J. Agric. Sci. Mansoura Univ., 32 (10): 8399 - 8411, 2007

IMPROVING GROWTH QUALITY OF *Pelargonium zonale*, L. BY USING SOME GROWTH RETARDANTS.

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ABSTRACT

This study was conducted in the nursery of Baramoon Research Station, Horticulture Research Institute, Agriculture Research Center, during two successive seasons (2004/2005 and 2005/2006), aiming to investigate the effect of different concentrations of Cycocel (CCC) at 1500 and 3000 and Paclobutrazol (PBZ) at 75 and 150 ppm on *Pelargonium zonale*, L. (Red cultivar) plants. Foliar spray was once (after 15 days) or twice (after 15 and 30 days from planting).

The most important results can be summarized as follows:-

1- CCC and PBZ controlled plant height in all treated plants and induced profuse branching.
2- The used growth retardants induced plentiful inflorescences as compared with control plants.
3- All of PBZ and most of CCC treatments reduced number of days to flower.
4- All CCC or PBZ treatments increased the total chlorophyll and carbohydrates content.

For obtaining compact plants, earlier flowering with dark green leaves, a profuse branches and plentiful inflorescences it may be recommended to use PBZ at 75 ppm twice.

INTRODUCTION

Pelargoniums (*Pelargonium zonale*, L.) belongs to fam. *Geraniaceae*. The wild species are native in South Africa with few exceptions. The genus Pelargonium includes more than 400 botanical species. The most spreading species is Common garden or zonal Geraniums (*Pelargonium zonale* L.) " They are widely sold bedding plants. They have distinct, dark markings or bands (commonly called zones) on their leaves. Several newer, fancy-leaf varieties posses silver, white gold, red, or purple markings in the leaf. Flower color includes red, pink, salmon and white. Common garden geraniums can be grown from cuttings or seeds.

Pelargoniums are one of the most popular indoor and outdoor flowering plants and with good reason! There are a wide variety of geraniums that differ in flower color, leaf shape, growth habit, and use. These versatile plants can be used as annual bedding plants, in hanging baskets, and in containers both indoors and outdoors.

Chlormequat (Cycocel): (2-chloroethyl) trimethyl ammonium chloride (11.8% a.i.).

Paclobutrazolh (Bonzi): (+or-)- (R,R)-beta- (4-chlorophenyl methyl) -alpha-(1,1-dimethylethyl)-1H-1,2,4-triazole--1-ethanol (0.4 % a.i.).

White (1970) reported that chlormequat chloride (CCC) was effective in reducing the height and accelerating flowering of geraniums. Miranda and Carlson (1980) concluded that 2 applications of CCC to geraniums were as

effective as 3 or 4 in reducing height. Hamza *et al.* (1981) indicated that an early CCC treatments (3 weeks after potting) induced greater branching than the untreated control. Koranski and Laffe (1985) recommended the use of growth retardants on plants be applied at the first or second true leaf stage. Hong *et. al.* (1986) reported that treated hybrid geraniums (*Pelargonium* x *hortorum*) by CCC or PBZ reduced stem elongation. Norremark and Anderson (1990) treated greenhouse plants of *Pelargonium* X *hortorum* L. with Paclobutrazol at 4 concentrations ranging from 0.05 to 1.0 mg a.i per plant, or with 0.2 gm chlormequat per plant, in a single applications of Paclobutrazol advanced flowering by one week, as did chlormequat, but high concentrations only advanced it by a few days. Paclobutrazol induced bending of flower stalk, especially in cv. Pulsar and it reduced the size and the number of flowers when the plants were transplanted outdoors.

The objective of this investigation aimed to study the effects of some growth retardants " Cycocel and Bonzi." on the vegetative growth, flowering, and the flowers quality to make Pelargoniums more compact, shorter, with a profuse of branches and inflorescences, flowering earlier, and to be more suitable as potted and grown balcony plants.

