IMPROVING GROWTH AND FLOWERING OF POINSETTIA BY USING GA_3 AND ETHREL

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ABSTRACT

This study was carried out at the Experimental Farm of the Fac. of Agric., Ain Shams Univ., during two successive seasons 2000/2001 and 2001/2002 to study the effect of gibberellic acid (GA_3) and ethrel at different concentrations on the vegetative growth and flowering of poinsettia plant. The purpose of this study was improving the quality of this plant by using some growth regulators such as gibberellic acid and ethrel. The plants were sprayed four times yearly at one month intervals by 50, 100 and 200 ppm GA_3 and 100, 200 and 300 ppm ethrel.

The obtained results showed that using GA_3 increased gradually the plant height and number of branches/plant. Meantime, GA_3 decreased the diameter of branches, number of leaves, total area of leaves, fresh and dry weights of plant. Also GA_3 delayed flowering and decreased number, fresh and dry weights of bracts. Moreover, GA_3 decreased the chlorophyll, N, and P content in plant leaves while it decreased K in most cases. On the other hand, ethrel in most cases decreased plant height, number and diameter of branches, number and total area of leaves, as well as fresh and dry weights of plant. In the same time, ethrel produced earlier flowering with significant difference especially with high concentrations during the second seaon and decreased number, fresh and dry weights of bracts, and chlorophyll, N, P and K contents in leaves in most cases. Spraying the poinsettia plant by 300 ppm ethrel can be recommended for best growth and quality of plant and produced earlier flowering.

INTRODUCTION

Poinsettia is a short-day plant that flowers when the scotoperiod exceeds ≈ 12.5 h depending on cultivar and temperature (Grueber, 1985). Under short days the poinsettia will rapidly initiate floral structures. The floral structures of poinsettia are termed cyathia and consist of a single pistillate flower with numerous staminate flowers enclosed in an involucral cup (Shanks 1980).

However, under LD the cyathia that are initiated do not develop to anthesis and are subtended by leaves rather than bracts. Evans, (1990) concluded that LD floral initiation occur after the meristem attains a critical antogentic age as measured by node count. When the meristem reaches the

cultivar-dependent antogenetic age, represented by the attainment of the critical node number, it initiates a cyathium. The critical node count required for LD floral initiation to occur is referred to as the long-day node number.

Gibberellins have been reported to inhibit flowering in numerous species Guttridge, (1963) demonstrated that exogenous GA_3 application delayed floral initiation in poinsettia under short day (SD). Also Hackett and Kofranek, (1971) demonstrated that GA_3, also delayed LD floral initiation in poinsettia. Mynett and Wilko, (1989) found that poinsettia cv. Impromptu could be successfully produced by applying 250, 500 or 750 mg GA_3/litre on 2 occasions 10 days apart, but flower initiation was inhibited. Michael *et al.*, (1992) found that foliar application of gibberellic acid applied at 7 or 14 days interval providing 50 or 125 ppm inhibited long day flora initiation in poinsettia.

Lee and Kwack, (1995) reported that GA_3 treatments increased shoot and internodal length and increased leaf size of *Hibiscus syriacus*. While, chlorophyll and total nitrogen contents were decreased. The increasing in height of plants by GA_3 treatments was mentioned by Chen *et al.*, (1998), and Talukdar and Paswan, (1998) on chrysanthemum plant.

Ethrel has also been reported to increase number of terminal cuttings of geranium plant by 93% (Foley and Keever, 1992). Also ethrel at the rate of 500 and 1000 ppm increased the number of secondary shoots of rose cultivar Raklagandha (Bhattacharjee and Singh, 1995). Ethrel increased number of shoots in *Vinca major* and *Pelargonium pellatum*. Also the stems of both plants were the shortest when the 500 ppm floral was applied 4 times. (Muse and Holcomb, 1997). Vegetative growth of impatiens plants was inhibited by ethephon application at the rate of 400 or 800 ppm (Tamari *et al.*, 1998).

