ACTA SCIENTIARUM POLONORUM *Acta Sci. Pol., Hortorum Cultus 12(1) 2013, 55-64*

THE INFLUENCE OF SELECTED GROWTH REGULATORS ON DEVELOPMENT, DECORATIVE VALUE AND YIELD OF CORMS OF EASY POT FREESIA (*Freesia* Eckl. ex Klatt). PART I. GIBBERELLIN A_3

Piotr Żurawik, Monika Placek

West Pomeranian University of Technology in Szczecin

Abstract. Freesias of Easy Pot group are very interesting complement to an assortment of flowering potted plants. However , there is a lack of information about their requirements and cultivation methods. Experiments were carried out in the years 2006–2007 in the unheated plastic tunnel. Cormlets of three cultivars: 'Gompey', 'Popey' and 'Suzy' were the plant material. Corms were soaked in solution of gibberellic acid in concentration of 10, 20, 40, 80 or 160 mg dm^{-3} for 24 hours just before planting, in a dark room with air temperature 28–30°C. Corms soaked in water were served as the control. During the vegetation season measurements of vegetative and generative traits of plants were conducted. After the end of vegetation period, coefficients of corm weight and number increase were calculated. It was found that cormlets of Easy Pot Freesia can be recommended for cultivation in pots. Cultivar had a significant effect on vegetative and generative parameters of plants. Among evaluated cultivars 'Gompey' was characterized by the greatest decorative value. Plants of this cultivar had the longest inflorescence shoots with the greatest number of lateral shoots and the greatest number of flowers. Irrespective of cultivar, gibberellic acid increased plant height, total number of leaves, length of inflorescence shoots and decreased flower diameter. The use of gibberellic acid increased weight of the offspring corms. Among evaluated concentrations the highest effect was noted for 160 mg dm^{-3}. However, used in the experiment growth regulator did not affect number of obtained new corms.

Key words: cultivars, morphological traits, flowering, Gibrescol 10 MG

INTRODUCTION

Growth regulators have many commercial applications in cultivation of ornamental plants under covers and in the field. Gibberellins are well-known and often used growth

Corresponding author – Adres do korespondencji: Piotr Żurawik, Department of Horticulture, Laboratory of Ornamental Plants, West Pomeranian University of Technology in Szczecin, ul. Papieża Pawła VI 3A, 71-459 Szczecin, Poland, e-mail: kro@zut.edu.pl

regulators. According to Shi et al. [1995] and Startek and Żurawik [2004] treating freesia corms with solution of gibberellic acid in different concentrations breaks dormancy of corms and accelerates of plant flowering. Gibberellic acid stimulates shoots elongation [Jankiewicz 1997], growth of shoots and leaves of freesia [Mynett et al. 2001], it affects also quality of flowers and inflorescences of cyclamen [Nowak 2000a], trumpet-lily [Janowska and Schroeter 2002] and freesia [Startek and Żurawik 2004]. Reports regarding the influence of gibberellic acid on the yield of geophytes corms are equivocal. According to Kawa-Miszczak et al. [1997] gibberellic acid inhibits the process of corms formation. However, Tafradziiski and Ivanova [1991] and also Żurawik [2008] are of the opinion that gibberellic acid stimulates the increase in weight of the offspring corms of freesia. Even small doses of exogenous gibberellin affect dramatically growth of plant, especially when native gibberellin also works [Jankiewicz 1997].

The phase of initiation of flower buds of freesia grown from new corms lasts 3–5 weeks according to Moen [1999] and 4–8 weeks according to Imanishi [1993]. Authors are of the opinion that the phase of initiation of inflorescence buds lasts 2–3 weeks longer when freesias are grown from new corms [Imamura-Torata et al. 1996, Moen 1999]. In conducted experiments with Easy Pot Freesia large new corms were used [Żurawik and Startek 2007, Żurawik 2008]. However, there is a lack of information regarding effect of gibberellic acid on freesias grown from cormlets.

The aim of conducted experiments was to examine the effect of concentration of gibberellic acid solution on growth, development, decorative value and yield of the offspring corms of Easy Pot Freesia grown from cormlets.