MATERIALS AND METHODS

Two field experiments were conducted at Baramoon Research Station, Horticulture Research Institute, Agriculture Research Center, during two successive seasons (2004/2005 and 2005/2006).

The core objectives of this trail were to improve the quality of the pelargonium plants *Pelargonium zonale*, L. by dwarfing, intensive vegetative growth having numerous inflorescences, earlier flowering, and to be more suitable as flowering potted. Various substances such as Bonzi and Cycocel were used to achieve this goal.

Uniform terminal cuttings of 7-9 cm length were planted in 8cm plastic pots filled with a mixture of peat moss and vermiculite (17:3 by volume) on October 1 in the both seasons. Then were moved to larger pots on November 15 in 17cm plastic pots filled with the same media. After words, the plants were treated on December 1 with growth substance. Plants treated twice were after 15 days from the first application on December 15.

Treatments were 9 as follows:

Untreated (Control).
Chlormequat (CCC) at 1500, 3000 ppm. (once or twice).
Paclobutrazolh (PBZ) at 75, 150 ppm. (once or twice).

The plants were at the nursery under natural conditions for 9 months receiving all the agricultural practices (from October to July) in the two growing seasons, 2004/2005 and 2005/2006.

The obtained data were subjected to statistical analysis as the technique of factorial experiment in a randomized complete block design according to Snedcor and Cochran (1968). The treatments means were compared using the Duncan Multiple Range test as published by Duncan (1965).

Data were recorded for:

- Plant height (cm) measured from the edge of the pot to the uppermost top plant.
- Number of branches and inflorescences per plant.
- Inflorescence diameter (cm).
- Time (days) from planting until the opening of the first flower on the first inflorescence flowering.
- Chlorophyll content (mg/g FW) according to Yadava, (1986).
- Total carbohydrates content (mg/g DW) according to Doubois *et al.* (1956).

RESULTS AND DISCUSSION

1) Plant height (cm):

Data recorded in Table (1) showed that treating plants with both growth retardants significantly decreased plant height when compared with the control treatment. It was quite clear that the shortest plants obtained resulted when plants were treated with CCC and PBZ in both seasons. Plants treated with PBZ gave the shortest plants which recorded 21.38 and 20.23 cm in the first and second season, respectively. Plants treated with CCC came in the second order in this respect, as it were 28.05 and 26.41 cm in the first and second season, respectively. It was obvious that there were significant differences between the both growth retardants. While the control treatment was 38.75 and 37.75 cm in the first and second season respectively.

Data in the same Table indicated that using PBZ at 150 ppm significantly gave the lowest value of plant height when compared with all other concentrations, as it was 20.37 and 19.00 cm in the first and second season. It was clear that there was a significant difference between the lower and the higher concentration of the both growth retardants. It was a mater of interest to notice that plants treated with PBZ at 150 ppm had been decreased in height to about the half compared with the untreated ones.

In addition the same Table cleared that treated plants with growth retardants in general for twice decreased plant height (28.41 and 27.14 cm) more than plants treated for once (30.37 and 29.12 cm in the first and second season respectively) only. There was a significant difference between spraying for once or twice in this respect.

Concerning the interaction effect data indicated that treating Pelargonium plants twice with PBZ at 150 ppm significantly gave the shortest plants when compared with most of other treatments (18.82 and 17.00 cm in the first and second season respectively) . It was obvious that plants sprayed with CCC at 1500 or 3000 ppm for once and 1500 ppm for twice had no significant difference between each other. A significant difference was noticed between plants either treated with CCC at 3000 ppm for once (28.22 and 26.62 cm) or twice (26.67 and 24.87 cm) in the first and second season respectively.

The reduction in plant height due to CCC and PBZ applied on the plant proved to be proportional to the concentrations used, as suggested by

Miranda and Carlson 1980, who reported that the reduction of plant height seemed to be due to the inhibition of gibberellin's biosynthesis in plant. Moreover, CCC and PBZ retarded stem elongation by preventing cell division and activity of sub-apical meristem, which is responsible for stem elongation, as reported by Sachs and Kofranek 1960.