MATERIALS AND METHODS

This work was carried out at the Experimental Farm, Faculty of Agriculture, Ain Shams University, Cairo, Egypt, for two successive seasons of 2000/2001 and 2001/2002. The aim of this study is to improve the quality of poinsettia plant by increasing the vegetative growth, producing compact plant, and prolonged the flowering period by using foliar application of some growth regulators such as gibberellin and ethrel.

Cuttings of softwood (7 month old) were taken on March 1st for both seasons. The basal end of cuttings were washed in tap-water, then were dipped in talc powder containing 0.1% indole butyric acid (IBA). Cuttings were cultivated in 30 cm pot (one cutting/pot) filled with a loamy soil. The

rooted cuttings were left to grow for about 5.5 months in order to establish inside the pots.

On August 15th, growth regulators were applied to the rooted cuttings at the rates of 50, 100 and 200 ppm for GA_3, 100, 200 and 300 ppm for ethrel. These treatments were repeated four times at one month interval through each growing season. A wetting agent (Tween 20) at 0.05% was added to the growth regulators solution just before application to reduce solution surface tension. Spraying with solution was done till the solution run off the plant foliage. The control plants were sprayed with distilled water. The plants were fertilized at the same time with growth regulator treatments with El-Badee nitrofosca (complete fertilizer) at the rate of 30 m/L as a soil drenche, produced by Abu-Zaabal Fertilizer and Chemical Company.

Each liter contains :

free azout, 100 g (In nitrate form)

phosphorous 415 g (orthophosphoric acid)

Mn	2 g	Ca 50 g
Cu	0.5 g	traces form sulphur
Fe	15 g	Zn 0.8 g

The experiments were planned in a complete randomized design with three replicates, each replicate contains 10 pots. The data were recorded at the flowering time.

Dried samples of the foliage in the second season were digested and chemically analyzed to determine their contents of N (using the Micro-Kjeldahl method described in the A.O.A.C 1990), while, P and K were determined according to Chapman and Pratt, (1978).

Leaf chlorophyll content was also determined by measuring light transmission through plant leaf, using. MINOLTA chlorophyll Meter S.P.A.D-501. Data were analyzed according to the methods described by Snedecor and Cochran, (1989).

RESULTS AND DISCUSSION

1. Plant height

The data presented in Tables (1, 2) reveal that both GA_3 and ethrel with all concentrations had affected the plant height in a comparison with the control plants in the two seasons when compared to the control.

The height of poinsettia plants was gradually increased by increasing the GA_3 at all concentrations in both seasons. In the two seasons, the tallest plants were obtained from 200 ppm GA_3.

On the other hand, using ethrel gradually reduced the plant height by increasing the used rate in comparison with the control plants and GA_3 treatments. So the shortest plants resulted from 300 ppm ethrel treatment. The differences between the tallest and shortest plants were significant. This reduction in stem growth can be attributed to a decrease in internode length as a result of the retardation of cell division and elongation in the subapical meristem of treated plants (Cathey, 1964). The reduction of stem length by ethrel was investigated by many workers as Muse and Holcomb, (1997) on pelargonium and Tamari *et al.*, (1998) on impatiens.

The physiological mechanism of ethylene action on the stem is still little understood, although it has been suggested that it influences cell differentiation or division (Han *et al.*, 1990). However, in some plants, this inhibitory effect of ethylene on stem growth has been attributed to a reduction in auxin levels either through modification of their metabolism (Riov *et al.*, 1982) or inhibition of their transport (Koch and Moore, 1990). The greater acidity of high concentration of ethephon may also affect the growing regions resulting in reduced growth (Han and Nobel, 1995).

On the other hand, increasing the stem length by GA_3 was found by Lee and Kwach, (1995) on *Hibiscus syriacus*, Chen *et al.*, (1998) on chrysanthemum, Oren and Nissim (1999) on *Photinia fraseri*.

