

RESPONSE OF TWO CULTIVARS OF *GLADIOLUS* TO CHICKEN MANURE IN THE NEW RECLAIMED LAND.

Manoly, N. D. and A. A. Nasr

Hort Res. Inst., Agric. Res. Center, Giza, Egypt.

ABSTRACT

A split plot field experiment was conducted during two successive seasons of 2006 and 2007 in order to investigate the response of two *Gladiolus* cultivars; White Prosperity and Rose Supreme to the application of chicken manure at four rates (0, 30, 60 and 90 m³ / fed.) in the new reclaimed soil at West Samalout. Minia, Egypt.

Obtained results showed that cv. White Prosperity was significantly superior to cv. Rose Supreme in few parameters and slight differences were detected for other ones. Concerning chicken manure application significantly enhanced the vegetative characters, flowering parameters, were detected bulb formation aspects and chemical constituents determinations. The highest overall values were obtained due to supplying both cultivars with chicken manure at 90 m³ / fed.

INTRODUCTION

Gladiolus grandiflorus is one of the most important ornamental bulbs. It belongs to Family Iridaceae. It's inflorescences are excellent attractive cut flowers, which can be exported to different foreign countries in winter and spring. In *Gladiolus*, there are many cultivars which differ in colour, size and other flower characteristics, White Prosperity with white florets and Rose Supreme with rose florets are among many other *gladiolus* cultivars introduced to Egypt. Investigating the response of these cultivars to different agriculturereal treatments including fertilization with different application of chicken manure to reach the optimum ones for better growth, flowering and corn production under the new reclaimed soil at west Samalout, Minia, Middle Egypt enviromental conditions is needed.

Some recent studies emphasized the improving effects of different rates of chicken manure, composted plant materials and urban wastes of flowering bulb plants such as *Gladiolus* (Liu, *et al.*, 1998; Gangadharan and Gopinath, 2000; Conte *et al.*, 2001; Zaghoul and Moghazy, 2001; Zaghoul and Atta – Alla, 2001; Pimpini and Zanin, 2002 and Atta – Alla *et al.*, 2003). Similar enhancing effects were found by Badawy (1998) and Abd El – Karim (2001) on tuberose, Wu *et al.*, (1999) and Manish *et al.*, (2000) on *Lilium*, Goma (2000) on *Ornithogalum*, Aiello *et al.*, (1997) on *Iris* and Hetman *et al.*, (2001) on tulip.

The aim of the present study was to investigate the effect of chicken manure rates on growth, flowering and bulb production of two *gladiolus* cultivars, i.e. White Prosperity and Rose Supreme under the new reclaimed land at El – Minia growing conditions.

MATERIALS AND METHODS

The present study was carried out in a sandy calcareous soil at a private farm the new reclaimed land, West Samalout, Minia Governorate, Egypt in the two successive seasons of 2005/2006 and 2006/2007. The physical and chemical properties of the experimental soil were shown in Table (A).

Property	Value	Property	Value
Sand (%)	90.85	Total N (%)	0.03
Silt (%)	6.20	Available P (%)	3.63
Clay (%)	2.95	Available K(me/100 g soil)	0.72
Texture grade	sandy soil	DTPA-Extractable P(ppm)	1.08
pH 1 : 2.5	8.16	Fe	1.18
Ec (in mohs / cm)	1.08	Mn	0.41
Organic matter (%)	0.09	Zn	0.22
Total Ca CO ₃ (%)	12.7		

