

## REGULAR ARTICLE

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

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### 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<sup>-1</sup>(4.23 kg), flower buds yield plot<sup>-1</sup>(33.84 kg) and flower buds yield hectare<sup>-1</sup> (14.1 t ha<sup>-1</sup>) 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].

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## 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<sup>-1</sup> (4.23 kg), flower buds yield plot<sup>-1</sup> (33.84 kg) and flower yield hectare<sup>-1</sup> (14.1 t ha<sup>-1</sup>) (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 <sub>1</sub> -Pruning	71.54	1.14	1.58	2.72	4.408
T <sub>2</sub> -CCC 1000 ppm	59.07	2.46	2.27	4.73	4.716
T <sub>3</sub> -CCC 1500 ppm	60.48	2.98	2.36	5.34	4.760
T <sub>4</sub> -CCC 2000 ppm	63.14	1.73	2.17	3.90	4.628
T <sub>5</sub> -Alar 1000 ppm	65.98	1.49	1.93	3.42	4.540
T <sub>6</sub> -Alar 2000 ppm	64.59	1.46	2.08	3.54	4.584
T <sub>7</sub> -Alar 3000 ppm	61.90	2.02	1.99	4.01	4.674
T <sub>8</sub> -Ethrel 1000 ppm	70.50	1.15	1.65	2.80	4.451
T <sub>9</sub> -Ethrel 1500 ppm	67.40	1.36	1.83	3.19	4.496
T <sub>10</sub> -Ethrel 2000 ppm	68.94	1.25	1.74	2.99	4.451
T <sub>11</sub> -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 <sup>-1</sup> (kg)	Flower buds yield plot <sup>-1</sup> (kg)	Flower buds yield hectare <sup>-1</sup> (t ha <sup>-1</sup> )	Shelf life (hrs)
T <sub>1</sub> -Pruning	7.21	3.21	25.68	10.7	11.25
T <sub>2</sub> -CCC 1000 ppm	9.53	4.11	32.88	13.7	12.42
T <sub>3</sub> -CCC 1500 ppm	9.90	4.23	33.84	14.1	12.54
T <sub>4</sub> -CCC 2000 ppm	8.90	3.84	30.72	12.8	12.11
T <sub>5</sub> -Alar 1000 ppm	8.37	3.72	29.76	12.4	11.32
T <sub>6</sub> -Alar 2000 ppm	8.59	3.75	30.00	12.5	12.10
T <sub>7</sub> -Alar 3000 ppm	9.21	3.99	31.92	13.3	12.25
T <sub>8</sub> -Ethrel 1000 ppm	7.42	3.27	26.16	10.9	11.97
T <sub>9</sub> -Ethrel 1500 ppm	8.04	3.60	28.80	12.0	11.58
T <sub>10</sub> -Ethrel 2000 ppm	7.74	3.51	28.08	11.7	11.28
T <sub>11</sub> -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 ethrel 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*).

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