MATERIAL AND METHODS

The experiments were conducted in the plastic tunnel, from May to December in the years 2006–2007. Cormlets of three cultivars of Easy Pot Freesia: 'Gompey', 'Popey' and 'Suzy' were the plant material. Corms were prepared for 16 weeks in a room with temperature 28–30^{o}C and relative air humidity 80–85%. Preparation process was finished at the moment when corms were characterized by properly formed and swelled apical buds with perceptible root boots. Just before planting, corms were put into the hermetically closed containers in a dark room with temperature 28–30^{o}C and soaked for 24 hours in solution of Gibrescol 10 MG preparation containing 10% of GA_3. Five concentrations of gibberellic acid were used: 10, 20, 40, 80, 160 mg dm^{-3}. Corms soaked in water were served as the control.

Damp corms were planted to 12-cm pots, filled with medium prepared of sphagnum peat deacidified with 7 g dm^{-3} chalk and 5 g dm^{-3} dolomite to pH 6.2. The slow-release fertilizer Osmocote Plus at the rate of 5 g dm^{-3} was used to supplement deficiency of nutritive components. Pots with planted corms were put on the tables in the plastic tunnel.

During freesia growth the measurements of plants traits were conducted three times: a month after beginning of germination (20th July), during flowering (24th September) and at the end of vegetation (18th December). Plant height and total number of leaves were evaluated. Also greenness index of leaves (SPAD) was measured twice: in Sep-

tember and in December. The measurements of generative traits were conducted at the moment when the first flower in inflorescence developed. Total length of main inflorescence shoot, inflorescence length, number of flowers in first inflorescence, number of flowers per plant, diameter of first flower in inflorescence and number of lateral inflorescence shoots were measured. After corms were dried, cleaned, the yield was evaluated and coefficients of corm weight and number increase were calculated.

18 treatments made of cultivar (3) and concentration of gibberellic acid solution (6) were evaluated in the research. Each treatment consisted of 20 corms in 4 replicates (5 corms in the pot). Experiments were established using the method of total randomization.

Results of the research were verified statistically using the analysis of variance in the following years of the research and as a synthesis of two years. Means were evaluated by multiple Tukey's test at the significance level $\alpha = 0.05$.

RESULTS AND DISCUSSION

In the experiments conducted with freesias grown for cut flowers [Mynett et al. 2001] and cultivated in the pots [Żurawik and Startek 2007] it was found that growth dynamics depended on concentration of gibberellic acid solution and also on cultivar. In cultivation of Easy Pot Freesia from new corms [Startek and Żurawik 2002, Żurawik and Startek 2007] plants of 'Gompey' cultivar were the highest and freesias of 'Popey' cultivar were the shortest. However, in the own experiments where freesias were grown from cormlets the plants of 'Suzy' cultivar were the highest and freesias of 'Popey' cultivar were the shortest (tab. 1). According to Mynett et al. [2001] freesias obtained from new corms are higher than freesias obtained from cormlets. In the literature information concerning the influence of gibberellic acid on plants growth is equivocal. According to Nowak [2000b], Schroeter-Zakrzewska and Janowska [2007] gibberellic acid stimulates plants elongation. However Talia [1983] is of the opinion that gibberellic acid inhibits plants growth. In the own experiments GA_3 significantly increased plant height. Stronger influence of gibberellic acid was observed when freesias were grown from cormlets in comparison with results of experiments conducted by Żurawik and Startek [2007] when freesias were cultivated from new corms. The highest plants were obtained when gibberellic acid solution in concentration of 160 mg dm^{-3} was used. However, the shortest plants were obtained when corms were soaked in water and in the gibberellic acid solution in concentration of 10 mg dm^{-3}. Significant interaction between cultivar and concentration of gibberellic acid solution was found. Cultivars evaluated in the experiments were characterized by different growth dynamics on each date of measurements. Results of the own experiments are analogous with the results obtained by Żurawik and Startek [2007]. In their study that Easy Pot Freesias grew and developed the most intensively in the first month after corms planting. On this date plants reached on the average 88.5% of their total height. Freesias grew much more slowly in September and in December.