Average corm diameter for cv. White Prosperity was 3.2 – 3.5 cm and average corm weight was 9.5 – 9.8 g in the two seasons, respectively, while those of cv. Rose Supreme were 3.0 – 3.2 cm diameter and 9.7 – 10.1 g weight for the two seasons, respectively. Such corms were obtained from Netherlands through Basonry nurseries, Cairo, Egypt. All corms were dipped in pinlate solution (1 g / l.) prior planting and then planted on October 8th of both seasons in rows, 60 cm apart with 20 cm distance between hills and the corms were placed at the lower third part of the row. Chicken manure was applied at four levels, i.e. 0, 30, 60 and 90 m³ / fed. The layout of this experiment was split – plot design with three replicates. An eight – cm levee width was left between different experimental units from all direction of each one of the three replicates. Gladiolus cultivars were assigned to the main plots, while chicken manure fertilizer was assigned to the sub plot, respectively. The assigned amounts of chicken manure were incorporated into the soil before planting. Chicken manure analysis is shown in Table (B).

Contents	Value	Contents	Value
N (%)	3.58	Mn (ppm)	331
P (%)	0.79	Zn (ppm)	118
K (%)	1.26	pH	7.31
Fe (ppm)	5323	Organic matters	38.15

All experimental units were fertilized with 120 kg / fed. in the form of ammonium sulphate (20.5 %, N), 200 kg / fed. calcium superphosphate (15.5 %, P₂O₅) and 150 kg / fed. of potassium sulphate (48.5 %, K₂O). The amounts of each ammonium sulphate and potassium sulphate for each treatment, were divided into 3 equal portions and applied after 6 and 10 weeks from planting and the third portion after flowering end. Those of calcium superphosphate were applied before planting. Concerning irrigation and other necessary agricultural practices; they were applied as usual.

During the flowering period, the following data were recorded: number of leaves and area (cm²), flowering date (day), spike length (cm), diameter (mm) and fresh weight (g); number of florets and lower floret fresh weight (g) / plant.

Six weeks after flowering termination, corms and cormles fresh weight (g) and number of cormles / plant were recorded.

In addition, total chlorophylls content (mg / g f.w) was determined according to Fadl and Seri – El deen (1978), while, N, P and K % in the leaves and bulbs were determined according to A.O.A.C. (1980).

Obtained data were statistically analyzed following L.S.D method of Snedecor and Cochran (1974).

RESULTS AND DISCUSSION

Vegetative growth characters :

From the obtained data in Table (1), it can be seen that the number of leaves and leaf area per plant of cv. White Prosperity recorded higher values than that of cv. Rose Supreme, however, the differences were not significant in both seasons. The two vegetative growth characters were significantly increased in both seasons due to the application of chicken manure at low and high rates in comparison with untreated plants. The highest values, however, were obtained from the high rate of chicken manure. Such treatment increased number of leaves and leaf area per plant by 40.3 and 44.4 %, respectively in the first season and by 50.3 and 44.0 %, respectively, in the second one, over those of untreated plants.

Table (1): Effect of chicken manure on number of leaves, leaf area and flowering date / plant of *Gladiolus grandiflorus* cv. White Prosperity and Rose Supreme for the two seasons OF 2005 / 2006 and 2006 / 2007.

Chicken manure rates (m ³ / fed). (B)	Number of leaves / plant					
	First season			Second season		
	Cultivars (A)					
	White Pros.	Rose Supr.	Mean (B)	White Pros.	Rose Supr.	Mean (B)
00	5.80	5.65	5.73	6.00	5.93	5.97
30	7.07	7.00	7.04	7.80	7.56	7.8
60	7.60	7.49	7.55	8.53	8.35	8.44
90	8.07	8.00	8.04	9.01	8.93	8.97
Mean (A)	7.14	7.04		7.84	7.69	
L.S.D 5 %	A: N.S	B: 0.32	AB: N.S	A: N.S	B: 0.47	AB: N.S
1 %	A: N.S	B: 0.42	AB: N.S	A: N.S	B: 0.62	AB: N.S
Leaf area (cm ²)						
00	56.07	54.74	55.41	59.05	58.11	58.58
30	67.02	66.35	66.69	68.39	66.44	67.42
60	77.47	77.35	77.41	80.24	79.30	79.77
90	80.60	79.41	80.01	83.44	80.53	81.99
Mean (A)	70.29	69.46		72.78	71.10	
L.S.D 5 %	A: N.S	B: 6.44	AB: N.S	A: N.S	B: 5.98	AB: N.S
1 %	A: N.S	B: 8.58	AB: N.S	A: N.S	B: 7.97	AB: N.S
Flowering date						
00	97.73	98.85	98.29	101.34	104.73	103.04
30	99.06	101.38	100.22	105.52	107.59	106.56
60	100.40	102.57	101.49	107.61	110.50	109.06
90	104.66	106.25	105.46	110.09	111.96	111.03
Mean (A)	100.46	102.26		106.14	108.70	
L.S.D 5 %	A: N.S	B: 1.03	AB: N.S	A: N.S	B: 1.90	AB: N.S
1 %	A: N.S	B: 1.37	AB: N.S	A: N.S	B: 2.53	AB: N.S

