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Influence of nitrogen and potassium on spike characters of crossandra (*Crossandra infundibuliformis* L.)

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Abstract

The results of the experiment indicated that, the application of nitrogen + potassium @ 150 kg + 60 kg followed by 100 kg + 120 kg significantly improved spike parameters viz., spike length, spike girth, number of spikes/plant.

Keywords: crossandra, NK levels, spike characters

Introduction

Flowers are the symbol of love, beauty and tranquility, express human sentiments and beautify environment. They are the souls of environment and convey the message of nature. Crossandra (or) Fire Cracker plant (*Crossandra infundibuliformis* L.) is native of India. It is an important group of flowering plants cultivated on a commercial scale and is being grown extensively in South India. The cultivars with orange coloured flowers are generally preferred for commercial cultivation. The plants are quite hardy and can be grown for flowerbeds and /or for loose flowers. Chromosome number is $2n=40$. It is known as Kanakambara in Karnataka and Southern states of India. The word crossandra is derived from Greek words 'krossoi' meaning fringe and 'aner' meaning male, thus word crossandra means fringed stamens. It does not have fragrant flowers but it is still desired for its distinct colour that has attracted the heart of every human being. It is an evergreen shrub of minor importance. It belongs to the family Acanthaceae. This is a large family of about 200 genera containing 2000 species. It consists of five cultivars, namely, orange, yellow, red, deep orange and bluish flowered forms. It is a sturdy, productive ornamental that should be more popular with indoor gardens. The bright orange coloured flowers are widely used in temple offerings and for making gajras and venis to use as hair adornments.

Research Methods

A field experiment entitled 'Influence of nitrogen and potassium on spike characters of crossandra (*Crossandra infundibuliformis* L.) conducted at Horticultural College and Research Institute, Venkataramannagudem, West Godavari district, Andhra Pradesh. The experiment comprising 16 treatment combinations consisted of four levels of nitrogen (0, 50, 100, 150 Kg/ha) and four levels of potash (0, 60, 120, 180 Kg/ha) were tried in Factorial Randomized Block Design with three replications.

Research findings and discussion**Spike length (cm)**

The length of spike was found to show a significant increase with increase in the dose of nitrogen up to 150 kg ha⁻¹ and potassium up to 60 kg ha⁻¹ only. The combination of nitrogen and potassium was found to be more efficient in bio-mass production with better availability of photosynthates. It is well established that nitrogen is one of the major essential elements, which regulates the cell or tissue functions of the plant being essential part of the nucleic acid, mitochondria and cytoplasmic contents of the cells. Nitrogen has a strong control on vegetative and reproductive stages of the plants. The role of potassium in plants includes cation transport across membrane, water economy, energy metabolism and enzyme activity.

Potassium increases carbon exchange and enhances carbohydrate movement. The results are in conformity with the findings of Patel *et al.* (2010) [4], Lehri *et al.* (2011) [3] in gladiolus.

Spike girth (cm)

The spike girth was found to show a significant increase with every increase in the dose of nitrogen upto 150 kg and potassium at 60 kg. The combination of nitrogen and potassium was found to be more efficient in bio-mass production with better availability of photosynthates. These results are in conformity with the findings of Khan *et al.* (2012) [2] and Shaukat *et al.* (2012) [5] in gladiolus.

Number of spikes/plant

Number of spikes/plant was found to increase with every increase in the nitrogen level up to 150 kg ha⁻¹. Supply of potassium could bring about an improvement in this parameter up to 60 kg ha⁻¹ only. It is evident that better number of spikes per plant were recorded by nitrogen at 150 kg and potassium at 60 kg individually and also in combination. This combination could have encouraged the plant to put up more dry matter by increased photosynthetic surface or leaf area leading to better outturn of photosynthates which might have stimulated more floral buds and leading to a better number of spikes per plant. Similar results were reported by Dalvi *et al.* (2008) [1], Khan *et al.* (2012) [2] in gladiolus.

Table 1: Effect of different levels of nitrogen and potassium on spike length (cm) in crossandra

Treatment	120 DAT					180 DAT				
	K ₀	K ₆₀	K ₁₂₀	K ₁₈₀	Mean	K ₀	K ₆₀	K ₁₂₀	K ₁₈₀	Mean
N ₀	3.84	4.35	4.51	4.60	4.32	7.34	7.54	7.61	7.63	7.53
N ₅₀	4.63	4.74	4.08	4.80	4.74	7.90	8.01	7.96	8.15	7.78
N ₁₀₀	4.90	5.16	5.59	5.30	5.23	8.18	8.22	8.49	8.23	8.28
N ₁₅₀	5.39	5.81	5.41	5.40	5.51	8.26	8.67	8.34	8.39	8.41
Mean	4.69	5.01	4.89	5.00		7.92	8.11	8.09	8.10	
Source	N	K	N×K				N	K	N×K	
SE m±	0.26	0.26	0.52				0.17	0.17	0.34	
CD at 5%	NS	NS	NS				0.51	NS	NS	

Table 2: Effect of different levels of nitrogen and potassium on spike girth (cm) in crossandra

Treatment	120 DAT					180 DAT				
	K ₀	K ₆₀	K ₁₂₀	K ₁₈₀	Mean	K ₀	K ₆₀	K ₁₂₀	K ₁₈₀	Mean
N ₀	2.83	2.88	3.05	3.06	2.95	3.39	3.47	3.47	3.49	3.45
N ₅₀	3.06	3.07	3.10	3.11	3.08	3.51	3.53	3.53	3.54	3.52
N ₁₀₀	3.12	3.13	4.03	3.13	3.35	3.55	3.55	4.41	3.59	3.77
N ₁₅₀	3.21	4.31	3.28	3.75	3.63	3.72	4.65	3.08	4.29	3.93
Mean	3.05	3.37	3.36	3.26		3.54	3.80	3.62	3.72	
Source	N	K	N×K				N	K	N×K	
SE m±	0.15	0.15	0.30				0.16	0.16	0.32	
CD at 5%	NS	NS	0.88				NS	NS	NS	

Table 3: Effect of different levels of nitrogen and potassium on number of spikes/plant in crossandra

Treatment	120 DAT					180 DAT				
	K ₀	K ₆₀	K ₁₂₀	K ₁₈₀	Mean	K ₀	K ₆₀	K ₁₂₀	K ₁₈₀	Mean
N ₀	2.94	4.43	7.02	10.08	6.12	8.70	10.67	10.83	12.18	10.59
N ₅₀	11.07	14.40	16.91	17.44	14.95	13.93	15.06	15.61	17.08	18.42
N ₁₀₀	22.82	23.09	32.76	26.79	25.58	18.35	21.33	31.98	25.05	30.94
N ₁₅₀	27.83	39.81	28.04	29.61	32.11	27.03	41.17	27.21	29.20	36.39
Mean	17.39	21.29	19.64	20.43		17.54	22.09	19.63	22.07	
Source	N	K	N×K				N	K	N×K	
SE m±	0.26	0.26	0.32				0.49	0.49	0.98	
CD at 5%	0.76	0.76	1.52				1.42	1.42	2.84	

Conclusion

Overall results indicate that the treatment combination of N₁₅₀ P₆₀ kg ha⁻¹ is the optimum for the cultivation of crossandra under coastal Andhra Pradesh.

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