The Pharma Innovation Journal 2023; 12(3): 5813-5815

www.ThePharmaJournal.com

The Pharma Innovation

ISSN (E): 2277-7695
ISSN (P): 2349-8242
NAAS Rating: 5.23
TPI 2023; 12(3): 5813-5815

www.thepharmajournal.com
Received: 13-12-2022
Accepted: 16-01-2023

S Akshitha,
Department of Floriculture and Landscape Architecture, College of Horticulture, SKLTSHU, Rajendranagar, Hyderabad, Telangana, India

A Girwani,
Department of Floriculture and Landscape Architecture, College of Horticulture, SKLTSHU, Mojerla, Telangana, India

P Prasanth,
Department of Floriculture and Landscape Architecture, Floricultural Research Station, ARI, Rajendranagar, Hyderabad, Telangana, India

Veena Joshi and
Department of Fruit Science, College of Horticulture, SKLTSHU, Mojerla, Telangana, India

S Praneeth Kumar
Department of Crop Physiology, Floricultural Research Station, ARI, Rajendranagar, Hyderabad, Telangana, India

Corresponding Author:
S Akshitha,
Department of Floriculture and Landscape Architecture, College of Horticulture, SKLTSHU, Rajendranagar, Hyderabad, Telangana, India

Studies on the effect of dosage and application schedule of gibberellic acid and benzyl adenine on flowering and yield attributes of gypsophila (*Gypsophila paniculata* L.) cv. Star World

S Akshitha, A Girwani, P Prasanth, Veena Joshi and S Praneeth Kumar

Abstract
Investigation carried on the effect of dosage and application schedule of gibberellic acid and benzyl adenine on flowering and yield attributes in gypsophila cv. Star World at Floricultural Research Station, ARI, Rajendranagar revealed that (G_3S_2) GA_3 at 450 ppm and double spray recorded maximum stalk length (36.25 cm). While maximum number of flower panicles per stalk (13.91), flower longevity (8.15 days), flower stalks yield per square meter (79) were obtained in (G_4S_2) BA at 150 ppm and double spray. The treatment GA_3 300 ppm and single spray (G_2S_1) recorded minimum number of days for flower stalk emergence (53.60), days for 50% flowering (64.50).

Keywords: Gypsophila, GA_3 (gibberellic acid), BA (benzyl adenine), star world, stalk length

Introduction
Gypsophila (*Gypsophila paniculata* L.) is species of flowering plant in the Caryophyllaceae family native to Eastern Europe. The genus name is derived from the Greek word gypsos ("gypsum") and philios ("loving"), a reference to the gypsum-rich substrates on which some species grow. Plants of the genus are known commonly as baby's-breath or babe's breath**.** Gypsophila is the most valued cut flower and is used an important filler material in floral bouquet making. It has become very important alternative cut flower in off seasons because of its perennial and hardy nature. It is well known for its use as complement in bouquets. Its beautiful inflorescence (panicle) is formed by many white or pink coloured small flowers. Through certain treatments the inflorescence can be used as a dry flower as well. It is also used as perennial plant in gardens, and blooms in spring and summertime. Some cultivars are grown as pot or hanging basket plants. The flowering time when grown in the open air is conditioned by the fact that it is a long-day species. Under protected conditions the use of specific techniques - such as artificial lighting, or growth regulators - enables all-year-round production. This is particularly useful for certain periods such as wintertime, when there is a certain scarcity on the market.

To increase the yield and quality in gypsophila production, plant growth regulators are used although is not very common (Kaya *et al*. 2004) [11]. To meet the demand of high value cut flower crop of gypsophila, it is necessary to enhance the production both in quantitative and qualitative aspects. To overcome the factors limiting the growth and yield to harness maximum profit, growth regulators are used in plant cultivation. Patra *et al*. (2015) [16] reported that using plant growth regulators in cultivation encourage flowering to get maximum yield.