2. Number of branches

Data in Table (1) indicated that in the first season, most treatments of GA_3 and ethrel (except ethrel at 100 ppm) increased the average number of branches/plant, as compared with the control. The highest number of branches (6.33) was obtained with the treatment of 100 ppm GA_3. There was a significant difference between the control and this treatment.

In the second season, Table (2) it was clear that, GA_3 at the rate of 100 and 200 ppm increased the number of branches/plant over control, while, the ethrel treatments at all concentrations decreased it. The highest number of branches were obtained from 100 ppm GA_3 with a mean of 6.33, while the least number of branches resulted from 100 ppm ethrel with a mean of 3.33, with significant differences between them.

These results are confirmed by those obtained by Farooqi *et al.*, (1999) who reported that the number of pyrethrum flowers/plant was significantly increased over the control in GA_3 treated plants.

Concerning ethrel, the results agreed with those of Strefeler *et al.*, (1996) who found that there were no significant differences between control and plants receiving 250 ppm ethephon in the total number of cuttings per chrysanthemum (*Dendranthema grandiflora*) plant.

Table (1): Effect of GA_3 and ethrel on vegetative growth parameters of poinsettia plant during 2000/2001 season.

Treatments	Plant height (cm.)	No. of branches/ plant	Diameter of branches (mm.)	No. of leaves/ plant	Total leaves area (cm^2)	Fresh weight of plant (g)	Dry weight of plant (g)
Control	87.25 C	4.67 BC	6.33 A	56.67 A	3499.60 A	295.4 A	87.19 A
GA_3 50 ppm	105.32 B	6.00 A	4.33 B	52.67 B	3076.10 B	192.50 C	64.17 C
GA_3 100 ppm	107.19 B	6.33 A	2.83 C	41.67 C	2635.30 C	242.20 B	69.25 B
GA_3 200 ppm	129.91 A	6.00 A	1.33 D	37.00 D	2008.40 D	103.40 E	32.94 E
Ethrel 100 ppm	55.93 D	4.33 C	4.33 B	40.00 CD	1344.70 E	73.30 F	22.75 F
Ethrel 200 ppm	51.35 DE	5.67 AB	4.33 B	37.33 D	1159.70 A	131.30 D	39.63 D
Ethrel 300 ppm	48.0 E	5.67 AB	2.83 C	31.33 E	936.95 F	99.40 E	37.99 D

Table (2): Effect of GA_3 and ethrel on vegetative growth parameters of poinsettia plant during 2001/2002 season.

Treatments	Plant height (cm.)	No. of branches/ plant	Diameter of branches (mm.)	No. of leaves/ plant	Total leaves area (cm^2)	Fresh weight of plant (g)	Dry weight of plant (g)
Control	72.33 D	5.00 AB	4.33 A	34.5 A	3203.97 A	161.92 A	55.62 A
GA_3 50 ppm	85.71 C	5.00 AB	3.83 AB	33.67 AB	2967.65 B	132.99 C	37.80 C
GA_3 100 ppm	104.28 B	6.33 A	2.33 C	30.00 BC	2008.96 C	152.72 B	48.24 B
GA_3 200 ppm	115.40 A	5.67 AB	2.33 C	24.00 D	1607.21 D	137.68 C	38.74 C
Ethrel 100 ppm	63.61 E	3.33 C	4.33 A	30.67 ABC	2075.27 C	110.78 E	32.83 D
Ethrel 200 ppm	51.38 F	4.33 BC	3.50 B	29.00 C	1158.71 E	122.02 D	36.09 CD
Ethrel 300 ppm	49.10 F	4.33 BC	3.33 B	27.67 CD	1014.60 E	81.52 F	22.66 E

3. Diameter of branches

It is evident from data in Tables (1 & 2) that all treatments decreased the thickness of branches compared with the untreated plants. The thicknest branches were obtained from the control with means of 6.33 and 4.33 mm for the first and second seasons, respectively with significant differences between the control and all treatments. Regarding GA_3 treatments, it was noticed that, as the concentration of GA_3 increased, the thickness of branches was decreased during both seasons. Also, the same trend was observed for the ethrel treatments in the first and second seasons.