Cultivars examined in the experiments differed in total number of leaves. Freesias of 'Suzy' cultivar were characterized by the greatest number of leaves, plants of 'Gompey'

cultivar had less leaves. However, freesias of 'Popey' cultivar were characterized by the smallest number of leaves (tab. 2). Żurawik and Startek [2007] are of the opinion that soaking new corms of Easy Pot Freesia in solution of gibberellic acid does not affect significantly a number of shoots and leaves set on main shoot. However, it decreases total number of leaves on plant. Results of the own experiments did not confirm these results. However, they are conformable with results obtained by Mynett et al. [2001]. According to these authors soaking corms of freesia from standard group in the solution of gibberellin increases leaf number. In the conducted experiments plants obtained from corms soaked in solution of gibberellic acid in concentration of 80 and 160 mg dm^{-3} were characterized by the greatest number of leaves however, control freesias had the least leaf number. Examined cultivars responded differently to gibberellic acid.

Results regarding the influence of gibberellic acid on greenness index of leaves are equivocal. Schroeter-Zakrzewska and Janowska [2007] are of the opinion that the use of gibberellic acid decreases greenness index of leaves of New Guinea Impatiens. However, according to Mynett et al. [2001] and also Janowska and Zakrzewski [2006], soaking corms of freesia from standard group and of trumpet-lily bulbs, increases greenness index of leaves but its effect depends on cultivar traits. In the own experiments the increase of concentration of gibberellic acid solution decreased greenness index of leaves of Easy Pot Freesia grown from cormlets (tab. 3). Moreover, it had a significant effect on a leaf colour. Freesias of 'Suzy' cultivar were characterized by the highest greenness index of leaves and freesias of 'Gompey' cultivar were characterized by the lowest greenness index of leaves. According to Żurawik and Startek [2007] greenness index of leaves depends on date of measurement. The own experiments did not confirm these results. However, cultivars varied in their response to the growth regulator.

Startek and Żurawik [2002] and also Żurawik et al. [2003] are of the opinion that cultivar has an effect on generative parameters of Easy Pot Freesia grown from large new corms. According to those authors 'Gompey' is the cultivar of the longest inflorescence shoots. These results were confirmed in the own research when freesias were grown from small cormlets (tab. 4). Irrespective of concentration of gibberellic acid freesias of 'Gompey' cultivar were characterized by the longest main inflorescence shoot in each year of the experiments. Plants of this cultivar were also characterized by greater number of flowers in first inflorescence and per plant, greater flower diameter and greater number of lateral inflorescence shoots than freesias of 'Suzy' and 'Popey' cultivars. Among examined cultivars freesias of 'Popey' cultivar were characterized by the shortest main inflorescence shoot. There is a lack of information in the literature concerning the effect of gibberellic acid on generative traits of Easy Pot Freesia. Also reports regarding the effect of gibberellic acid on the other geophytes are equivocal. According to Nowak [2000a] gibberellic acid stimulates elongation of cyclamen peduncles. However, Janowska and Schroeter [2002] and also Treder [2003] are of the opinion that gibberellic acid inhibits the length of trumpet-lily peduncles. In the own experiments freesia corms soaked in solution of gibberellic acid were characterized by longer inflorescence shoots than control plants. Irrespective of cultivar, freesias obtained from corms treated with solution of gibberellic acid in concentration of 80 mg·dm^{-3} had the longest main inflorescence shoots. However, control plants were characterized by the shortest main inflorescence shoots. In the own experiments plants treated

Table 1. Dynamics of growth (cm) of Easy Pot Freesia depending on cultivar and concentration of GA_3 solution (mean of the years 2006–2007)
Tabela 1. Dynamika wzrostu (cm) frezji z grupy Easy Pot w zależności od odmiany i stężenia roztworu GA_3 (średnia z lat 2006–2007)

