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RESPONSE OF DIFFERENT PRESERVATIVES ON VASE LIFE AND QUALITY OF *GLADIOLUS* FLOWER *CV.* YELLOW STONE.

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Abstract

The experiment was conducted at the laboratory of the Department of Horticulture, Raja Balwant Singh College, Bichpuri, Agra (U.P.) during 2016-17 to find out the response of different preservatives on vase life and quality of Gladiolus flower *cv.* Yellow stone. The investigation was conducted under "Completely Randomized Design having nine treatment combinations *i.e.* T_1 (Tap water), T_2 (Sucrose 2%), T_3 (Sucrose 4%), T_4 (Sodium benzoic acid 100ppm), T_5 (Sodium benzoic acid 200ppm), T_6 (Sodium thiosulphate 150ppm), T_7 (Sodium thiosulphate 300ppm), T_8 (Acetic acid 100ppm) and T_9 (Acetic acid 200ppm) which was replicated thrice. On the basis of the statistical analysis the Vase life of gladiolus spike was found to be significantly maximum with T_7 (Sodium thiosulphate 300ppm) as compared to other treatment combination.

Key words: Vase life, *Gladiolus*, preservatives, Yellow stone.

Introduction

Gladiolus (*Gladiolus grandiflorus* L.) belongs to the family "Iridaceae" and sub-family "Exioideae". Gladiolus was introduced in India in 16th-19th century by the Britishers. The origin place of this plant is said to be South Africa. Gladiolus being a potential cut flower is grown globally for its attractive spike(Sinha and Roy, 2002). Owing to unsurpassed beauty and economic value, Gladiolus has gained popularity in many part of the world. The major producing countries are the United State (Florida and California), Holland, Italy, France, Poland, Bulgaria, Brazil, India, Australia and Israel. Gladiolus is grown as flower bed in gardens and used in floral arrangement for interior decoration as well as making high quality bouquets (Lepcha *et al*., 2007) and it is also grown largely for both cut flowers and garden display purposes.

Gladiolus is the next most important cut flower after rose in India. Earlier it was considered a crop for temperate regions and its production was restricted to the hilly areas, particularly in the North-Eastern region, which still continues to supply the planting material to most part of the country. However, with improved agronomic techniques and better management, the Northern plains of Delhi, Haryana, Panjab, Uttar Pradesh as well as Maharashtra and Karnataka have emerged as the major area for production of gladiolus.

There are now a large number of varieties of gladiolus with different colors, size , types of florets and petal structure available in the world which has arisen as results of inter- specific and inter-varietal hybridization in every year, there is remarkable addition of new varieties.

The use of floral preservatives is the most economical practical method for extending post-harvest life of gladiolus cut flower. The vase life of cut flower is influenced by constant water supply, checking of microbial growth prevention of ethylene formation and energy source. Several types of floral preservatives in the form of germicide, ethylene antagonistic and source of energy(sucrose) are in use to preserve the flower quality and post-harvest longevity of cut flowers(Sukla and Kher, 2009).

Samanth and Dass (2005) reported that an ideal floral preservatives should contain energy source and chemical having germicidal and germistatal effect. The vase life of flowers varies with the variety. Different varieties perform differently under preservative treatments. The vase life of cut flowers is influenced by variety of factor like climate, crop variety, harvesting time, post-harvest handling etc.

Materials and Methods

The experiment was carried out under ambient conditions in the laboratory of Department of Horticulture, Raja Balwant Singh College, Bichpuri, Agra during 2017-18.The laboratory is situated at about 11 km to the west of Agra-Bharatpur road at latitude of $27^{0}2$ N and longitude of $77^{0}9$ E at an elevation of 163.4m above sea level . The Agra tract has a tropical and subtropical climate with hot dry summer and sever winter. Under normal climate condition the area receives about 670mm. annual rain fall, around 80% of which occurs from July to September. The mean annual maximum and minimum atmospheric temperature are 47.5^{0} and $1\text{-}2^{0}$ respectively. During summers (May-June), the dry westerly winds, locally known as "*Loo*" also blow with considerable velocity.

The investigation was laid out under "Completely Randomized Design having nine treatment combinations *i.e.* T_1 (Tap water), T_2 (Sucrose 2%), T_3 (Sucrose 4%), T_4 (Sodium benzoic acid 100ppm), T_5 (Sodium benzoic acid 200ppm), T_6 (Sodium thiosulphate 150ppm), T_7 (Sodium thiosulphate 300ppm), T_8 (Acetic acid 100ppm) and T_9 (Acetic acid 200ppm) which was replicated thrice.