The enhancing effect of chicken manure on number of leaves and leaf area was also obtained by Gangadharan and Gopinath (2000) and Conte *et al.*, (2001) on *Gladiolus*, Badawy (1998) on tuberose, Wu *et al.*, (1999) and Manish *et al.*, (2000) on *Lilium* and Goma (2000) on *Ornithogalum*.

The interaction between *Gladiolus* cultivars and chicken manure treatments was not significant in both seasons.

The highest overall values were obtained due to supplying both cultivars with chicken manure at 90 m³ / fed.

Flowering parameters :

Flowering date :

Data in Table (1) show that *cv. White Prosperity* produced earlier flowers than *cv. Rose Supreme*, yet the differences were not significant in both seasons.

Flowering date, recorded as number of days from planting till flowering was significantly delayed as a result of supplying plants with the medium (101.49 and 109.06 days) and the high (105.46 and 111.03 days) chicken manure rates in the two seasons, in comparison with the unfertilized plants (98.29 and 103.04 days) as shown in Table (1).

The interaction between two factors was not significant in both seasons.

Other flowering parameters :

Non significant differences were obtained between the two studied cultivars, however, *cv. White Prosperity* produced longer and thicker spikes, higher number and fresh weight of lower florets and spikes than those of *cv. Rose Supreme* in both seasons, while lower florets fresh weight was significant only in the second season.

Tables (2 and 3) illustrate that chicken manure treatments, especially, the medium and high rates, significantly increased all studied flowering parameters in the two seasons, in comparison with those of the control plants.

The high rate (90 m³ / fed.) increased spike length, diameter and fresh weight, floret numbers and lower floret fresh weight per plant by 25.8, 70.8, 56.1, 53.3 and 56.4 % respectively, in the first season and by 24.9, 80.5, 58.3, 50.8 and 54.7 % respectively, in the second one, over those of the control plants. These results are in agreement with those reported by Gangadharan and Gopinath (2000), Conte *et al.*, (2001), Zaghloul and Atta – Alla (2001) and Pimpini and Zanin (2002) on *Gladiolus*, and Badawy (1998) and Abd – El Karim (2001) on tuberose.

The interaction between cultivars and fertilization was not significant in both seasons. The best results were obtained due to supplying both cultivars with chicken manure at 90 m³ / fed.

Table (2) : Effect of chicken manure on spike length, diameter and fresh weight / plant of *Gladiolus grandiflorus* cv. White Prosperity and Rose Supreme for the two seasons OF 2005 / 2006 and 2006 / 2007.