Cultivar Odmiana (C)	Date of measurement Termin pomiaru (T)			GA_3 (G) (mg × dm^{-3})						Mean Średnia
	VII*	IX	XII	0	10	20	40	80	160	
Gompey	28.2	30.9	31.1	24.4	24.5	30.8	33.3	32.7	34.6	30.1
Popey	27.2	28.8	32.0	22.7	22.9	30.3	32.1	33.1	34.7	29.3
Suzy	30.4	32.2	33.9	27.6	28.1	32.0	33.4	35.8	36.1	32.2
Mean – Średnia	28.6	30.6	32.3	24.9	25.2	31.0	32.9	33.9	35.1	
$LSD_{0.05}$ – $NIR_{0.05}$	C – 0.54	T – 0.54	G – 0.93	C(T) – 0.93	T(C) – 0.93	C(G) – 1.32	G(C) – 1.61	G × T – n.s.; r.n.		

Table 2. Total number of leaves (pcs.) of Easy Pot Freesia depending on cultivar and concentration of GA_3 solution (mean of the years 2006–2007)
Tabela 2. Całkowita liczba liści (szt.) u frezji z grupy Easy Pot w zależności od odmiany i stężenia roztworu GA_3 (średnia z lat 2006–2007)

Cultivar Odmiana (C)	Date of measurement Termin pomiaru (T)			GA_3 (G) (mg × dm^{-3})						Mean Średnia
	VII*	IX	XII	0	10	20	40	80	160	
Gompey	5.1	5.3	5.4	3.5	3.3	6.3	5.9	6.5	6.3	5.3
Popey	5.1	5.1	5.1	2.8	3.5	5.6	5.6	6.5	6.4	5.1
Suzy	5.5	5.6	5.7	3.4	3.5	6.3	6.2	7.0	7.1	5.6
Mean – Średnia	5.2	5.3	5.4	3.2	3.4	6.1	5.9	6.7	6.6	
$LSD_{0.05}$ – $NIR_{0.05}$	C – 0.09	T – 0.09	G – 0.15	C × T – n.s.; r.n.	C(G) – 0.21	G(C) – 0.26	G × T – n.s.; r.n.			

Table 3. Greenness index of leaves (SPAD) of Easy Pot Freesia depending on cultivar and concentration of GA_3 solution (mean of the years 2006–2007)
Tabela 3. Indeks zazielenienia liści (SPAD) frezji z grupy Easy Pot w zależności od odmiany i stężenia roztworu GA_3 (średnia z lat 2006–2007)

Cultivar Odmiana (C)	Date of measurement Termin pomiaru (T)		GA_3 (G) (mg × dm^{-3})						Mean Średnia
	IX*	XII	0	10	20	40	80	160	
Gompey	45.4	44.1	47.9	45.9	45.4	41.8	45.1	42.6	44.8
Popey	50.6	50.6	52.0	51.1	52.5	51.2	48.8	48.3	50.6
Suzy	52.9	53.1	54.6	52.2	56.2	54.7	51.5	48.7	53.0
Mean – Średnia	49.6	49.3	51.5	49.7	51.4	49.2	48.5	46.5	
$LSD_{0.05}$ – $NIR_{0.05}$	C – 1.00	T – n.s.; r.n.	G – 1.73	C × T – n.s.; r.n.	C(G) – 2.44	G(C) – 2.99	G × T – n.s.; r.n.		

*Explanations for Tables 1–3 – Objaśnienia dla tabel 1–3:
VII – July – lipiec, IX – September – wrzesień, XII – December – grudzień; n.s.; r.n. – not significant difference – nie różnią się istotnie

Table 4. Characteristics of flowering of Easy Pot Freesia depending on cultivar and concentration of GA_3 solution (mean of the years 2006–2007)
Tabela 4. Charakterystyka kwitnienia frezji z grupy Easy Pot w zależności od odmiany i stężenia roztworu GA_3 (średnia z lat 2006–2007)

