

REGULAR ARTICLE

GROWTH RETARDANTS EFFECTS ON FLOWERING AND YIELD PARAMETERS OF SPANISH JASMINE (*JASMINUM GRANDIFLORUM* L.)

R. SUDHAGAR*, S. KAMALAKANNAN

Department of Horticulture, Faculty of Agriculture, Annamalai University, Annamalai Nagar 608 002, Tamil Nadu, India

ABSTRACT

An experiment was conducted to study the effect of growth retardants on flowering and yield parameters and shelf life of spanish jasmine. The experiment comprised of eleven treatments each replicated thrice was executed following the principles of randomized block design. The treatments included foliar spray of CCC @ 1000, 1500 and 2000 ppm, alar @ 1000, 2000 and 3000 ppm, ethrel @ 1000, 1500 and 2000 ppm, pruning and untreated control. In this study, the application of CCC 1500 ppm exerted favourable influence and enhanced the flower bud characters viz., flower bud length (2.98 cm), flower stalk length (2.36 cm) and total length of the flower (5.34 cm). The yield and yield attributes viz., hundred flower buds weight (9.90 g), flower buds yield plant⁻¹ (4.23 kg), flower buds yield plot⁻¹ (33.84 kg) and flower buds yield hectare⁻¹ (14.1 t ha⁻¹) were also found to be the maximum in the plants treated with CCC 1500 ppm. The plant growth retardants did not show any significant effect on shelf life of flowers.

Keywords: Spanish jasmine, Growth retardants, CCC, Alar, Ethrel

INTRODUCTION

Spanish jasmine (*Jasminum grandiflorum* L.) is the most fascinating, versatile flower crop of commerce and is a popular traditional loose flower. It is extensively used for oil extraction and also for the preparation of jasmine concrete [1]. There are several methods that growers utilize to manipulate growth and development of the plant to achieve higher production. Among this, using of growth retardants is an appropriate practice followed in floriculture for manipulating growth and flowering of many flower crops. Plant growth retardants are used for controlling many aspects of plant growth and development, including height, flower initiation, and flower yield. Several retardants interrupt physiological pathways of hormones and enzymes, which disrupts normal growth. Many of these modes of action are far less obvious and understood than are the results that they produce.

In recent years, notable plant growth retardants like CCC, alar and Ethrel have been found to control stem elongation which leads to the production of compact plants coupled with higher yield. Their effect varies with plant species, variety, concentration used, frequency of application and various other factors which influence the uptake and translocation of the chemicals. Therefore, an attempt was made to study the influence of growth retardants viz., CCC, alar and ethrel on growth and flower yield and shelf life of

Jasminum grandiflorum.

MATERIALS AND METHODS

The present experiment was conducted in the floriculture unit, Department of Horticulture, Annamalai University to study the effect of growth retardants on flowering and yield parameters of spanish jasmine. The experiment comprised of eleven treatments each replicated thrice was executed following the principles of randomized block design. The treatments included foliar spray of CCC @ 1000, 1500 and 2000 ppm, alar @ 1000, 2000 and 3000 ppm, ethrel @ 1000, 1500 and 2000 ppm, pruning and untreated control. The cultivar of *Jasminum grandiflorum* L. used for the study was Tiruvannamalai local. It has wide adaptability to different soils and climatic conditions. Plants taken up for the experiment were already existing one, which were pruned uniformly in the last week of december. After pruning, when the new shoots appeared with sufficient good number of leaves, the first spray was given during first week of February as per the treatment schedule. One month after the first spray, second spray was done treatment wise on the same plants. Control plants were sprayed with distilled water. Various biometric observations regarding flowering and yield were recorded. The data obtained from the field observations and laboratory experiments were analysed using 'F' test for significance following the method described by Panse and Sukhatme [2].

Received 07 November 2017; Accepted 29 December 2017

*Corresponding Author

R. Sudhagar

Assistant Professor, Department of Horticulture, Faculty of Agriculture, Annamalai University, Annamalai Nagar 608 002, Tamil Nadu, India

Email: sudhaflori@gmail.com

©This article is open access and licensed under the terms of the Creative Commons Attribution License (<http://creativecommons.org/licenses/by/4.0/>) which permits unrestricted, use, distribution and reproduction in any medium, or format for any purpose, even commercially provided the work is properly cited. Attribution — You must give appropriate credit, provide a link to the license, and indicate if changes were made.