Chicken manure rates (m ³ / fed). (B)	Spike length (cm)					
	First season			Second season		
	Cultivars (A)					
	White Pros.	Rose Supr.	Mean (B)	White Pros.	Rose Supr.	Mean (B)
00	65.36	64.54	64.95	70.22	69.32	69.77
30	72.73	72.13	72.43	78.14	77.06	77.60
60	77.98	76.18	77.08	81.16	80.97	81.07
90	82.19	81.24	81.72	88.00	86.23	87.12
Mean (A)	74.57	73.52		79.38	78.40	
L.S.D 5 %	A: N.S	B: 2.90	AB: N.S	A: N.S	B: 3.46	AB: N.S
1 %	A: N.S	B: 3.46	AB: N.S	A: N.S	B: 4.60	AB: N.S
Spike diameter (mm)						
00	5.54	5.48	5.51	5.60	5.55	5.58
30	7.84	7.70	7.77	7.92	7.81	7.87
60	8.24	8.10	8.17	8.35	8.27	8.31
90	9.46	9.35	9.41	10.11	10.02	10.07
Mean (A)	7.77	7.66		8.00	7.91	
L.S.D 5 %	A: N.S	B: 0.45	AB: N.S	A: N.S	B: 0.51	AB: N.S
1 %	A: N.S	B: 0.60	AB: N.S	A: N.S	B: 0.66	AB: N.S
Spike fresh weight (g)						
00	19.89	18.66	19.28	20.63	20.02	20.33
30	25.44	24.97	25.21	26.33	26.07	26.20
60	27.00	26.95	26.98	29.25	28.14	28.70
90	30.13	30.04	30.09	32.28	32.08	32.18
Mean (A)	25.62	25.16		27.12	26.58	
L.S.D 5 %	A: N.S	B: 2.68	AB: N.S	A: N.S	B: 2.81	AB: N.S
1 %	A: N.S	B: 3.58	AB: N.S	A: N.S	B: 3.75	AB: N.S

Bulbs productivity :

It's clear that the corm and cormles fresh weights and number of cv. White Prosperity gave higher values than that of cv. Rose Supreme in both seasons, consequently, significant differences were found in the second season only as shown in Tables (3 and 4).

Fresh weight of corms and cormles and number of cormles of *Gladiolus* plants were significantly increased due to the different chicken manure treatments comparing to control treatment in the two seasons as shown in Tables (3 and 4).

The high rates of chicken manure (90 m³ / fed.) increased fresh weight of corm and cormles and number of cormles by 51.3, 69.9 and 43.3 % respectively, in the first season and by 41.3, 65.2 and 38.7 % respectively, in the second one, over those of the control plants. In accordance with these results are the findings of Liu *et al.*, (1998) and Atta - Alla *et al.*, (2003) on *Gladiolus*, Wu *et al.*, (1999) and Manish *et al.*, (2000) on *Lilium*, Aiello *et al.*, (1997) on *Iris*.

The interaction between the two cultivars and chicken manure was not significant in both seasons, except for number of cormles which was significant only in the second season. The highest overall values were obtained due to supplying both cultivars with chicken manure at 90 m³ / fed.

Table (3): Effect of chicken manure on numbers of florets , lower floret and corms fresh wight / plant of *Gladiolus grandiflorus* cv. White Prosperity and Rose Supreme for the two seasons 2005 / 2006 and 2006 / 2007.