Trait Cecha	Cultivar Odmiana (C)	GA_3 (G) ($mg \times dm^{-3}$)						Mean Średnia
		0	10	20	40	80	160	
Length of main inflorescence shoot (cm) Długość głównego pędu kwiatostanowego (cm)	Gompey	28.5	29.9	30.3	30.5	29.5	27.6	29.4
	Popey	22.1	23.8	25.3	23.8	23.9	22.2	23.5
	Suzy	19.5	23.2	23.4	24.0	30.9	31.4	25.4
Mean – Średnia		23.4	25.6	26.3	26.1	28.1	27.1	
$LSD_{0.05} – NIR_{0,05}$		C – 0.72	G – 1.25	C(G) – 0.72	G(C) – 2.16			
Inflorescence length (cm) Długość kwiatostanu (cm)	Gompey	6.0	6.5	6.6	6.3	5.9	6.5	6.3
	Popey	3.8	4.2	4.3	4.8	5.0	5.2	4.6
	Suzy	5.9	7.0	6.2	6.7	6.6	6.7	6.5
Mean – Średnia		5.2	5.9	5.7	5.9	5.8	6.1	
$LSD_{0.05} – NIR_{0,05}$		C – 0.29	G – 0.51	C(G) – 0.29	G(C) – 0.88			
Number of flowers in first inflorescence (pcs.) Liczba kwiatów w kwiatostanie I rzędu (szt.)	Gompey	11.2	11.0	10.3	10.0	9.8	9.6	10.3
	Popey	8.5	9.2	8.3	9.2	9.6	9.7	9.1
	Suzy	8.8	9.1	8.9	9.2	9.1	9.3	9.1
Mean – Średnia		9.5	9.8	9.2	9.5	9.5	9.5	
$LSD_{0.05} – NIR_{0,05}$		C – 0.25	G – 0.44	C(G) – 0.25	G(C) – 0.75			
Number of flowers per plant (pcs.) Liczba kwiatów na roślinie (szt.)	Gompey	16.1	17.3	17.4	15.6	15.4	15.9	16.3
	Popey	10.7	11.6	10.5	11.6	12.4	11.3	11.4
	Suzy	10.1	11.4	12.8	12.2	12.0	11.3	11.6
Mean – Średnia		12.3	13.4	13.6	13.1	13.3	12.8	
$LSD_{0.05} – NIR_{0,05}$		C – 0.77	G – n.s.; r.n.	C(G) – 0.77	G(C) – 2.35			
Flower diameter (cm) Średnica kwiatów (cm)	Gompey	5.1	4.9	4.6	4.7	4.7	4.8	4.8
	Popey	4.5	4.2	4.2	4.2	4.2	4.3	4.3
	Suzy	4.3	4.2	4.2	4.2	4.3	4.3	4.2
Mean – Średnia		4.6	4.4	4.3	4.4	4.4	4.4	
$LSD_{0.05} – NIR_{0,05}$		C – 0.08	G – 0.13	C(G) – 0.08	G(C) – 0.23			
Number of lateral inflorescence shoots (pcs.) Liczba bocznych pędów kwiatostanowych (szt.)	Gompey	0.8	1.0	1.1	1.1	1.0	1.1	1.0
	Popey	0.5	0.6	0.6	0.8	0.9	0.9	0.7
	Suzy	0.4	0.7	0.8	0.9	0.9	0.9	0.8
Mean – Średnia		0.6	0.8	0.8	0.9	0.9	0.9	
$LSD_{0.05} – NIR_{0,05}$		C – 0.12	G – 0.21	C × G – n.s.; r.n.*				

*Explanations as in Table 1 – Objaśnienia jak w tabeli 1

with gibberellic acid in concentration of 10, 40, 80 and 160 mg dm^{-3} had longer inflorescences than control plants. According to Schroeter-Zakrzewska and Janowska [2007] treating impatiens with gibberellic acid increases number of flowers. In the experiments with Easy Pot Freesia number of flowers set in first inflorescence depended significantly on concentration of gibberellic acid solution. However, the use of examined compound did not affect total number of flowers. According to Nowak [2000a] inflorescence diameter of African daisy increases when plants are treated with gibberellic acid. However, Janowska and Schroeter [2002] are of the opinion that gibberellic acid decreases inflorescence diameter of trumpet-lily. Regardless of concentration of gibberellic acid solution Easy Pot Freesias treated with it were characterized by flowers of smaller diameter than control plants. According to Nowak [2000b] gibberellic acid does not affect number of lateral shoots of poinsettia. In the own experiments with freesia the use of gibberellic acid solutions in the concentrations of 20, 40, 80 and 160 mg dm^{-3} increased number of lateral inflorescence shoots in comparison with plants obtained from corms soaked in water (control).