The obtained results in this work are in agreement with those obtained by Banon *et al.*, (1998) who reported that application of ethephon reduced stem diameter of *Liatris spicata* as compared with the control.

4. Number and total leaf area

The results in Tables (1 & 2) reveal that the number and area of leaves per plant were affected by GA_3 and ethrel treatments. All the treatments decreased the number and total area of leaves, the decreasing being greater as the GA_3 and ethrel concentrations increased.

The biggest number of leaves and its total area was obtained from the control plants with significant differences between the control and all other treatments. However, there were significant differences between the treatments in most cases.

5. Fresh and dry weight/plant :

It is clear form the data in Tables (1 & 2) that spraying the plants with different concentrations of GA_3 or ethrel decreased the fresh and dry weights of plant comparing with the untreated plants, in both seasons.

As for GA_3, 100 ppm concentration was more effective for increasing the fresh and dry weights of plant in comparison with the other GA_3 treatments in both seasons.

Meantime, the medium concentration of ethrel (200 ppm) increased the fresh and dry weights of plants over the other concentrations in the two seasons. There were significant differences between the ethrel treatments in most cases.

6. Flowering date

Results in Tables (3 & 4) showed that the number of days from planting till flowering was noticeably affected with the different treatments in both seasons. Spraying poinsettia plants with GA_3 at all concentrations delayed flowering more than the control and other treatments. The longest period for flowering was obtained from 200 ppm GA_3 with a mean of 268.3 days, while the control plants flowered after 235 days. The differences between the control and GA_3 treatments were significant.

Table (3): Effect of GA_3 and ethrel on flowering date and quality of bracts during 2000/2001 season.

Treatments	No. of days from planting till flowering	No. of bracts / flower	Diameter of bract (cm.)	Fresh weight of bracts/ branch (g)	Dry weight of bracts/ branch (g)
Control	235 C	18.67 B	21.47 B	17.00 A	3.33 A
GA_3 50 ppm	249.7 B	18.00 B	25.83 A	8.00 B	2.00 B
GA_3 100 ppm	248 B	9.67 D	23.23 B	7.67 B	1.58 BC
GA_3 200 ppm	268 A	5.33 E	18.37 C	3.67 C	1.22 C
Ethrel 100 ppm	231 CD	14.67 C	21.66 B	7.67 B	1.67 BC
Ethrel 200 ppm	227 D	17.67 B	22.97 B	8.00 B	2.00 B
Ethrel 300 ppm	221 E	23.00 A	22.06 B	9.17 B	2.17 B

Table (4): Effect of GA_3 and ethrel on flowering date and quality of bracts during 2001/2002 season.

Treatments	No. of days from planting till flowering	No. of bracts / flower	Diameter of bract (cm.)	Fresh weight of bracts/ branch (g)	Dry weight of bracts/ branch (g)
Control	229.67C	17.67 A	21.37 A	11.67 A	2.00 A
GA_3 50 ppm	248 B	8.33 B	17.00 BC	5.00 D	1.0 B
GA_3 100 ppm	247.33 B	7.50 B	17.00 BC	4.67 D	1.00 B
GA_3 200 ppm	267 A	5.67 B	16.83 BC	2.67 E	0.78 B
Ethrel 100 ppm	228.67 C	15.67 A	16.00 C	6.00 C	1.73 A
Ethrel 200 ppm	228.67 C	16.00 A	17.33 BC	9.67 B	2.00 A
Ethrel 300 ppm	227.67 C	17.00 A	18.00 B	11.00 A	2.13 A

Meantime, ethrel treatments at all concentrations accelerated the flowering comparing with control plants and the other treatments. The earliest flowering was obtained from 300 ppm ethrel with a mean of 221 days, with a significant difference between this treatment and the other treatments including control during the first season, but there was non-significant differences between the ethrel concentrations and the control during the second season. The results here are in agreement with Mynett and Wilko, (1989) who reported that the flower initiation of poinsettia cv. Impropotu was inhibited by applying the plants 250, 500 or 750 mg GA_3/L to plants.