Chicken manure rates (m ³ fed). (B)	Number of florets / spike					
	First season			Second season		
	Cultivars (A)					
	White Pros.	Rose Supr.	Mean (B)	White Pros.	Rose Supr.	Mean (B)
00	6.18	6.02	6.10	6.35	6.28	6.32
30	8.40	8.30	8.35	8.60	8.47	8.54
60	9.15	9.11	9.13	9.44	9.29	9.33
90	9.40	9.30	9.35	9.60	9.45	9.53
Mean (A)	8.28	8.18		8.50	8.37	
L.S.D 5 %	A: N.S	B: 0.82	AB: N.S	A: N.S	B: 1.12	AB: N.S
1 %	A: N.S	B: 1.10	AB: N.S	A: N.S	B: 1.50	AB: N.S
Lower floret fresh weight (g)						
00	4.62	4.50	4.56	4.72	4.60	4.66
30	5.85	5.57	5.71	5.90	5.60	5.75
60	6.12	6.08	6.10	6.15	6.10	6.13
90	7.15	7.10	7.13	7.22	7.20	7.21
Mean (A)	5.94	5.81		6.00	5.88	
L.S.D 5 %	A: N.S	B: 0.46	AB: N.S	A: 0.26	B: 0.35	AB: N.S
1 %	A: N.S	B: 0.62	AB: N.S	A: 0.44	B: 0.47	AB: N.S
Corms fresh weight (g)						
00	33.28	32.37	32.83	36.19	35.72	35.96
30	40.57	39.40	39.99	42.98	40.62	41.80
60	42.64	40.48	41.56	44.91	42.39	43.65
90	50.70	48.62	49.66	52.06	49.57	50.82
Mean (A)	41.80	40.28		44.04	42.08	
L.S.D.5 %	A: N.S	B: 4.27	AB: N.S	A: 1.20	B: 2.81	AB: N.S
1 %	A: N.S	B: 5.69	AB: N.S	A: 1.82	B: 3.74	AB: N.S

Total chlorophylls content :

The total chlorophylls content as affected by cultivars was not significantly influenced in the two seasons.

Table (4) shows the existence of significant differences in total chlorophylls content in the two seasons due to chicken manure treatments at the high rate giving the highest values. The findings of Hetman *et al.*, (2001) on tulip. Are in agreement with this result.

The interaction between the two factors was not significant in both seasons.

Table (4) : Effect of chicken manure on number and corms fresh weight and total chlorophylls content / plant of *Gladiolus grandiflorus* cv. White Prosperity and Rose Supreme for the two seasons OF-2005 / 2006 and 2006 / 2007.

Chicken manure rates (m ³ / fed). (B)	Number of corms / plant					
	First season			Second season		
	Cultivars (A)					
	White Pros.	Rose Supr.	Mean (B)	White Pros.	Rose Supr.	Mean (B)
00	15.71	15.45	15.58	16.77	16.64	16.71
30	19.68	19.37	19.53	21.86	20.70	21.28
60	21.89	20.44	21.17	22.99	21.16	22.08
90	22.78	21.85	22.32	23.30	23.03	23.17
Mean (A)	20.02	19.28		21.23	20.38	
L.S.D 5 %	A: N.S	B: 1.83	AB: N.S	A: 1.43	B: 1.94	AB: 2.74
1 %	A: N.S	B: 2.43	AB: N.S	A: 2.15	B: 2.58	AB: 3.64
Corms fresh weight (g)						
00	8.80	8.71	8.76	9.90	9.83	9.87
30	12.33	12.06	12.20	14.08	13.05	13.66
60	14.00	13.32	13.66	15.00	14.98	14.99
90	15.41	14.35	14.88	16.40	16.22	16.31
Mean (A)	12.64	12.11		13.85	13.52	
L.S.D 5 %	A: N.S	B: 1.71	AB: N.S	A: 0.98	B: 1.32	AB: N.S
1 %	A: N.S	B: 2.28	AB: N.S	A: 1.47	B: 1.76	AB: N.S
Total chlorophylls content (mg / g f.w)						
00	3.12	3.03	3.08	3.25	3.10	3.18
30	3.66	3.42	3.54	3.77	3.69	3.73
60	3.70	3.64	3.67	3.96	3.76	3.86
90	4.07	3.88	3.98	4.27	4.01	4.14
Mean (A)	3.64	3.49		3.81	3.64	
L.S.D 5 %	A: N.S	B: 0.20	AB: N.S	A: N.S	B: 0.22	AB: N.S
1 %	A: N.S	B: 0.28	AB: N.S	A: N.S	B: 0.30	AB: N.S

Nitrogen, phosphorus and potassium in the leaves and bulbs :

Data in Tables (5 and 6) reveal that nitrogen, phosphorus and potassium percentage in the leaves and bulbs of cv. White prosperity were higher than those of cv. Rose Supreme, yet the differences were statically significant in the second season only in regard to nitrogen percentage in the leaves and bulbs.

