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E: ISSN NO.: 2349-980X **Shrinkhla Ek Shodhparak Vaicharik Patrika**

Effect of Micronutrients on Flower Yield and Quality of Various Genotypes of Gerbera

S.L.Pal
Associate Professor,
Deptt. of Horticulture,
R.S.M.(P.G.) College,
Dhampur , Bijnor, Uttar Pradesh

Devi Singh
Assistant Professor,
Deptt. of Horticulture,
SHUATS,
Allahabad, Uttar Pradesh

Abstract

The present investigation on Response of micronutrients on flower yield and quality of various genotypes of Gerbera was conducted at Floriculture research field, Department of Horticulture, SHUATS Allahabad. During the year 2016-2017, the experiment was laid out in a two factor Randomized Block Design having 15 treatments with three replications. The 15 treatments comprised of five various genotypes of Gerbera including three levels of three micronutrients combination (Fe+Zn+Mn). The result obtained that var. Venizia was found to be best among the five varieties; it shows better performance in terms of flower yield i.e. number of cut flower per plant (10.40), first flower bud emergence (80.69 days). With quality aspects variety Kento registered maximum stalk length of flower (57.25 cm), stalk diameter (0.54 cm) and shelf-life of flowers (14.78 days). Among micronutrients combination, 0.2% of Fe+Zn+Mn shows superior over all other interacting combination in relation to flower yield and quality.

Keywords: Gerbera, Micronutrients (Fe+Zn+Mn).

Introduction

Gerbera is a cut flower crop with increasing commercial significance, is an excellent herbaceous perennial cut flower, having good demand in the both domestic and international markets (Rajiv and Yadav, 2005). Gerbera is gaining lot of importance in recent days. The improvement of gerbera depends on the selection of stable genotypes for different agro climatic conditions. However, performance of each gerbera varieties varies with the region, season and growing conditions. Micronutrients are essentially as important as macronutrients to have better growth, yield and quality in plants. Damke and Bhattacharjee (2000) reported that NPK fertilization supplemented by foliar nutrients viz. Zinc, Iron, Manganese and Copper, increased yield. In the past, there was no need of micronutrients because these trace elements were naturally supplied by soil. But due to intensive cultivation, increase in salinity and soil pH in most of soils, these nutrients are present but are not available to plants (Ahmad *et.al,* 2010). Micronutrients have a great bearing in influencing the yield attributes and flower production. Zende (1996) has been reported the role of micronutrients in various metabolic processes and the enzymes involved in these processes. Muthumanickam *et al.(*1999) In gerbera, higher flower yield per plant, increased flower diameter and plant height was obtained with foliar feeding of plants with ferrous sulphate + zinc sulphate + manganese sulphate.

Aim of Study

The present study was aimed to find out the Effect of Micronutrients on Flower Yield and Quality of Various Genotypes of Gerbera.

Review of Literature

Damke, and Bhattacharjee, (2000), experimented on fertilization in Rose cv, 'Superstar', and find out that the flower yield and quality of flower was significantly associated with fertilization with NPK. Khoshgoftarmanesh, et al (2008) find out the growth, nutritional status and flower quality of rose cultivars in soilless culture was Influenced with additional supply of micronutrient. Similarly flower yield, quality and nutrient content was very much influenced with Foliar Application of Micronutrients on Gerbera. Mukesh Kumar et al (2017) and Muthumanickam, et al (1999),

also find the similar results on gerbera crop in different experiments.

Naveen kumar, et al (2009) suggested that the growth and flowering of chrysanthemum is effected by spraying of different micronutrient.

Pal S,et al (2016). Suggested that the foliar application of micro nutrient specially Fe and Zn affect the growth, flowering and yield of gerbera (Gerbera jamesonii) under protected condition.

Materials and Methods

The present experiment was conducted at floriculture section, Department of Horticulture, SHUATS, Allahabad, during 2016-2017, in a randomized block design replicated thrice to evaluate the dose of micronutrients for various growth and flowering characters in Gerbera. The experimental site is situated at a latitude of 25o 45' N and longitude of 80o 81' E and at an altitude of 98 meters above mean sea level (MSL). Minimum temperature ranged from 4o -5o C (during Oct - Feb) and maximum temperature ranged from 45o – 48o C (during March - June). Five genotypes with uniform sized tissue cultured plants were planted during August 2016, maintaining a spacing of 30 cm either side. The combination of micronutrients solutions were prepared as per the requirement i.e. 0, 0.2 and 0.4 percent sprayed to each genotypes and repeated at 15 days intervals. Five pants recording observations. The recommended package of practices was followed for raising the successful crop. Data on flower quality and yield characters were recorded three months after transplanting when the plants were fully grown.