Table 5. Coefficient of subsequent corm weight increase of Easy Pot Freesia depending on cultivar and concentration of GA_3 solution (mean of the years 2006–2007)

Tabela 5. Współczynnik przyrostu masy bulw następczych frezji z grupy Easy Pot w zależności od odmiany i stężenia roztworu GA_3 (średnia z lat 2006–2007)

Cultivar Odmiana (C)	GA_3 (G) (mg × dm^{-3})						Mean Średnia
	0	10	20	40	80	160	
Gompey	1.86	1.70	2.53	2.59	3.00	3.48	2.53
Popey	1.96	1.69	2.26	2.28	2.36	2.86	2.24
Suzy	1.58	1.91	2.19	2.15	2.33	2.37	2.09
Mean – Średnia	1.80	1.77	2.33	2.34	2.56	2.90	
$LSD_{0.05}$ – $NIR_{0,05}$	C – 0.133	G – 0.231	C(G) – 0.133	G(C) – 0.400			

Table 6. Coefficient of subsequent corm number increase of Easy Pot Freesia depending on cultivar and concentration of GA_3 solution (mean of the years 2006–2007)

Tabela 6. Współczynnik przyrostu liczby bulw następczych frezji z grupy Easy Pot w zależności od odmiany i stężenia roztworu GA_3 (średnia z lat 2006–2007)

Cultivar Odmiana (C)	GA_3 (G) (mg × dm^{-3})						Mean Średnia
	0	10	20	40	80	160	
Gompey	0.95	0.95	1.00	0.95	0.95	0.95	0.96
Popey	0.95	1.00	1.00	0.95	0.90	0.95	0.96
Suzy	1.00	0.95	1.00	0.95	1.00	0.95	0.98
Mean – Średnia	0.97	0.97	1.00	0.95	0.95	0.95	
$LSD_{0.05}$ – $NIR_{0,05}$	C – n.s.; r.n.*	G – n.s.; r.n.	C × G – n.s.; r.n.				

*Explanations as in Table 1 – Objaśnienia jak w tabeli 1

In the experiments with Easy Pot Freesia grown from large new corms, Żurawik [2008] found that gibberellic acid solution used in the concentrations of 10, 20, 40, 80 and 160 mg dm^{-3} stimulated the increase of offspring corms weight. Concentration of 160 mg dm^{-3} was characterized by the greatest effect. In the own experiments where cormlets were used, similar effect was found. The smallest coefficient of subsequent corm weight increase was obtained in the control object and also when corms were treated with gibberellic acid solution in concentration of 10 mg dm^{-3}. Plants obtained from corms soaked in gibberellic acid solution in concentrations of 20, 40 and 80 mg dm^{-3} were characterized by higher coefficient and freesias obtained from corms soaked in gibberellic acid solution in concentration of 160 mg dm^{-3} were characterized by the highest coefficient (tab. 5). Coefficient of corm weight increase of Easy Pot Freesia depends also on cultivar traits, regardless of the size of plant material [Żurawik 2008]. Results of the own experiments are conformable with these results. Freesias of 'Gompey' cultivar were characterized by the highest coefficient of subsequent corm weight increase. However, freesias of 'Suzy' cultivar were characterized by the lowest coefficient. According to Mansour and Saadawy [1980] soaking of corms in the solution of gibberellic acid can increase coefficient of offspring corm number increase. Obtained results of the own experiments did not confirm that opinion (tab. 6). However, they are conformable with results published by Żurawik [2008]. According to the author treating corms with gibberellic acid solution before their planting does not affect this trait but coefficient of corm number increase is affected by cultivar traits. In the own experiments where cormlets were used after vegetation period all examined cultivars were characterized by similar number of new corms.