Gibberellins have been reported to inhibit flowering in *Malus domestica* Borkh. (Tromp, 1982).

Concerning the ethrel treatments, it was found that the obtained data with the second season are in accordance with those obtained by Harry and Stephen, (1990) on zonal geranium, who mentioned that no delay of flowering with ethophon treatments was observed.

7. The quality of the bracts (number, diameter, fresh and dry weights of bracts)

The data in Tables (3 & 4) indicated that the GA_3 and ethrel treatments decreased the number of bracts (except ethrel at 300 ppm) while increased the diameter of bract in most cases. In case of fresh and dry weights of bracts, GA_3 and ethrel treatments at all concentrations increased the weights of bracts.

Table (5): Effect of GA_3 and ethrel on some chemical contents in poinsettia leaves during 2001/2002 season.

Treatments	Chlorophyll content (spad)	N (%)	P (%)	K (%)
Control	45.65	4.3	0.19	3.20
GA_3 50 ppm	33.07	3.5	0.16	3.80
GA_3 100 ppm	31.93	4.2	0.16	2.18
GA_3 200 ppm	28.17	3.5	0.17	2.85
Ethrel 100 ppm	36.90	4.2	0.20	4.17
Ethrel 200 ppm	37.90	4.2	0.17	2.80
Ethrel 300 ppm	35.82	4.9	0.12	2.50

The decreasing of diameter, fresh and dry weights of bracts were proportional to the increasing of GA_3 concentration. On the other hand, ethrel treatments increased the diameter, fresh and dry weights of bracts, as the increasing being greater as the ethrel concentration increased.

8. Chemical anslyses

8.1. Total chlorophyll content

The results in Table (5) indicated that, both growth regulators treatments at all concentrations reduced the chlorophyll content in poinsettia plant when compared to the control.

On the other hand, spraying the poinsettia plant by ethrel at different concentrations was more effective in increasing the chlorophyll content in leaves in comparison with GA_3 treatments.

In this concern Bhattacharyya *et al.*, (1989) mentioned that spraying *Jasminum sambac* by ethrel at 100 and 200 ppm reduced chlorophyll content in leaves. The results herein are in agreement with those of Lee and Kwack, (1995) on *Hibiscus syriacus* who mentioned that chlorophyll content was decreased due to GA_3 treatment.

8.2. N, P and K content :

Data presented in Table (5) illustrate that spraying poinsettia plants with GA_3 or ethrel at any level reduced the N,P and K% content in plant leaf tissues when compared with the control, in most cases.

These results are in accordance with those obtained by Gowda *et al.*, (1989) on *Jasminum sambac* who came to a similar conclusion.

REFERENCES

A.O.A.C. (1990). Official Methods of Analysis of the Association of Official Analytical Chemists. Pub. A.O.A.C. INC. Suite 400, 2200 Wilson, Boulevard Arlington, Virginia 22201 USA 15th Ed. Vol. I, pp. 17-22.

Banon, S.; A. Gonalez; J.A. Fernandez and J.A. Franco (1998). The effect of ethephon on the growth and development of *Liatris spicata*. J. of Hort. Scie. & Biotech., 73 (6): 851-855.

Bhattacharjee, S.K. and U.C. Singh (1995). Growth and flowering response of *Rosa hybrida* cv. "Raktagndha" to certain growth regulator sprays. Orissa J. Hort., 23, 1/2: (21-25).

Bhattacharyya, S.C.; N. Sen and K.L. Sethi (1989). Effect of growth regulators on growth, flowering, and composition in gundumallige (*Jasminum sambac* Ait.) Proceedings of the 11th International Congress of Essential Oils, Fragrances and Flavours. New Delhi, India, 12-16 November, Vol. 3: 105-112.

Cathey, H.M. (1964). Physiology of growth retarding chemicals. Ann. Rev. Plant Physiol., 15: 271-302.