Concerning the percentages of N, P and K in the leaves and bulbs of *Gladiolus* plants they were significantly increased, in both seasons, due to chicken manure treatments in comparison with untreated plants, (Tables, 5 and 6). The highest values were recorded for chicken manure at 90 m³ / fed., for the three N, P and K nutrients in both seasons. Similar conclusion were reached by different researches on *gladiolus* (Zaghloul and Moghazy, 2001 and Zaghloul and Atta – All, 2001), *Ornithogalum* (Goma, 2000) and *tulip* (Hetman *et al.*, 2001).

The interaction between the two cultivars and chicken manure was not significant in both seasons.

Concerning the beneficial roles of organic fertilizers, they provide the soil with essential macro – and micro – nutrients, improve soil texture, increase ion exchange capacity of the soil, absorb essential nutrients against leaching and release such nutrients faster by microbial decomposition (Follett *et al.*, 1981). The use of organic fertilizers should be much more beneficial under sandy soil conditions at which such experiment was conducted.

Table (5): Effect of chicken manure on leaves nitrogen, phosphorus and potassium %/ plant of *Gladiolus grandiflorus* cv. White Prosperity and Rose Supreme for the two seasons OF 2005 / 2006 and 2006 / 2007.

Chicken manure rates (m ³ / fed). (B)	Leaves nitrogen %					
	First season			Second season		
	Cultivars (A)					
	White Pros.	Rose Supr.	Mean (B)	White Pros.	Rose Supr.	Mean (B)
00	1.92	1.80	1.86	1.96	1.85	1.91
30	2.15	2.11	2.13	2.88	2.74	2.80
60	2.24	2.18	2.21	3.00	2.83	2.92
90	2.36	2.25	2.31	3.15	3.05	3.10
Mean (A)	2.17	2.07		2.74	2.62	
L.S.D 5 %	A: N.S	B: 0.16	AB: N.S	A: 0.12	B: 0.21	AB: N.S
1 %	A: N.S	B: 0.22	AB: N.S	A: 0.16	B: 0.28	AB: N.S
Leaves phosphorus %						
00	0.288	0.274	0.281	0.308	0.299	0.304
30	0.407	0.400	0.404	0.515	0.510	0.513
60	0.410	0.405	0.408	0.518	0.512	0.515
90	0.425	0.412	0.419	0.526	0.515	0.521
Mean (A)	0.383	0.373		0.487	0.459	
L.S.D 5 %	A: N.S	B: 0.095	AB: N.S	A: N.S	B: 0.097	AB: N.S
1 %	A: N.S	B: 0.119	AB: N.S	A: N.S	B: 0.129	AB: N.S
Leaves potassium %						
00	2.901	2.893	2.897	3.045	3.001	3.023
30	3.545	3.540	3.543	4.252	4.220	4.236
60	3.567	3.555	3.561	4.275	4.267	4.271
90	3.593	3.587	3.590	4.288	4.270	4.279
Mean (A)	3.402	3.394		3.965	3.939	
L.S.D 5 %	A: N.S	B: 0.103	AB: N.S	A: N.S	B: 0.097	AB: N.S
1 %	A: N.S	B: 0.138	AB: N.S	A: N.S	B: 0.129	AB: N.S

Table (6) : Effect of chicken manure on corms nitrogen, phosphorus and potassium % / plant of *Gladiolus grandiflorus* cv. White Prosperity and Rose Supreme for the two seasons OF 2005 / 2006 and 2006 / 2007.