CONCLUSIONS

1. Decorative value of Easy Pot Freesia grown from cormlets depends on a cultivar. Freesias of 'Gompey' cultivar is characterized by the longest inflorescence shoots, greater number of flowers in first inflorescence and per plant, greater number of lateral inflorescence shoots and flowers of greater diameter than 'Popey' and 'Suzy' cultivars.

2. The use of solution of gibberellic acid in concentrations of 10, 20, 40, 80 and 160 mg dm^{-3} does not affect a number of flowers per plant. However, it increases inflorescence shoot length and decreases flower diameter.

3. Regardless of a cultivar, the use of gibberellic acid solution increases height and total number of leaves of freesia.

4. In cultivation of freesia from cormlets the use of gibberellic acid solution increases new corms weight. Among evaluated concentrations, 160 mg dm^{-3} shows the strongest effect. However, gibberellic acid has no effect on a coefficient of subsequent corm number increase.

REFERENCES

Imamura-Torata Y., Doi M., Imanishi H., 1996. Differences in dormancy release and flowering responses to chilling in freesia corms and cormlets. J. Jap. Soc. Horticult. Sci., 65(1), 121–127.

Imanishi H., 1993. Freesia. The physiology of flower bulbs. In: De Hertogh A.A., Le Nard M. (ed.). Elsevier Sci. Publishers. Amsterdam, 285–296.

Jankiewicz L.S., 1997. Regulatory wzrostu i rozwoju roślin. Właściwości i działanie. PWN Warszawa. t. 1, 41–59.

Janowska B., Schroeter A., 2002. Wpływ kwasu giberelinowego na kwitnienie cantedeskii Elliotta (*Zantedeschia ellottiana* Engl.) 'Black Magic'. Zesz. Prob. Post. Nauk Rol. 483, 93–99.

Janowska B., Zakrzewski P., 2006. Wpływ kwasu giberelinowego i sposobu przygotowania kłączy na kwitnienie cantedeskii (*Zantedeschia* Spring.). Zesz. Prob. Post. Nauk Rol. 510, 223–233.

Kawa-Miszczak L., Węgrzynowicz-Lesiak E., Saniewski M., 1997. Pozytywny wpływ etylenu na wzrost i rozwój ozdobnych roślin cebulowych i bulwiastych. Post. Nauk Rol. 1, 49–61.

Mansour B., Saadawy F.M.A., 1980. Effect of gibberellin on vegetative growth, Freesia – Egypt. J. Hortic. 7, 64–69.

Moen M., 1999. The cultivation of Freesias. Van Staaveren Aalsmeer, 1–28.

Mynett K., Startek L., Żurawik P., Płoszaj B., 2001. Wpływ Gibrescolu i Flordimexu na wschody i wzrost frezji ogrodowej. Rocz. AR Pozn. 332, Ogrodnictwo 33, 103–110.

Nowak J., 2000a. Wpływ różnych preparatów zawierających kwas giberelinowy na wzrost i kwitnienie cyklamena i gerbery. Zesz. Nauk. Inst. Sad. i Kwiac. 7, 259–263.

Nowak J., 2000b. Zastosowanie różnych preparatów zawierających kwas giberelinowy do formowania „piennych" pelargonii i poinsecji. Zesz. Nauk. Inst. Sad. i Kwiac. 7, 255–258.

Schroeter-Zakrzewska A., Janowska B., 2007. Wpływ kwasu giberelinowego na wzrost i kwitnienie niecierpka walleriana (*Impatiens walleriana* Hook.) z grupy Spellbound. Rocz. AR Pozn. 332, Ogrodnictwo 41, 195–200.

Shi Y.M., Tao Y.W., Qin W.Y., Fei X.N., 1995. Effects of gibberellin and chilling on freesia blooming. J. Shang. Agricult. Coll., 13–21.

Startek L., Żurawik P., 2002. Wpływ Azofoski i nawozów o działaniu spowolnionym na dynamikę wzrostu i wartość dekoracyjną odmian frezji (*Freesia* Eckl. ex Klatt) z grupy Easy Pot. Zesz. Prob. Post. Nauk Rol. 484, 645–651.