Plant growth regulators are organic chemical substances that, when used in low quantities, affect or regulate physiological processes. They are quickly absorbed and travel through tissues. Growth regulators were also found to be effective in terms of overall plant growth, flowering duration, floriferousness, and ultimate cut bloom quality. Previously, researchers reported that GA_3 (Gibberellic acid) had a positive influence on growth parameters such as shoot length and internodal length, as well as flowering parameters such as early flowering, longer stalk, extended flowering period, increased yield per unit area, and longer vase life. BA (Benzyladenine) enhanced the number of basal shoots, the number of flowers, flower longevity and the vase life.

Material and Methods

A field experiment entitled Studies on the effect of dosage and application schedule of gibberellic acid and benzyl adenine on flowering and yield attributes of Gypsophila (*Gypsophila paniculata* L.) cv. Star World was conducted out at the Floricultural Research Station, Agricultural Research Institute, Rajendranagar, Sri Konda Laxman Telangana State Horticultural University, Hyderabad during the year 2019. The experimental site's soil is sandy loam with a pH of 7.2 and an E.C. of 0.27 dSm-1. The experiment was set up in two replications using a Factorial completely randomised block design (FCRD) with seven levels of treatments: T_1- GA_3 at 150 ppm, T_2- GA_3 at 300 ppm, T_3- GA_3 at 450 ppm, T_4- BA at 150 ppm, T_5- BA at 300 ppm, T_6- BA at 450 ppm, distilled water spray - T_7, and two levels of application schedules: S_1- (30 and 45 days after pruning). During the experiment, the plants had reached the age of one year, and the observations were made from June 2019 to September 2019, i.e. during one flowering season. The plants were entirely clipped to the ground level at the end of May, 2019. One month after trimming, spraying of growth regulators GA_3 and BA at varying doses began at 30 DAP and 45 DAP at fifteen-day intervals. Throughout the experiment, all necessary cultural operations (such as irrigation, fertilisation, weeding, hoeing, pesticide application, and so on) were carried out. Observations of numerous parameters on flowering and yield characters were made using standard methods. Five plants selected randomly from each plot were tagged to record the observations.

Results and Discussion

1. Flowering and Yield Attributes

The minimum number of days for flower stalk emergence (53.60 days) was recorded in the plants sprayed with growth regulator GA_3 at 300 ppm + single spray (G_2S_1) followed by GA_3 at 300 ppm+ double spray (G_2S_2-54.86 days). This acceleration or earliness in flower stalk emergence in gypsophila may be due to role of gibberellins in early flower primordial development might be due to reduced vegetative period, resulting in induction of early flower development. The results were in conformity with the results of Sharma and Joshi (2015) [21] in china aster, Amit kumar *et al*. (2011) [1] and in African marigold by Badge *et al*. (2015) [3].

Interaction between growth regulators and application schedule on number of days for 50 percent flowering was found to be non significant in gypsophila.

It was observed that maximum number of flower panicles per stalk (13.91) was reported in the plants are sprayed with growth regulator BA at 150 ppm + double spray (G_4S_2) followed by GA_3 at 300 ppm + double spray (G_2S_2-12.71). The maximum number of flower panicles per stalk might be due to the fact that, BA produced more number of side shoots leading to more number of flower panicles per stalk. Similar, results were reported by Mondal and Sarkar (2017) [13] in Hybrid Tea rose cv. Buggati, Ashwani *et al*. (2017) [2] in carnation, Karaguzel and Bahce (1998) [9] in gypsophila.

The flowers harvested from the plot under the treatment BA at 150 ppm + double spray exhibited delayed senescence with a longer vase life (G_1S_2- 8.15 days) followed by BA at 450 ppm + double spray (G_6S_2-7.80 days) while minimum flower longevity has been reported in control (G_7S_1-3.65 days). Maximum longevity of flowers with BA treatment in gypsophila might be due to its physiological role as anti-senescent hormone and also due to its longer persistence in the plant tissues. Senescence retarding effect of BA may be attributed to its action on the production of nucleic acid and protein synthesis. Similar, findings was reported by Paulo *et al*. (2005) [17] in Heliconia, Po hung wu *et al*. (2012) [18] in orchid.