Chapman, H.D. and P.E. Pratt (1978). Methods of Analysis for Soils, Plants, and Waters. Univ. California, Div. Agric. Sci. p. 17 and 150.

Chen Y.; H. S. Chung; S. Chianshinn, T. Suhlluey and Y. Meeishiouh (1998). Effects of GA_3 spray on spray type chrysanthemums. Special Publication. Taichung Distric Agricultural Improvement Station, 40, pp. 159-170.

Evans, M.R. (1990). Control of long-day floral initiation in *Euphorbia pulcherrimma*. Ph.D. Theses. Univ. of Minnesota, St. Paul.

Farooqi, A.H.A.; R. Kumar; S. Sharma and Sushilkumar (1999). Effect of plant growth regulators on flowering behaviour of pyrethrum (*Chrysanthemum cinerariaefolium*) in North Indian Plains. J. of Medicinal and Aromatic Plant Sciences, 21, (3): 681-685.

Foley, J.T. and G.J. Keever (1992). Chemical promotion of axillary shoot development of geranium stock plants. J. Enviro. Hort .10, (2): 90-94.

Gawda, J.V.N.; V. Gowda; N. Gowda and A.A. Farooqi (1989). Effect of growth regulators on growth, flowering and composition in gundumallige (*Jasminum sambac* Ait.) Proceeding of the 11th International Congress of Essential Oils, Fragrances and Flavours. New Delhi, India, (3): 105-112.

Grueber, K.L. (1985). Initiation and development of the inflorescence in five cultivars of poinsettia. Ph.D. Diss. Univ. of Minnesota, St. Paul.

Guttridge, C.G. (1963). Inhibition of flowering in poinsettia by gibberellic acid. Nature, 197 (4870): 920-921.

Hackett, W.P. and A.M. Kofranek (1971). Analysis of low temperature stimulation of floral initiation in poinsettia cv. Paul Mikkelsen. J. Amer. Soc. Hort. Sci., 96 (3): 308-311.

Han, S. and J. Nobel (1995). Ethylene-induced abscission of Easter cactus phylloclades for vegetative propagation. Hort., Science, 30: 1070-1073.

Han, S.S.; A.H. Halevy; R.M. Sachs and M.S. Reid (1990). Enhancement of growth and flowering of *Triteleia laxa* by ethylene. J. Amer. Soc. Hort. Sci., 115, 482-485.

Harry, K.T. and A.C. Stephen (1999). Zonal geranium growth and flowering responses to six growth regulators. Hort. Sci., 25 (1): 82-83.

Koch, B.L. and T.C. Moore (1990). On ethylene and stem elongation in green pea seedling. Plant Physiology, 93, 1663-1664.

Lee, H.S. and B.H. Kwack (1995). Effect of uniconazol and GA_3 on growth and flowering of *Hibiscus syriacus* showing different growing habits. J. of Korean Soc. Hort. Sci., 36 (1): 121-131.

Michael, R.E.; F.W. Harold and P.H. Wesley (1992). Gibberellins and temperature influence long-day floral initiation in poinsettia. J. Amer. Soc. Hort. Sci., 117 (6): 966-971.

Muse, G. and E.J. Holcomb (1997). Florel as a growth regulator for use on *Vinca major* and *Pelargonium peltatum*. Bulletin-Pennsylvania Flower Growers No. 439: 1-3.

Mynett, K. and A. Wilko (1989). Growth regulators application in the shape forming of some pot plants. Acta Horticulturae, 251: 311-314.

Oren-Shamir, M.; A. Nissim-Levi (1999). Temperature and gibberellin effects on growth and anthocyanin pigmentation in Photonia leaves. J. Hort. Sci. and Biotech., 74 (3): 355-360.

Riov, J.; N. Dror and R. Goren (1982). Effect of ethylene on [^{14}C] indole-3 acetic acid metabolism in leaf tissues of wooay plants. Plant Physioilogy, 70: 1265-1270.