Table (1): Effect of different concentrations and application times of CCC and PBZ on Plant height (cm) of *Pelargonium zonale* (Red cultivar) at 2004-2005 and 2005-2006 seasons

Seasons / Applications		2004-2005				2005-2006			
Compounds (A)	Concentrations ppm (B)	Spray Once	Spray Twice	Mean of (B)	Mean of (A)	Spray Once	Spray Twice	Mean of (B)	Mean of (A)
Control	0	38.75	38.75	38.75	38.75	37.75	37.75	37.75	37.75
CCC	1500	28.92	28.37	28.65	28.05	27.40	26.75	27.07	26.41
	3000	28.22	26.67	27.45		26.62	24.87	25.75	
PBZ	75	25.67	19.10	22.38	21.38	24.20	18.75	21.47	20.23
	150	21.92	18.82	20.37		21.00	17.00	19.00	
Mean of (C)		30.37	28.41			29.12	27.14		
LSD at 5%	A	0.95				0.93			
	B	0.86				0.84			
	C	0.86				0.84			
	ABC	1.35				1.31			

2) Number of branches per plant:

Data presented in Table (2) showed that number of branches of Pelargonium plants was increased by using the growth retardants (CCC or PBZ) irrespective of there level when compared with the control treatment. It was worth noting that treated plants with PBZ had almost double number of branches (9.87 branches/plant in the first season) when compared with the control treatment, as it was 5.00 branches/plant only. In both seasons there was a significant difference between PBZ (9.87 branches/plant) and CCC (7.06 branches/ plant) in the first season.

Regarding the concentration it was detected from data in the same Table that treated plants with PBZ at 75 ppm gave the maximum number of branches/plant (10.00 and 11.25 branches/plant in the first and second season, respectively) when compared with the lower concentration. It was obvious that duplicating the concentration of CCC increased the number of branches/plant compared with the lower level of the same retardant.

Data recorded in the same Table showed that treated Pelargonium plants twice (7.67 and 10.35 branches/ plant) were more effective than plants treated once (6.96 and 8.87 branches/plant in the first and second season, respectively) in increasing the number of branches per plant.

Dealing with the interaction data indicated that treated plants with PBZ at 75 ppm for twice significantly gave the maximum number of branches per plant (11.00 and 11.25 branches/plant in the first and second season, respectively) when compared with all of the other treatments. It was clear that

PBZ treatments were more effective in this respect followed by CCC treatments. It was worth noticing that applying CCC for once or twice in both seasons increased the number of branches per plant than control. PBZ at the two levels increased number of branches as compared with control but the lower level was more effective in this respect.

Table (2): Effect of different concentrations and application times of CCC and PBZ on number of branches per plant of *Pelargonium zonale* L. (Red cultivar) at 2004-2005 and 2005-2006 seasons.

Seasons / Applications		The First Season				The Second Season			
Compounds (A)	Concentrations ppm (B)	Spray		Mean of (B)	Mean of (A)	Spray		Mean of (B)	Mean of (A)
		Once	Twice			Once	Twice		
Control	0	5.00	5.00	5.00	5.00	7.25	7.25	7.25	7.25
CCC	1500	6.50	7.00	6.75	7.06	9.00	10.75	9.87	10.37
	3000	6.75	8.00	7.37		10.00	11.75	10.87	
PBZ	75	9.00	11.00	10.00	9.87	9.50	11.25	10.37	10.43
	150	9.50	10.00	9.75		10.25	10.75	10.50	
Mean of (C)		6.96	7.67			8.87	10.35		
LSD 5%	A	0.67				0.59			
	B	0.61				0.54			
	C	0.61				0.54			
	ABC	0.95				0.84			

CCC and PBZ retard the hormonal activity of the apical meristem of plant and break the apical dominance allowing the plant to be more branching.