The maximum number of flower stalks per square meter (79.00) was recorded in the plants sprayed with growth regulator BA at 150 ppm + double spray (G_4S_2) followed by GA_3 at 450 ppm + double spray (G_3S_2-73.75). While minimum number of flower stalks per square meter has been reported with Control (G_7S_1- 48.76). Maximum number of flower stalks per square meter in gypsophila might be due to enhanced photosynthetic activity, metabolic activity and better nutrient uptake from soil due to the application of GA_3. Similar results were given by Ridha *et al*. (2016) [20] in gerbera, Mondal and Mitra sarkar (2017) [13] in Hybrid tea rose cv. Buggati.

Table 1: Effect of dosage and application schedule of GA_3 and BA on flowering and yield parameters in gypsophila cv. Star world

Treatments	Days taken for flower stalk emergence	Days taken for 50 percent flowering	Flower panicles per stalk (Number)	Flower longevity on plant (Days)	Flower stalks yield per square meter (Number)
G_1S_1	55.41	64.70	9.15	5.90	67.06
G_1S_2	55.40	66.50	12.23	6.50	73.49
G_2S_1	53.60	64.50	10.90	6.20	58.50
G_2S_2	54.86	65.00	12.71	6.80	75.49
G_3S_1	55.78	66.70	10.58	6.35	69.00
G_3S_2	56.01	66.80	12.41	7.55	73.75
G_4S_1	56.61	69.59	11.79	7.65	69.51
G_4S_2	58.61	69.30	13.91	8.15	79.00
G_5S_1	56.40	66.79	10.58	6.35	64.26
G_5S_2	56.10	67.30	12.31	7.30	69.51
G_6S_1	55.78	66.30	9.81	6.95	67.50
G_6S_2	56.70	66.90	10.21	7.80	73.75
G_7S_1	60.50	70.67	7.60	3.65	78.76
G_7S_2	62.81	71.39	7.91	4.50	50.70
S.E m±	0.37	0.35	0.35	0.35	0.29
C.D	1.14	N.S	1.60	1.06	0.90

Conclusion

The above findings showed that foliar application of GA_3 at 450 ppm + double spray and BA at 150 ppm + double spray was proved most effective in increasing the flowering and yield attributes of gypsophila.

