0.907), rachis length (0.555) and flower yield per plant (0.788).

Number of leaves per plant at 120 days
Number of leaves per plant exhibited positive genotypic correlated with 100 flower weight (0.422), number of flowers per spike (0.358), number of spikes per plant (0.859), rachis length (0.537) and yield per plant (0.611).

100 flower weight
100 flower weight revealed positive genotypic correlation with number of spikes per plant (0.569), rachis length (0.011), yield per plant (0.536) and negatively correlation with number of flowers per spike (-0.010)

Number of flowers per spike
Number of flowers per spike showed positive genotypic correlation with number of spikes per plant (0.622), rachis length (0.946) and yield per plant (0.585).

Number of spikes per plant
Number of flowers per spike showed positive genotypic correlation with rachis length (0.719) and yield per plant (0.905).

Rachis length
Rachis length exhibited positive genotypic correlation with yield per plant (0.634).

Discussion
The correlation coefficient shows a strong association between plant morphological characters coupled with yield. A positive correlation between desirable characters is favorable to the plant breeder for using the genotypes in improvement of both the characters. Yield per plant was positively and significantly correlated with number of primary branches, number of spikes per plant and rachis length. Positive and significant correlation was also recorded in rachis length, plant spread, number of spikes per plant and number of flowers per spike. Number of spikes per plant was positively and significantly correlated with plant height, plant spread, number of primary branches and number of leaves. Positive and significant correlation was observed in number of flowers per spike with plant spread. 100 flower weight was positively and significantly correlated with number of primary branches. Number of leaves was positively and significantly correlated with plant height, number of primary branches and plant spread. Number of primary branches was positively and significantly correlated with plant height and plant spread. Positive and significant correlation was noted in plant spread and plant height. Similar observation was reported by Poornima *et al.* (2006) [7] in China aster and Kumar *et al.* (2012) [5] in chrysanthemum. John *et al.* (1994) [3] in Zinnia, Singh and Kumar (2008) [9], Karuppaiah and Kumar (2011) [4], Anuja and Jahnavi (2012) [1] and Panwar *et al.* (2014) [6] in African marigold and Sharma and Raghuvanshi (2011) [8] in French marigold observed significant and positive association for flower size with single flower weight. Bharathi (2014) [2] also observed significant and positive association for this trait with flower compactness. Single flower weight recorded highly significant and positive correlations with flower compactness in both cross combinations. Similar result was observed by Bharathi (2014) [2].

Genotypic correlation coefficient for different characters of crossandra genotypes

	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
1	1	0.637*	0.717*	0.798**	0.977**	0.346	0.366	0.813**	0.539	0.530
2		1	0.835**	0.679*	0.649*	0.107	0.571	0.682*	0.765**	0.591
3		.	1	0.593	0.664*	0.006	0.814**	0.758*	0.906**	0.619
4				1	0.866**	0.635*	0.379	0.907**	0.555	0.788**
5					1	0.422	0.358	0.859**	0.537	0.611
6						1	-0.010	0.569	0.011	0.536
7							1	0.622	0.946**	0.585
8								1	0.719*	0.905**
9									1	0.634*
10									.	1

1. Plant height 120 DAT
2. Plant spread 120 DAT in N-S direction
3. Plant spread 120 DAT in E-W direction
4. Primary branches in 120 DAT
5. Number of leaves
6. 100 flower weight
7. Number of flowers per spike
8. Number of spikes per plant
9. Rachis length
10. Yield per plant

*Significant at 5% level
**Significant at 1% level

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