Startek L., Żurawik P., 2004. Wpływ niektórych regulatorów wzrostu na przebieg i długość faz rozwojowych frezji z grupy Easy Pot. Część I. Giberelina A_3. Folia Univ. Agric. Stetin. Agricultura 236(94), 195–200.

Tafradziiski O., Ivanova V., 1991. Effect of GA_3, IAA and their combination upon the vegetative and reproductive characters of Freesia. Sci. Works 36 (2), 77–84.

Talia M.C., 1983. Effects of gibberellin upon Freesia flowering. Acta Hortic. 137, 225–230.

Treder J., 2003. Wzrost i kwitnienie cantedeskii uprawianej w szklarni i w polu. Zesz. Prob. Post. Nauk Rol. 491, 283–291.

Żurawik P., 2008. Wielkość i jakość plonu bulw potomnych frezji z grupy Easy Pot w zależności od stężenia GA_3. Zesz. Prob. Post. Nauk Rol. 525, 551–556.

Żurawik P., Startek L., 2007. Wpływ niektórych regulatorów wzrostu na cechy morfologiczne frezji z grupy Easy Pot uprawianej w okresie wiosenno-letnim. Część I. Giberelina A_3. Folia Univ. Agric. Stetin. Agric., Aliment., Pisc., Zootech. 261(6), 143–152.

Żurawik P., Startek L., Salachna P., 2003. Wzrost, rozwój i kwitnienie w okresie letnim odmian frezji (*Freesia* Eckl. ex Klatt) z grupy Easy Pot. Zesz. Prob. Post. Nauk Rol. 491, 403–410.

WPŁYW WYBRANYCH REGULATORÓW WZROSTU NA ROZWÓJ, WARTOŚĆ DEKORACYJNĄ I PLON BULW FREZJI (*Freesia* Eckl. ex Klatt) Z GRUPY EASY POT. CZĘŚĆ I. GIBERELINA A_3

Streszczenie. Frezje z grupy Easy Pot są bardzo ciekawym uzupełnieniem asortymentu kwitnących roślin doniczkowych. Niestety niewiele jest informacji dotyczących wymagań oraz zasad ich uprawy. Badania prowadzono w latach 2006–2007 w nieogrzewanym tunelu foliowym. Materiał roślinny stanowiły wypreparowane bulwy przybyszowe trzech odmian: 'Gompey', 'Popey' i 'Suzy'. Bezpośrednio przed sadzeniem bulw moczono je przez 24 godziny, w pomieszczeniu bez dostępu światła i w temperaturze 28–30°C, w roztworze kwasu giberelinowego o stężeniach: 10, 20, 40, 80, 160 mg dm^{-3}. Kontrolę stanowiły bulwy moczone w wodzie wodociągowej. W trakcie okresu wegetacji, wykonano pomiary cech wegetatywnych i generatywnych roślin. Po zakończeniu uprawy, obliczono współczynniki przyrostu masy i liczby bulw następczych. Wykazano, że bulwy przybyszowe frezji z grupy Easy Pot można z powodzeniem wykorzystać do uprawy w pojemnikach. Odmiana w dużym stopniu decydowała o parametrach wegetatywnych i generatywnych roślin. Spośród porównywanych odmian najlepszymi walorami dekoracyjnymi odznaczała się 'Gompey'. Rośliny tej odmiany wykształcały najdłuższe pędy kwiatostanowe o największej liczbie bocznych rozgałęzień i największej liczbie osadzonych na nich kwiatów. Niezależnie od uprawianej odmiany, kwas giberelinowy powodował zwiększenie wysokości i całkowitej liczby wykształconych przez frezje liści oraz przyczyniał się do wytwarzania dłuższych pędów kwiatostanowych i kwiatów o mniejszej średnicy. Zastosowany do moczenia bulw kwas giberelinowy powodował zwiększenie masy bulw potomnych. Spośród zastosowanych stężeń najsilniej oddziaływało 160 mg dm^{-3}. Regulator ten nie decydował natomiast o liczbie uzyskanych bulw następczych.

Słowa kluczowe: odmiany, cechy morfologiczne, kwitnienie, Gibrescol 10 MG

Accepted for print – Zaakceptowano do druku: 11.06.2012