References

1. Amit Kumar, Jitendra Kumar, Braj Mohan, Singh JP, Rajbeer, Nathi Ram. Effect of plant growth regulators on growth, flowering and yield of African marigold (*Tagetes erecta* L.) cv. Pusa Narangi Gainda., The Asian J Hort. 2011;6(2):418-422.
2. Ashwani Kasturi, Chandra Sekhar R. Effect of Plant Growth Regulators on vegetative growth of Carnation (*Dianthus Caryophyllus* L.) cv. Domingo in second season crop. Plant Archives. 2017;2(17):1113-1116.
3. Badge S, Panchbhai DM, Patil S. Regulation of flowering by pinching and foliar application of gibberellic acid in African marigold (*Tagetes erecta* L.). Ind. Hort. J 2015;5(1/2):41-46.
4. Baskaran V, Misra RL. Effect of plant growth regulators on growth and flowering of gladiolus. Indian Journal of Horticulture. 2007;64:479-482.
5. Devadanam A, Shinde BN, Sable PB, Vedpathak SG. Effect of foliar spray of plant growth regulators on flowering and vase life of tuberose (*Polianthes tuberosa* L.). J Soils and Crops. 2007;17:86-88.
6. Dutta JP, Seemantini Ramadas, Abdul Khadre. Regulation of flowering in Chrysanthemum cv. Co.1 by artificial photoperiod and gibberellic Acid. Karnataka J Agri. Sci. 1998;11(1): 251-253.
7. Gautam SK, Sen NL, Jain MC, Dashora LK. Effect of growth regulators on growth, flowering and yield of chrysanthemum cv. Nilima Orissa J Horti. 2006;34(1):36-40.
8. Ibrahim SMM, Taha LS, Farahat MM. Vegetative growth and chemical constituents of croton plants as affected by foliar application of gibberellic acid. Journal of American science. 2010;6:126-130.
9. Karaguzel O, Bahce. Effect of GA_3 on cut flower yield and quality of (*Gypsophila paniculata*) L.'Perfecta' under late winter and spring natural photoperiod. Eurekamag.com. 1998;25(1/2):55-59.
10. Katakar PB, Naik DM, Boodamwad SG, Gharat SN. Influence of plant growth regulators on flowering, quality and yield of flower in china aster cv. California Giant Mix. South Indian Hort. 2003;53(1-6):378-381.
11. Kaya A, Karagüzel Ö, Aydinşakir K, Arı E, Özçelik A. Pink elegance gerbera (*Gerbera jamessonii*) çeşidinde GA ve BA uygulamalarının kış verimi ve 3 kalitesi üzerine etkileri. Derim. 2004;21(2):35-39. (in Turkish).
12. Kumar, J, Singh, P, Pal, K. Effect of growth substances on flowering and bulb production in tuberose (*Polianthes tuberosa* L.) cv. Pearl Double. J of Orn. Hort. 2006;9(3):227-228.
13. Mondal S, Mitra Sarkar M. Influence of plant growth regulators on growth, flowering and yield characteristics of Hybrid Tea Rose cv. Bugatti during Spring-Summer Months. Advances in Research. 2017;12(6):1-7.
14. Mynett K. Effect of exogenous growth regulator on flower stalk and bud development in glass house carnation. Prace. Instytutue. Sadowinctai kwiaciarstwa wskiernie. Wicach. 1979;B.4:70-84.
15. Nandre DR, Navandar UO, Archana D, Watane. Effect of growth regulators on growth, flowering and yield of china aster. The Asian J of Hort. 2009;4(1):50-51.
16. Patra SK, Beura S, Shasani T. Efficacy of GA_3 on growth and flowering regulation of in vitro raised hybrid gerbera under shade net. Agricultural Science Digest. 2015;35(3):173-177
17. Paulo J, De Moraes, Fernando L, Finger JG, Barbosa, Paulo, *et al*. Influence of benzyladenine on longevity of *Heliconia latispatha* Benth. Acta Hort, 2005, 683.
18. Po-Hung Wu, Doris CN, Chang. Cytokinin treatment and flower quality in *Phalaenopsis* orchids: Comparing N-6-benzyladenine, kinetin and 2- Isopentenyl adenine. African Journal of Biotechnology. 2012;11(7):1592-1596.
19. Ramesh KM, Selvarajan M, Chezhiyan N. Effect of certain growth substances and salicylic acid on the growth and yield of china aster cv. Kamini. Orissa J Hort. 2001;29(2):41-45.
20. Ridha A, Salem A, Saravanan S, Prasad VM. Effect of benzyl adenine on growth, yield and flowers of gerbera (*Gerbera jamesonii*). International Journal of Engineering Sciences & Research Technology; c2016 ISSN: 2277-9655, Publication Impact Factor: 3.785.
21. Sharma MK, Joshi KI. Effect of foliar spray of GA_3 and NAA on growth, flowering and yield of China aster (*Callistephus chinensis* Nees) cultivars. *Int. J. of Agri. sci and res*. 2015;5(4) :105-110 ref.23.
22. Shillo R. *Gypsophila Paniculata*. In: Halvey A.H. (ed). The Handbook of Flowering. 1985;3:83-87.
23. Singh BP. Influence of GA_3 on vegetative growth and flowering of winter annuals. Science and Culture. 196632(11):551-552.
24. Soach, S, Kumar R, Sooch M. Effect of NAA and kinetin on plant growth and flower production in Carnation. Floriculture research trend in India. Proceedings of the national symposium on Indian floriculture in the new millennium, during. 2002 February 25-27;295-297.
25. Tyagi AK, Kumar V. Effect of gibberellic acid and vermi compost on vegetative growth and flowering in African marigold (*Tagetes erecta* Linn.) J Orn. Hort. 2006;9(2):150-151.