Results and Discussion

The mean performances of the cultivars for various yield parameters have been presented in Table No.1. All the cultivars were showing significant difference for yield parameters. The varieties showed significant result in case of number of cut flowers per plant. Maximum number of cut flowers per plant was found in Venizia (10.40) followed by Pink Intezz and Daphane, 9.07 and 8.96 respectively and minimum number of cut flowers per plant was obtained in Shania (8.42). The response of micronutrients combination also shows significant results, maximum number of cut flower per plant (9.45) was found with M_1 (0.2% (Fe+Zn+Mn)) followed by M_2 [0.4% (Fe+Zn+Mn) (9.08)] and the minimum number of cut flower per plant (8.67) was measured with M_0 (control). Similar trends were also registered in cut flower yield per plot and cut flower yield per hectare as shown in Table No. 1.This increases due to the inherent characters of individual cultivars, favorable micro-climate under the polyhouse conditions as well as micronutrients which also play a major role in growth and yield. Flower yield is also increased due to significant correlation between cultivars and micronutrients combination. The similar observations have been reported by Muthumanickam *et al.*(1999) in Gerbera, Damke, Mukesh *et al* (2017), Pal *et al* (2015) and Bhattacharjee (2000) in Rose.

Table No.2 reveals that flower quality parameters such as days to first flower bud emergence, flower diameter (cm), Stalk length (cm), Stalk diameter (cm) and Self life of flower (days) differed significantly among different cultivars and micronutrient combination. The varieties as showed significant result in case of first flower bud emergence showed in Table No.2. The first flower bud emergence was found minimum in Venizia (80.69) followed by Pink Intezz 82.62 and maximum number of days for first flower bud initiation was obtained in Daphane (86.40).The response of micronutrients combination also shows significant results, least number of days for first flower bud initiation was observed (83.40) with M_1 (0.2% (Fe+Zn+Mn)) followed by M_2 [0.4% (Fe+Zn+Mn) (83.64)] and maximum number of days for first flower bud initiation (84.64) was measured with M_0 (control). However, first flower bud initiation was generally early in cultivars having more number of suckers, plant height and spread, this cultivar might be due to significant correlation between cultivar and micronutrient combination. The similar studies have been reported by Muthumanickam *et al.*(1999) in Gerbera.

The mean performances of the cultivars for flower diameter (cm) have been presented in Table No.2. All the cultivars were showing significant difference for flower diameter (cm). Maximum flower diameter was found in Daphane (10.18 cm) followed by Kento 9.95 cm and minimum flower diameter was obtained in Shania (7.98 cm).The response of micronutrients combination shows that also significantly results .there was found the maximum flower diameter 9.40 cm with M_1 (0.2% (Fe+Zn+Mn)) followed by 9.12 cm M_2 (0.4% (Fe+Zn+Mn)) and minimum flower diameter was measured 8.95cm with M_0 (control). This increase may be due to the genetic characters of individual cultivars and also effect of micronutrients combination. The similar observations have been reported by Mukesh *et al* (2017), Pal *et al* (2015), Muthumanickam *et al.* (1999) in Gerbera and Ahmad *et al.* (2010) in Rose.

The outcome of the investigation revealed that stalk length, stalk diameter and vase-life of flowers differed significantly among the different cultivars and micronutrients combination (Table No.2). Maximum stalk length, stalk diameter and vase-life of flowers was found in Kento cultivar with 57.25 cm, 0.54 cm and 14.78 days respectively and minimum stalk length, stalk diameter and vase-life was obtained in Shania cultivar with 53.77 cm, 0.34 cm and 12.84 days respectively. The response of micronutrients combination shows that also significantly results, there was found the maximum stalk length, stalk diameter and vase-life with 56.50 cm, 0.45 cm and 14.01 days with M_1 (0.2%, Fe+Zn+Mn) and minimum stalk length, stalk diameter and vase-life was obtained in M_0 (control) with 55.80 cm, 0.42 and 13.59 days. The interaction between varieties and micronutrients combination was found significant for number of cut flowers per plant, cut flowers yield per plot, cut flowers yield per hectare, first flower bud emergence and vase-life flowers, non-significant for flower diameter, stalk length and stalk diameter. Higher stalk length

and stalk diameter attained might be due to the inherent characters of individual cultivars. The variations in size and quality of the gerbera flower were dependent upon the difference in the cultivars, environmental and seasonal conditions. These results are in accordance with the results reported by Mukesh *et al* (2017), Pal *et al* (2015), in Chrysanthemum and Ahmad *et al.* (2010) in Rose. In vase-life among the cultivars may be attributed to variations in their genetically make up and also effect of micronutrients combination. Earlier, Mukesh *et al* (2017), Pal *et al* (2015), Khoshgftarmanesh *et al.*(2008) in Rose have reported the similar results.