Chicken manure rates (m ³ / fed). (B)	Corms nitrogen %					
	First season			Second season		
	Cultivars (A)					
	White Pros.	Rose Supr.	Mean (B)	White Pros.	Rose Supr.	Mean (B)
00	1.22	1.19	1.21	1.37	1.21	1.29
30	1.54	1.42	1.48	1.65	1.50	1.58
60	1.73	1.66	1.70	1.86	1.75	1.81
90	1.88	1.73	1.81	1.92	1.84	1.88
Mean (A)	1.59	1.50		1.70	1.58	
L.S.D 5 %	A: N.S	B: 0.11	AB: N.S	A: 0.09	B: 0.14	AB: N.S
1 %	A: N.S	B: 0.15	AB: N.S	A: 0.12	B: 0.19	AB: N.S
Corm phosphorus %						
00	0.185	0.174	0.180	0.190	0.180	0.185
30	0.230	0.226	0.228	0.234	0.228	0.231
60	0.232	0.228	0.230	0.246	0.234	0.240
90	0.240	0.236	0.238	0.258	0.240	0.249
Mean (A)	0.222	0.216		0.232	0.221	
L.S.D 5 %	A: N.S	B: 0.033	AB: N.S	A: N.S	B: 0.014	AB: N.S
1 %	A: N.S	B: 0.044	AB: N.S	A: N.S	B: 0.019	AB: N.S
Corm potassium %						
00	1.893	1.881	1.887	1.900	1.890	1.895
30	2.240	2.230	2.235	2.342	2.334	2.330
60	2.253	2.246	2.250	2.344	2.348	2.346
90	2.280	2.264	2.272	2.380	2.387	2.383
Mean (A)	2.187	2.155		2.242	2.240	
L.S.D 5 %	A: N.S	B: 0.064	AB: N.S	A: N.S	B: 0.050	AB: N.S
1 %	A: N.S	B: 0.085	AB: N.S	A: N.S	B: 0.067	AB: N.S

REFERENCES

- Abd – El Karim, F.M. (2001) : Studies on some factors affecting growth and bulb productivity of *Polianthes tuberosa*, L. plants. Ph.D Diss. Fac. Agric., Kafr – El Sheikh, Tanta Univ.
- Aliello, N.; Bezzi, A. and Clemental, F. (1997) : The effect of mineral fertilizer application on the yield and quality of *Iris pallida* rhizomes. *J. Soils and Crops*, 7 (1) : 66 – 71 (C.F. Hort. Abst., 67 (8) : 7195).
- A.O.A.C. (1980) : Association of Official Analytical Chemists. Official Methods of Analysis, 12th Edit. Washington, D.C.
- Atta – Alla, H.K.; Zaghloul, M.A. and Hashish, K.H. (2003) : Effect of organic manure and NPK fertilizers on vegetative growth, flowering, and chemical composition of some gladiolus cultivars. *Ann. Agric. Sci. Moshtohor*, 41 (2) : 680 – 691.
- Badawy, O.E. (1998) : Physiological and anatomical studies on tuberose bulbs. Ph.D Diss., Fac. of Agric. Cairo Univ.
- Conte, C.A.; Ruppenthal, V.; Zigiotto, D.C.; Bianchini, M.I. and Backes, C. (2001) : Organic fertilization in the culture of the gladiolus. *Scientia Agraria Paranaensis*, 1 (1) 33 – 41. (C.F. CAB Abst. ENAL).
- Fadl, M.S. and Seri – El deen, S.A. (1978) : Effect of benzyl adenine on photosynthetic pigments and total soluble sugars of olive seedlings grown under saline conditions. *Res. Bull. No. 843, Fac. Agric. Ain Shams Univ.*
- Follett, R. H.; Murphy, L. S. and Dorahue, R. L. (1981) : Fertilizers and Soil Amendments, Prentice – Hall. Inc. Englewood Cliffs New Jersey, U S A.
- Gangadharan, G.D. and Gopinath, G. (2000) : Effect of organic and inorganic fertilizers on growth, flowering and quality of Gladiolus cv. White Prosperity. *Karnataka J. Agric. Sci.* 13 (2) : 401 – 405. CF. www.bids.ac.UK.
- Goma, S.A. (2000) : Physiological studies on *Polianthes tuberosa* and *Ornithogalum thyrsoides* bulbs Ph.D Diss., Fac. Agric., Kafr – El Sheikh, Tanta Univ.
- Hetman, J.; Laskowska, H.; Durlak, W. and Wolski, T. (2001) : Attempt at using the herbs of *Echinacea purpurea* to improve the properties of soil used for planting tulips. *Annals Univ. Mariae Curie Sklodowska Sectio EEE, Horticultura*, 9 : 301 – 306 (C.F. CAB Abst. ENAL).
- Liu, W.C.; Wu, G. D.; Yao, T.P.; Chen, F.H. and Chen, W.H. (1998) : Effect of soil factors and management practices on soil fertility and gladiolus growth in a state alluvial soil. *Taiwan Sugat*, 45 (3) : 20 – 25 (C.F. CAP Abst., ENAL).
- Manish, K.; Grewal, H.S. and Arora J.S. (2000) : Effect of media on propagation of *Lilium.*, *J. Ornam. Hort.*, 3 (1) : 58 – 59. (C.F. Hort. Abst., 71 (3) : 2539).
- Pimpini, F. and Zanin, G. (2002) : Gladiolus, the effect of soil type and fertilizer, culture. *Protette*, 31 (9) : 107–114 [c.f. WWW. bids. ac. UK].