Shanks, J.B. (1980). Poinsettia, in: R. Larson (ed.). Introduction to Floriculture. Academic Press, New York, 301-326.

Snedecor, G.W. and W.G. Cochran (1989). Statistical Methods. Eighth edition. Iowa State University, Press, Ames, Iowa, U.S.A.

Strefeler, M.S.; N.O. Anderson and P.D. Ascher (1996). Ethylene + GA_3 sprays for delaying flower bud initiation in chrysanthemum (*Dendranthema grandiflora*) stock plants. Hort. Techn. 6 (3): 251-253.

Talukdar, M.C. and L. Paswan (1998). Effect of GA_3 and CCC on growth and flowering of standard chrysanthemums. Journal of Ornamental Horticulture, 1 (1): 11-16.

Tamari, G.; L. Pappa; T. Zered and A. Borochov (1998). Effects of ethrel and gibberellin on impatiens plants. Scientia Hort., 76 (1/2): 29-35.

Tromp, J. (1982). Flower-bud formation in apple as affected by various gibberellins. J. Hort. Sci., 57 (3): 277-282.

الملخص العربى

تحسين نمو وازهار نبات بنت القنصل بإستخدام الجبرلين والاثريل

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أجريت هذه التجربة فى مزرعة التجارب بكلية الزراعة جامعة عين شمس خلال الموسمين ٢٠٠٠/٢٠٠١ و ٢٠٠١/٢٠٠٢ لدراسة تأثير الرش بتركيزات مختلفة من الجبرلين والأيثريل على نمو وأزهار نبات بنت القنصل بهدف تحسين جودة هذا النبات عن طريق تحسين النمو الخضرى والزهرى له . وقد تم رش النباتات بالجبرلين بتركيز ٥٠ ، ١٠٠ ، ٢٠٠ جزء فى المليون ، الأثيريل بتركيز ١٠٠ ، ٢٠٠ ، ٣٠٠ جزء فى المليون ٤ مرات خلال موسم النمو بفاصل شهر بين كل منها بداية من ١٥ أغسطس .

وقد أظهرت النتائج المتحصل عليها الآتى :

أدت المعاملة بالجبرلين إلى زيادة فى طول النبات وعدد الأفرع ولكن مع قلة سمكها ، كما أنه قد أدى إلى قلة عدد الأوراق وبالتالى قلة المساحة الكلية لأوراق النبات، قلة الوزن الطازج والجاف للنبات . فى نفس الوقت أدى الجبرلين إلى تأخير أزهار النبات مع قلة عدد القنابات وكذلك وزنها الطازج والجاف . كما أنه أدى أيضاً الى قلة الكلوروفيل الكلى والنسبة المئوية للنتروجين والفوسفور فى أوراق النبات .

أما المعاملة بالإيثريل فقد أدت الى نقص طول النبات (أى أن النبات أصبح مندمجاً وهى صفه مطلوبة فى هذا النبات) كما أنه قد قلل عدد وقطر الأفرع ولكن بدرجة أقل من الجبرلين . ونظراً لقصر النبات أصبحت عدد الأوراق أقل ومساحتها الكلية بالتالى قليلة .

وقد أدت المعاملة بالإيثريل عموماً الى تبكير الازهار بدرجة معنوية خاصة مع استخدام تركيز ٢٠٠ ، ٣٠٠ جزء فى المليون خلال الموسم الأول مقارنة مع الكنترول ، ولم تظهر فروق معنوية فى الموسم الثانى ، كما أنها قللت عدد القنابات ووزنها الطازج والجاف ولكن بصورة أقل من الجبرلين – كذلك فقد قل الكلوروفيل الكلى والنسبة المئوية للنتروجين والفوسفور فى أوراق النبات . ويمكن التوصية برش نبات بنت القنصل بالايثريل بتركيز ٣٠٠ جزء فى المليون وذلك للحصول على أحسن نمو خضرى وتحسين جودة هذا النبات مع انتاج الازهار مبكراً .