RESULTS AND DISCUSSION

Application of growth retardants was found to produce significant effects on the flowering characteristics of Spanish jasmine. Early flowering (59.07 d) (table 1) was observed with CCC 1000 ppm followed by CCC 1500 ppm and alar 3000 ppm. Maximum delay in flowering was observed with control. Our results are in agreement with the reports of Sathyanarayana Reddy *et al.* [3] in tuberose. Reduced level of endogenous gibberellins might be a prerequisite for floral induction which was achieved by the retardants sprays. In a previous study, there was early flowering in CCC treated jasmine plant [4] because of the anti-gibberellin action of CCC.

In the present study, among the treatments, CCC 1500 ppm recorded the highest flower bud length (2.98 cm), flower stalk length (2.36 cm) and total flower length (5.34 cm) (table 1) and it was significantly superior to all treatments followed by CCC 1000 ppm. The least number of flowers were observed in the untreated plants. This goes in line with earlier reports by Jitendra Kumar *et al.* [5] in tuberose, Munikrishnappa and Chandrashekar [6] in China aster. The production of big sized flowers due to growth retardants might be due to the indirect effect of more number of laterals, increased number of leaves with thick texture as stimulated and developed by the influence of such chemicals. However, the flower diameter (table 1)

was not influenced by the application of growth retardants in *J. grandiflorum*. The results of the present study are in confirmation with the earlier findings of Kumar and Haripriya [7] in nerium.

In the present investigation, spraying of growth retardants enhanced the hundred flower buds weight (9.90 g), the flower yield plant⁻¹ (4.23 kg), flower buds yield plot⁻¹ (33.84 kg) and flower yield hectare⁻¹ (14.1 t ha⁻¹) (table 2). Among the various treatments, CCC 1500 ppm recorded the maximum flower yield followed by CCC 1000 ppm. The values were minimum in the control. The results of the present study are in agreement with the findings of Meera Manjusha [8] in gerbera and Patil *et al.* [9] in golden rod. It is a well-known fact that all the growth retardants can suppress apical dominance, resulting in increased biometric characters like more number of branches and leaves ultimately leading to maximum leaf area compared to the control. This may lead to the production of more photosynthates that were diverted to the Sink (flower) and thereby increased number of flowers with better size, weight and ultimately the yield [10, 11].

Even though the application of growth retardants in *J. grandiflorum* increased the shelf life (table 2) when compared to the control there was no significant difference among the treatments. This result is in conformity with the findings of Kumar and Haripriya [7] in nerium.

Table 1: Effect of growth retardants on flowering parameters of spanish jasmine (*Jasminum grandiflorum* L.)

Treatments	Number of days taken for first bud appearance	Length of flower bud (cm)	Length of flower stalk (cm)	Total flower length (cm)	Flower diameter (cm)
T ₁ -Pruning	71.54	1.14	1.58	2.72	4.408
T ₂ -CCC 1000 ppm	59.07	2.46	2.27	4.73	4.716
T ₃ -CCC 1500 ppm	60.48	2.98	2.36	5.34	4.760
T ₄ -CCC 2000 ppm	63.14	1.73	2.17	3.90	4.628
T ₅ -Alar 1000 ppm	65.98	1.49	1.93	3.42	4.540
T ₆ -Alar 2000 ppm	64.59	1.46	2.08	3.54	4.584
T ₇ -Alar 3000 ppm	61.90	2.02	1.99	4.01	4.674
T ₈ -Ethrel 1000 ppm	70.50	1.15	1.65	2.80	4.451
T ₉ -Ethrel 1500 ppm	67.40	1.36	1.83	3.19	4.496
T ₁₀ -Ethrel 2000 ppm	68.94	1.25	1.74	2.99	4.451
T ₁₁ -Control (Un pruned)	73.00	1.03	1.49	2.52	4.364
CD (P=0.05)	1.33	0.10	0.08	0.12	N. S

Table 2: Effect of growth retardants on yield parameters and shelf life of spanish jasmine (*Jasminum grandiflorum* L.)