These results were in agreement with those of Hamza *et al.* (1981) on F1 hybrid Geraniums (*Pelargonium X hortorum* Bailey), Welander (1984) on *Pelargonium hortorum*, El-Mowafy (1996) on *Pelargonium graveolens* and Karaguzel (1999) on *Bougainvillea spectabilis* plant

3) Number of inflorescences per plant:

Data presented in Table (3) showed that number of inflorescences was increased by using the growth retardants (CCC and PBZ) compared with the control. It was worth noting that treated plants with PBZ had been tripled the number of inflorescences (8.68 and 9.12 inflorescences /plant in the first and second season, respectively) when compared with the control treatment, as it was 2.50and 3.00 inflorescences /plant only in the first and second season, respectively. While, treated plants with CCC produced (5.00and 7.90 inflorescences /plant in the first and second season, respectively) had been duplicated compared to the control treatment. In both seasons there was a significant difference between the number of inflorescences induced by PBZ and that induced by CCC.

Concerning the effect of the retardants concentration it was observed that treated plants with PBZ at 150 ppm had (9.12 and 9.50 inflorescences /plant) in the first and second seasons, respectively which resemble the maximum number of inflorescences /plant compared with all of the other concentrations. It was also obvious that duplicating the concentration of CCC and PBZ increased the number of inflorescences /plant than the lower one and control plants.

Using each of the growth retardants were more effective in increasing the number of inflorescences per plant when were sprayed twice (5.83 and 7.04 inflorescences /plant) more than once (4.95 and 6.33 inflorescences /plant) in the first and second season, consecutively.

Studying the interaction data in Table (3) indicated that sprayed plants with PBZ at 75 ppm for twice significantly gave the maximum number of inflorescences per plant (9.75 and 10.00 inflorescences /plant) in both seasons, when compared with most of the other treatments. It was clear that PBZ treatments were more effected than CCC treatments in this respect. In addition it may be observed that the least number of inflorescences was so little of control since didn't exceed than 2.50 and 3.00 in both seasons.

The increase in number of inflorescences was the output of increasing the number of branches, as aforementioned by Hamza *et al.* (1981) on F1 hybrid Geraniums (*Pelargonium X hortorum* Bailey), Gowda and Gowda (1990) on *Jasminum sambac* cv. Gundumallige plants, and Talukdar and Paswan (1996) on chrysanthemum cv. Prof. Harris.

Table(3): Effect of different concentrations and application times of CCC and PBZ on number of inflorescences per plant of *Pelargonium zonale* L. (Red cultivar) at 2004-2005 and 2005-2006 seasons.

Seasons / Applications		2004-2005				2005-2006			
Compounds (A)	Concentrations ppm (B)	Spray		Mean of (B)	Mean of (A)	Spray		Mean of (B)	Mean of (A)
		Once	Twice			Once	Twice		
Control	0	2.50	2.50	2.50	2.50	3.00	3.00	3.00	3.00
CCC	1500	4.25	5.00	4.62	5.00	7.00	7.75	7.37	7.90
	3000	4.50	6.25	5.37		7.75	9.25	8.50	
PBZ	75	6.75	9.75	8.25	8.68	7.50	10.00	8.75	9.12
	150	9.25	9.00	9.12		9.75	9.25	9.50	
Mean of (C)		4.95	5.83			6.33	7.04		
LSD at 5%		0.65				0.69			
		0.58				0.63			
		0.58				0.63			
		0.92				0.98			

4) Inflorescences diameter (cm):

It was evident from data recorded in Table (4) that treated plants with the both growth retardants significantly decreased diameter of the inflorescence when compared with the control treatment. Plants treated with PBZ gave the lowest values which recorded 7.35 and 5.96 cm in the first and second seasons, respectively. Plants treated with CCC gave larger inflorescences than treating with PBZ, as it was 9.59 and 7.12 cm in the first and second seasons, respectively. It was clear that a high significant difference was detected between the both growth retardants. While the control treatment was 11.25 and 10.00 cm in the first and second seasons, respectively.