- Snedecor, G.W. and Cochran, W.G. (1974) : Statistical Methods, Iowa State Univ. Press, Ames, Iowa, U.S.A.
- Wu, G.D.; Liu, W.C.; Chang, J.Y.; Yao, T.P.; Chen, J.B. and Chen, W.H. (1999) : A mixed medium of filter cake and rice hull for cultivation of *Lilium Casablanca* bulbs, Report, Taiwan Sugar Res. Inst. No. 163 : 33 - 44 (C.F. Hort. Abst., 71 (3): 7015).
- Zaghloul, M. and Atta - Alla, H.K. (2001) : Effect of irrigation sewage sludge and cement dust on vegetative growth, flowering and chemical composition of gladiolus grown in sandy soil. Annals of Agric. Sci., Moshtohor, 39 (1) : 365 - 583.
- Zaghloul M. and Moghazy, E.I. (2001) : Response of some gladiolus cultivars to organic manure and NPK fertilization in sandy soil under Sinai conditions. Annals of Agric. Sci. Moshtohor, 39 (1) : 585 - 602.

**استجابة صنفين من الجلاديولوس لزرق الدولجن في الأراضي حديثة الاستصلاح
نادى ليمترى مانولى و عبد المجيد عبد القادر نصر
معهد بحوث البساتين - مركز البحوث الزراعية - الجيزة - مصر**

في تجربة حقلية بطريقة لقطع المنشقة خلال موسمين متتاليين ٢٠٠٦ و ٢٠٠٧ تمت دراسة مدى استجابة صنفين من الجلاديولوس هما هوليت بروسبيرتي وروز سويريم لأربع معدلات من زرق الدولجن (صفر ، ٣٠ ، ٦٠ ، ٩٠ م^٢ للفدان) وذلك تحت ظروف الأراضي حديثة الاستصلاح لمنطقة غرب سالوط بالمنيا .
يمكن تلخيص النتائج المتحصل عليها في الآتي:
- تفوق الصنف هوليت بروسبيرتي معنويا بقليل من الصفات محل الدراسة بالمقارنة بالصنف روز سويريم وكذلك أدى التسميد بزرق الدولجن إلى تحسن معنوية النمو الخضري والزهرى وإنتاج الأصيل والتقدير الكيماوية .
والحصول على أعلى قيم لجميع الصفات محل الدراسة يجب إمداد كلا الصنفين بزرق الدولجن بمعدل ٩٠ م^٢ للفدان .