The experimental Gladiolus cultivar "*Yellow Stone*" was used for this study. Its takes about 99 days for flowering, spike length 68 cm, 14 florets per spike, florets colour golden and ruffed, 4 cormel production per plant. The experimental flowers were held in the laboratory at about 22 ± 2^{0}C ambient room temperature and $80 \pm 5\%$ relative humidity (RH).

The experimental cut spike were harvested in early morning and were treated with 0.5% $HgCl_2$ solution emediotly. The required concentration off all solution were kept in 500 ml flask plugged with cotton bolls. The flower spike were placed in the pre-conditioned solution after pre-cooling for 12-24 hours at 22 ± 2^{0}C room temperature. The duration between the opening of first and wilting of 6^{th} floret from the base of spike was taken as actual vase life as suggested by Suneetha and Kumar(1998).

Results and Discussion

The recorded data regarding vase life and quality of gladiolus flower were presented in table 1 and table 2. The results presented in the table 1 showed that different

Table 1: Response of different preservatives on quality parameters and vase life of Gladiolus flower.

Treat ments	Days taken of basal floret open	Weight loss of spike (gm)	Increase rachis length (cm)	Percentage of opened florets(%)	Solution uptake (ml)	Vase life of gladiolus spike(days)
T_1	2.74	36.17	4.00	80.36	116.31	9.33
T_2	3.82	12.84	7.58	90.88	118.14	13.33
T_3	2.68	20.00	7.08	91.58	118.48	12.60
T_4	2.35	23.83	8.25	90.17	151.83	12.50
T_5	3.48	7.50	6.72	91.15	156.48	13.16
T_6	3.25	15.17	8.58	92.10	159.48	14.76
T_7	4.78	7.00	9.33	92.30	183.48	15.33
T_8	2.51	12.67	7.12	83.51	175.14	12.83
T_9	2.78	13.16	6.08	89.21	144.15	11.66
CD at 5% level of probability						
	0.962	14.421	0.216	0.516	0.932	0.611

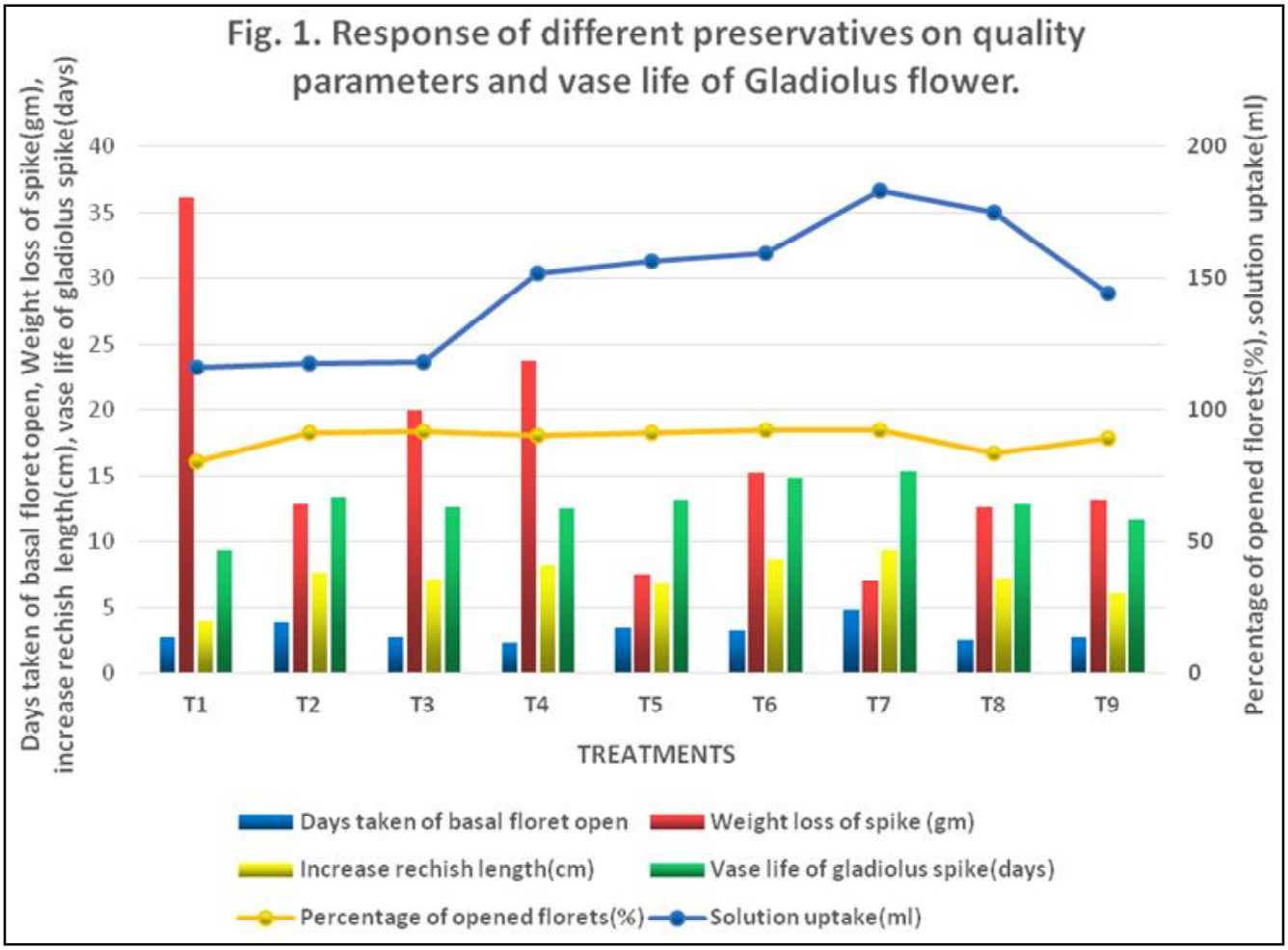
Table 2: Response of different preservatives on length and diameter of first, third and last fully opened pair of florets.