Treatments	Hundred buds weight (g)	Flower buds yield plant ⁻¹ (kg)	Flower buds yield plot ⁻¹ (kg)	Flower buds yield hectare ⁻¹ (t ha ⁻¹)	Shelf life (hrs)
T ₁ -Pruning	7.21	3.21	25.68	10.7	11.25
T ₂ -CCC 1000 ppm	9.53	4.11	32.88	13.7	12.42
T ₃ -CCC 1500 ppm	9.90	4.23	33.84	14.1	12.54
T ₄ -CCC 2000 ppm	8.90	3.84	30.72	12.8	12.11
T ₅ -Alar 1000 ppm	8.37	3.72	29.76	12.4	11.32
T ₆ -Alar 2000 ppm	8.59	3.75	30.00	12.5	12.10
T ₇ -Alar 3000 ppm	9.21	3.99	31.92	13.3	12.25
T ₈ -Ethrel 1000 ppm	7.42	3.27	26.16	10.9	11.97
T ₉ -Ethrel 1500 ppm	8.04	3.60	28.80	12.0	11.58
T ₁₀ -Ethrel 2000 ppm	7.74	3.51	28.08	11.7	11.28
T ₁₁ -Control (Un pruned)	6.73	3.06	24.48	10.2	10.48
CD (P=0.05)	0.28	0.07	0.51	0.3	NS

CONCLUSION

In the present study, use of three growth retardants viz., CCC, alar and etrel revealed that foliar spray of CCC 1500 ppm was superior in decreasing the days to first flower bud appearance and increasing flower bud length, flower stalk length, total flower length, weight and flower yield. Based on the present investigation it may be concluded that the plants treated with foliar spray of CCC 1500 ppm exhibited superior results in enhancing flowering, yield characters and shelf life and which can be commercially used for realizing better yield in spanish jasmine (*Jasminum grandiflorum*).

REFERENCES

1. Arun M, Satish S, Anima P. Phytopharmacological profile of *Jasminum grandiflorum* Linn. (Oleaceae). Chinese journal of integrative medicine. 2016;22:311-20.
2. Panse VG, Sukhatme PV. Statistical Methods for Agricultural Workers, ICAR, New Delhi; 1978;pp.145-151.
3. Sathyanarayana Reddy B, Kartar Singh, Gangadharappa PM. Effect of growth substances on flowering and shelf life of flowers of tuberose cv. Double. Karnataka J. Agric. Sci 1997;10:731-737.
4. Murali TP, Narayana Gowda JV. Effect of certain growth regulators on growth, composition and flowering in kakada (*Jasminum multiflorum*) M. Sc. (Agri.) Thesis, University of Agricultural Sciences, Bangalore; 1988.
5. Jitendra Kumar, Pushpendra Singh and Krishan Pal. Effect of growth substances on flowering and bulb production in tuberose (*Polianthes tuberosa* L.) cv. Pearl Double. J. Orn. Hort 2006;9: 227-228.
6. Munikrishnappa PM, Chandrashekar SY. Effect of growth regulators on growth and flowering of China aster (*Callistephus chinensis* [L.] Nees.) a review. Indian J Hort 2014;35:57-63.
7. Kumar S, HariPriya K. Effect of growth retardants on growth, flowering and yield of nerium (*Nerium odorum* L.) Plant Archives 2010;10:681-684.
8. Meera Manjusha AV. Effect of planting dates, growth regulators and chemicals on growth, flowering and quality of gerbera. M. Sc. (Ag.) Thesis, University of Agricultural Sciences, Dharwad; 2000.
9. Patil SR, Sathyanarayana Reddy B, Prashant, Kulkarni BS. Effect of growth substances on growth and yield of golden rod (*Solidago canadensis* L.). J. Orn. Hort 2004;7(3-4):159-163.
10. Mohamed Ahmad, Gaurishankar, Muthoo AK. Effect of paclobutrazol on growth and flowering of cosmos. Punjab Hort. J 1988;28(1-2):105-108.
11. Sujatha AN, Singh V, Sharma TVRS. Effect of plant growth regulators on yield and quality of gerbera under bay island conditions. Indian J. Hort 2002;59:100-105.