Concerning the effect of concentration results presented in the same Table indicated that using PBZ at 150 ppm significantly gave the lowest value of diameter of the inflorescences when compared with 75 ppm concentration, as it was 6.96 and 5.73 cm in the first and second season respectively. It was quite clear that non-significant difference was noticed when doubling the concentration of CCC as compared with the single application. While a significant difference was present when doubling the concentration of PBZ. It was worth noting that treated plants with PBZ at 150 ppm gave approximately about the half value in that character compared with control treatment. However the nearest diameter to control was that of plants treated with CCC at the lower level.

Table (4) Effect of different concentrations and application times of CCC and PBZ on inflorescences diameter (cm.) of *Pelargonium zonale* L. (Red cultivar) at 2004-2005 and 2005-2006 seasons.

Seasons / Applications		2004-2005				2005-2006			
Compounds (A)	Concentrations ppm (B)	Spray		Mean of (B)	Mean of (A)	Spray		Mean of (B)	Mean of (A)
		Once				Once	Twice		
Control	0	11.25	0	11.25	11.25	10.00	10.00	10.00	10.00
CCC	1500	10.25	1500	9.75	9.59	7.50	7.00	7.25	7.12
	3000	9.75	3000	9.43		7.22	6.75	6.98	
PBZ	75	8.50	75	7.75	7.35	6.50	5.87	6.18	5.96
	150	7.25	150	6.96		6.10	5.37	5.73	
Mean of (C)		9.70	9.10			7.88	7.50		
LSD at 5%		0.65				0.49			
		0.58				0.44			
		0.58				0.44			
		0.92				0.70			

Dealing with applications frequency data evidenced that there was no insignificant difference between spraying the plants for once (9.70 cm) or twice (9.10 cm) in the first season. A similar concept was found also in the second season.

Regarding the interaction between the different factors data indicated that treated plants with CCC at 1500 ppm and PBZ at 75 ppm for once gave the largest diameter of inflorescence compared with all of the other

treatments except those of control plants. It was a mater of interest to notice that the untreated plants (control) significantly gave the largest diameter of the inflorescence compared with the both growth retardants (CCC and PBZ) at any level, as it was 11.25 and 10.00 cm in the first and second season, respectively. However although the inflorescence diameter was less with retardant applications but plants had more inflorescences than control. The larger diameter of control plants was logic since these plants had less number of branches and inflorescences on plant.

The reduction of the inflorescence diameter was the output of using the growth retardants as aforementioned by Norremark and Anderson (1990) on *Pelargonium x hortorum* plants and Gilbertz (1992**)** on chrysanthemum plants.

5) Time (days) to flower:

It was observed that treating plants with both growth retardants significantly reduced number of days to flower when compared with the control ones(Table 5), this agreed with the findings of Norremark and Anderson (1990). It was obvious that the minimum days to flower was obtained when plants were treated with CCC and PBZ in both seasons. The plants that were treated with PBZ gave the earliest interval to flower (165.50 and 154.62 days to flower in the first and second season, respectively). While that treated with CCC came in the second order in this respect, as it were 170.25 and 159.50 days to flower in the first and second season, respectively. It was worth noting that there was a highly significant difference between the two growth retardants. While the control plants were the latest to flower compared with the other treated plants. Since, these plants flowered after 179.25 and 170.00 days respectively.

Regarding the concentration effect data in the same Table indicated that using PBZ at 150 ppm significantly gave the minimum days to flower compared with all of the other concentrations, as it was 165.00 and 151.25 days to flower in the first and second season, respectively. It was quite clear that doubling the concentration reduced the days to flower between the two PBZ levels. However the differences were not so great but were statistically significant. In the contrary dealing with CCC levels it was found that the high level prolonged the days to flower than its lower level.

Results recorded at the same Table indicated that treated plants with retardants for twice encouraged significantly flowering earlier (170.91 and 159.00 days) compared with spraying plants for once (172.41 and 163.75 days) in the first and second season, respectively.