Conclusion

On the basis of the above findings, it may be concluded that the cultivar Venizia was showed good response in terms of number of cut flower per plant (10.40), cut flower yield per plot (104.67), first flower bud emergence (80.69 days). Kento cultivar shows best performance for stalk length (57.25 cm), stalk diameter (0.54 cm) and vase-life (14.78 days) of flower among all varieties. Among micronutrients combination, 0.2% of Fe+Zn+Mn was found superior over all other interacting combination in relation to flower yield and quality.

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Table No.1 : Micronutrients Combination Influences on Different Cultivars of Gerbera on Yield Parameters

	Number of cut flowers per plant				Cut flowers per plot				Cut flowers per hectare (lakh No.)			
Varieties	Control	M1	M2	Mean	Control	M1	M2	Mean	Control	M1	M2	Mean
V1	9.73	11.2	10.27	10.4	99.33	112	102.67	104.67	11.03	12.44	11.4	11.62
V2	8.07	8.87	8.33	8.42	80.67	88.67	83.33	84.22	8.96	9.85	9.25	9.35
V3	8.2	8.47	8.8	8.49	82	84.67	88	84.89	9.11	9.4	9.77	9.43
V4	8.67	8.8	9.4	8.96	86.67	88	94	89.56	9.62	9.77	10.44	9.95
V5	8.67	9.93	8.6	9.07	86.67	97.33	86	90	9.62	10.81	9.55	9.99
Mean	8.67	9.45	9.08	9.07	87.07	94.13	90.8	90.67	9.67	10.45	10.08	10.07
	C.D. 5%				C.D. 5%				C.D. 5%			
V	0.36				3.57				3.97			
M	0.28				2.77				3.07			
V x M	0.62				6.19				6.87			

Table No.2 : Micronutrients Combination Influences on Different Varieties of Gerbera on Qualitative Parameters

	First flower bud initiation				Flower diameter (cm)				Stalk length (cm)				Stalk diameter (cm)				Vase-life of flower (days)			
Varieties	Control	M1	M2	Mean	Control	M1	M2	Mean	Control	M1	M2	Mean	Control	M1	M2	Mean	Control	M1	M2	Mean
V1	81.6	79.6	80.87	80.69	8.64	9.15	8.93	8.91	55.61	56.51	56.11	56.08	0.38	0.42	0.4	0.4	13.6	14.13	13.93	13.89
V2	84.87	84.67	84.4	84.64	7.92	8.09	7.94	7.98	53.55	54.03	53.75	53.77	0.33	0.34	0.34	0.34	13	12.6	12.93	12.84
V3	85.93	84.87	84.53	85.11	9.68	10.21	9.95	9.95	56.91	57.51	57.31	57.25	0.51	0.56	0.53	0.54	14.4	15.07	14.87	14.78
V4	87.4	85.67	86.13	86.4	9.95	10.5	10.08	10.18	56.31	57.11	56.71	56.71	0.41	0.43	0.42	0.42	13.33	13.67	13.53	13.51
V5	83.4	82.2	82.27	82.62	8.58	9.05	8.68	8.77	56.61	57.31	57.01	56.98	0.45	0.5	0.48	0.47	13.6	14.6	14.47	14.22
Mean	84.64	83.4	83.64	83.89	8.95	9.4	9.12	9.16	55.8	56.5	56.18	56.16	0.42	0.45	0.43	0.43	13.59	14.01	13.95	13.85
	C.D.5%				C.D.5%				C.D.5%				C.D.5%				C.D.5%			
V	0.46				0.12				0.48				0.02				0.25			
M	0.35				0.10				0.38				0.02				0.19			
V x M	0.79				0.21				0.84				0.03				0.43			

V1- Venizia, V2- Shania, V3- Kento, V4- Daphne and V5- Pink intezz. M1- 0.2% Fe+Zn+Mn and M2- 0.4% Fe+Zn+Mn