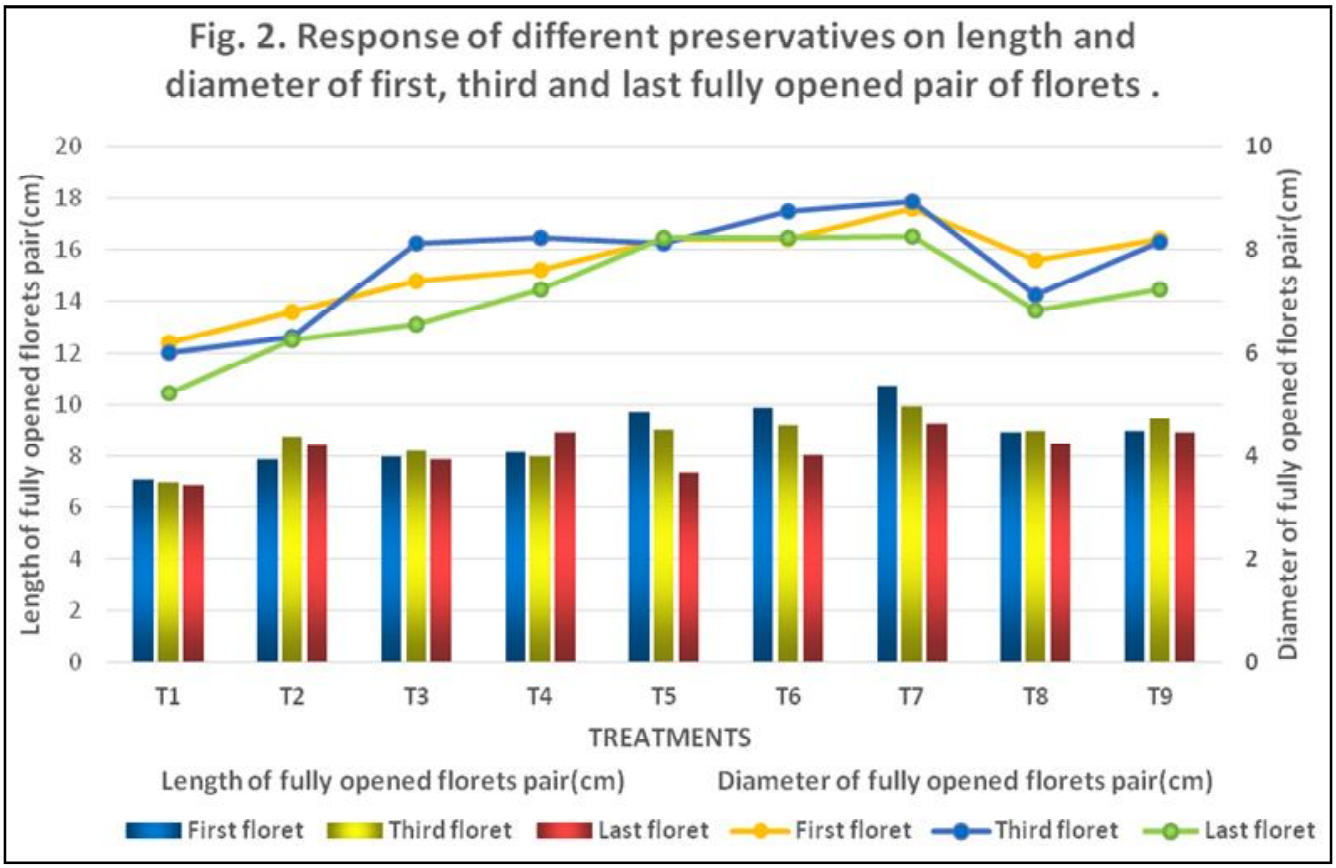
	Length of fully opened florets pair (cm)			Diameter of fully opened florets pair (cm)		
	First floret	Third floret	Last floret	First floret	Third floret	Last floret
T_1	7.12	7.03	6.88	6.20	6.01	5.23
T_2	7.94	8.78	8.48	6.80	6.32	6.26
T_3	8.02	8.24	7.92	7.40	8.12	6.56
T_4	8.18	8.02	8.98	7.60	8.23	7.23
T_5	9.75	9.08	7.39	8.20	8.12	8.23
T_6	9.91	9.25	8.09	8.20	8.74	8.24
T_7	10.80	9.99	9.29	8.80	8.93	8.25
T_8	8.93	8.99	8.54	7.80	7.12	6.83
T_9	9.01	9.52	8.98	8.20	8.14	7.23
CD at 5% level of probability						
	0.887	0.451	0.304	0.351	0.198	0.876