Concerning the interaction data in Table (6) indicated that treated plants with PBZ at 75 ppm for twice flowered after 159.00 and 149.00 days in the first and second season, respectively. These values were the significantly minimum days to flower compared with all of the other treatments. Plants treated with CCC at 1500 ppm for once significantly reduced days to flower compared with control but was less effective in this concern with the prementioned treatments.

Table (5) Effect of different concentrations and application times of CCC and PBZ on time (days) to flower of *Pelargonium zonale* L. (Red cultivar) at 2004-2005 and 2005-2006 seasons.

Seasons / Applications		The First Season				The Second Season			
Compounds (A)	Concentrations (B)	Spray		Mean of (B)	Mean of (A)	Spray		Mean of (B)	Mean of (A)
		Once	Twice			Once	Twice		
Control	0 ppm	179.25	179.25	179.25	179.25	170.00	170.00	170.00	170.00
CCC	1500 ppm	167.00	170.00	168.50	170.25	150.00	155.00	152.50	159.50
	3000 ppm	173.00	171.00	172.00		175.00	158.00	166.50	
PBZ	75 ppm	173.00	159.00	166.00	165.50	167.00	149.00	158.00	154.62
	150 ppm	163.00	167.00	165.00		150.50	152.00	151.25	
Mean of (C)		172.41	170.91			163.75	159.00		
LSD 5%	A	0.96				0.72			
	B	0.65				0.65			
	C	0.65				0.65			
	ABC	1.35				1.03			

Such results agreed with Konjoian and Tayama (1978) who reported that chlormequat as a spray reduces height, reduces the time to flower and increases the number of inflorescences of seed geraniums.

The chemical components:

It is a well known fact that the chemical composition of plants gives a real picture about plant metabolism and health.

6) The total chlorophyll (mg/g FW):

Data in Table (8) showed that treating plants of *Pelargonium zonale* with either growth retardant significantly increased the total chlorophyll content when compared with the control treatment. It was quite clear that treating plants by PBZ was more effective than the others treated by CCC. In addition it was observed that treated plants with CCC at 1500 ppm for twice had the superior values (0.988 and 1.154 mg/g FW) in the first and the second season, respectively compared with the other treatments with CCC. It was worth noting that treated plants with PBZ at 75 ppm for twice significantly gave the maximum value of the total chlorophyll content (1.208 and 1.462 mg/g FW) in the first and the second season respectively when it was compared with all of the other treatments including control.

These are in agreement with Crittendon and Kiplinger (1969) who treated young plants of the poinsettia cv. Elisabeth Ecke with Cycocel at 2.950 ppm. Which produced darker green leaves, Borowski *et al.* (1998) on sweet pepper cv. Kujawinka, and Abbas (1994) on *Celosia argentea* and *Zinnia elegans*.

7) The total carbohydrates (mg/g DW):

Data presented in Table (7) showed that treating *Pelargonium zonale* with the both growth retardants (CCC or PBZ) were significantly increased the total carbohydrates content when compared with the control treatment.

Abou-Zeid and Bakry (1978**)** reported a similar result. It was clear that treated plants with CCC at 1500 ppm for twice (69.6 and 81.2 mg/g DW) in the first and the second season, respectively which were the maximum values of total carbohydrates as compared with all the other applications treated with CCC. Treated plants with PBZ at 75 ppm for twice (85.1 and 102.9 mg/g DW) in the first and the second season, respectively) significantly had the maximum value of total carbohydrates when compared with all of the other treatments either of PBZ or CCC and control.

From the above mentioned results it could be concluded that both growth retardants increased carbohydrates content at different values actually. It may be added that the chlorophyll increase formerly mentioned had a close response on photosynthesis. The carbohydrates convert by further metabolic processes into lipids, nucleic acids, proteins and other organic molecules. These carbohydrates increment could promote flowering, as mentioned by Gowda and Gowda (1990) who sprayed *Jasminun sambac* plants with Cycocel at 1000 or 2000 ppm and found that application produced leaves contained more carbohydrates content.

Table (6): Effect of the difference concentrations and application methods of CCC and PBZ on total chlorophyll (mg/g FW) of *Pelargonium zonale* L. (Red cultivar) at 2004-2005 and 2005-2006 seasons.

Seasons / Treatments (ppm)		2004/2005		2005/2006	
		Once	Twice	Once	Twice
Control	0	0.687		0.942	
CCC	1500	0.917	0.988	1.125	1.154
	3000	0.871	0.783	1.061	0.977
PBZ	75	1.077	1.208	1.272	1.462
	150	1.175	1.101	1.429	1.317
LSD 0.05		0.06		0.06	

Table (7): Effect the difference concentrations and application methods of CCC and PBZ on total carbohydrate (mg/g DW) of *Pelargonium zonale* L. (Red cultivar) at (2004-2005 and 2005-2006) seasons.

Seasons / Treatments ppm		2004/2005		2005/2006	
		Once	Twice	Once	Twice
Control	0	48.4		66.3	
CCC	1500	64.6	69.6	79.2	81.2
	3000	61.3	55.2	74.6	68.7
PBZ	75	75.8	85.1	89.5	102.9
	150	82.8	77.5	100.5	92.7
LSD at. 0.05		4.2		4.2	

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رفع جودة نبات الجارونيا من خلال استخدام بعض مؤخرات النمو.

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تعتبر الجارونيا من أهم نباتات الأصص المزهرة المتعددة الاستخدامات التنسيقية لما تمتاز به من تباين فى ألوان أزهارها، وأشكال أوراقها، وطبيعة نموها.
ويعيب الأصناف المحلية منها استطالة سوقها التي قد تصل إلى المتر الواحد أو يزيد، وهذا يحد من قيمة النبات التنسيقية خاصة في أغراض التزيين كنباتات أصص مزهرة أو كنباتات لتزيين الشرفات. فضلاً عن هذا قلة النورات الزهرية نظراً لقلة الأفرع. ولكي تكون الجارونيا مثالية يجب أن تكون قصيرة فى الطول، مبكرة الإزهار ، غزيرة التفريع والأزهار.
لذلك تم إجراء هذه الدراسة بمحطة بحوث البساتين بالمنصورة (البرامون)، مركز البحوث الزراعية خلال موسمي 2004- 2005 ، 2005- 2006 بهدف دراسة تأثير التركيزات المختلفة لمركبي السيكوسيل والباكلوبترازول (مؤخرات نمو) على نبات الجارونيا (الصنف الأحمر محلي)، تم معاملة النباتات بمركب السيكوسيل عند تركيزي 1500، 3000 جزء/مليون ومركب الباكلوبترازول عند تركيزي 75، 150 جزء/مليون رشاً علي الأوراق وذلك لمرة واحدة أو مرتين .
صممت التجربة فى شكل قطاعات تامة العشوائية عدد المكررات بها 4 مكررات بكل مكررة نبات واحد، وكان عدد المعاملات 36 معاملة. وكانت النتائج على النحو التالي:
1- كلا المركبين قد حدا من طول النبات وزادا كلاً من عدد كل من الأفرع والنورات الزهرية.
2- النباتات المعاملة بكرت في الإزهار مقارنة بمعاملة المقارنة.
3- ارتفعت نسبة الكلوروفيل والكربوهيدرات الكلية بالأوراق بالنباتات المعاملة بأي من منظمي النمو المستخدمين بشكل ملحوظ عن نباتات معاملة المقارنة.
لذلك يوصى باستخدام مركب الباكلوبترازول عند تركيز 75 جزء فى المليون رشاً علي الأوراق لمرتين لتحسين خواص النبات الطبيعية لكي نحصل على نباتات جارونيا قصيرة الطول زاهية اللون غزيرة التفريع والنورات ومبكرة الإزهار.