treatments were significantly affected on different observations except fresh weight change of gladiolus spike(gm**)**. The maximum days taken of basal floret open(4.78) was recorded with T_7 (Sodium thiosulphate 300ppm) followed by T_2 and T_5. The minimum weight loss of spike(7.0gm) was found with T_7 (Sodium thiosulphate 300ppm) followed by T_5 and T_8. The maximum rachis length of gladiolus spike (9.33cm) was noted with T_7(Sodium thiosulphate 300ppm) followed by T_6 and T_4. The maximum percentage of floret open of gladiolus spike (92.30%) was noted with T_7 (Sodium thiosulphate 300ppm) followed by T_6 and T_3. The maximum solution uptake (183.48ml) was recorded with T_7 (Sodium thiosulphate 300ppm) followed by T_8 and T_6. Likewise the maximum vase life of gladiolus spike (15.33days) was noted with T_7 (Sodium thiosulphate 300ppm) followed by T_6 (Sodium thiosulphate 150ppm) which was found at par to each other where as, the minimum vase life (9.33 days) was found in T_1 (tap water). This may be due to sodium thiosulphate as increase in spike length and vase life is growth process and it acts as respiratory substrate and enhancer of H_2O uptake which was earlier reported by Sheik *et al.,* (2005) and Soad *et al.,* (2011).

The data presented in table 2 indicate that the treatments have significant effect on length and diameter of first, third and last fully opened pair of florets. The data indicate that the maximum floret length of first fully open floret (10.80cm) was found with T_7 (Sodium thiosulphate 300ppm) followed by T_6, T_5 and T_9 being 9.91, 9.75 and 9.01 cm respectively. The maximum floret length of third fully open floret (9.99cm) was found with T_7 (Sodium thiosulphate 300ppm) followed by T_9, T_6 and T_5 being 9.52, 9.25 and 9.08 cm respectively. The maximum floret length of last fully open floret (9.29cm) was found with T_7 (Sodium thiosulphate 300ppm) which was significantly higher than of rest of the treatments. While treatment T_4 (8.98cm), T_9 (8.98cm) and T_8 (8.54cm) were statistically at par among them selves in this regards.

The table 2 also indicate that the maximum diameter of first fully opened florets (8.80cm) was recorded with T_7 (Sodium thiosulphate 300ppm) which was significantly superior to over all other treatments tested in this investigation. treatment T_5 (8.20cm), T_6 (8.20cm) and T_9 (8.8.20cm) were at par in this respect but had significantly





more diameter of first fully opened florets than rest of the treatment. The maximum diameter of third fully open floret (8.93cm) was recorded with T_7 (Sodium thiosulphate 300ppm) followed by T_6, T_4, T_9 and T_5 being 8.74cm, 8.23cm, 8.14cm and 8.12cm respectively. The maximum diameter of last fully open floret (8.25cm) was recorded with T_7 (Sodium thiosulphate 300ppm). The variation in diameter of last fully opened florets with treatment T_7, T_6 and T_5 was marginal and could not reach the level of significant but significantly higher diameter of last fully opened florets was obtained with these treatments as compared to rest of the treatments tested in this experiment. The findings were in close proximity with results noted by Kumar *et al.*, (2015) and Khattab *et al.*, (2017).

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