RESULTS AND DISCUSSION

4-Results and Discussion

4-I-Effect of Yeast:

4-I-1-Effect of Yeast on *Lilium longiflorum* var lasio:

4-I-1-1-Effect of Yeast on vegetative growth: -

4-I-1-1-1-Number of leaves: -

Data in Table (1) showed that, yeast application at different levels increased leaf number per plant compared with control treatment; the rate of increasing was increased by increasing the concentration of yeast. The highest level of yeast gave the highest number of leaves /plant compared with medium and low levels of yeast treatment, in this respect it could be concluded that the rate of increase reached to 20.83, 13.89 and 9.17% for high, medium and low level of yeast in the first seasons but reached to 20.57 and 20.38% in the second season for the high and medium levels of yeast treatment, over control plants .In this connection **Noggle and Fritz (1992)** on the closely associated higher plants, **Ahmed *et al*,(1997)**of the berries,**Shadia *et al.* (1998)**on *Hibiscus sabdariffa*,**L.,Khedr and Farid (2000)**on tomato.

4-I-1-1-2-Spike length: -

Lilium spike length was increased by yeast application compared with control plants. The highest value of spike length was observed from treating plants with high level of yeast (Table, 1). The same results obtained by **El-Desouky *et al.* (1998)** on squash.

4-I-1-1-3-Spike diameter: -

Data in Table (1) showed that all different yeast treatments increased spike diameter in the first and second seasons compared with control plants except low level treatment in the first season which slightly decreased spike diameter. In this respect the high level of yeast gave the highly significant

increase in spike diameter in the first and second seasons, respectively. **Mansour (1998)** on apple gave the same trend.

4-I-1-1-4-Fresh weight of leaves: -

Fresh weight of leaves was increased by yeast application on lilium plants, data in Table (1) showed that all different yeast treatments increased fresh weight of leaves in both seasons, the best results for this character was attained from high levels of yeast followed by medium and low level compared with control treatment. The rate of increasing reached to 139.77,113.5 and 106.0 or 99.36, 98.56 and 86.56% in the first and second seasons respectively for the high, medium and low levels of yeast. Similar results were demonstrated by **Kheder and Farid (2000)** on tomato.

4-I-1-1-5-Dry weight of leaves: -

Data in Table (1) showed that the same trend of results for fresh weight of leaves was attained for leaves dry weight where the highest value for this character were obtained from treated plants with high level of yeast followed by medium and low level of yeast treatment. Similar trend of results was obtained by **Kheder and Faried (2000)** on tomato.

4-I-1-1-6—Effect of yeast on chemical constituents of leaves:-

4-I-1-1-6-a-Carbohydrate %: -

Data in Table (2) show that the carbohydrate percentages in the leaves were decreased with low level of yeast in the first and second seasons but increasing with medium and high levels compared with control plants. The similar result was given by **(Fathy *et al.*, 2000)** on tomato.

4-I-1-1-6-b-Nitrogen: -

Data in Table (2) show that the nitrogen percentage of the leaves were decreased with low level of yeast in the first season

but increased in the second increased with medium and high level in both seasons. The same result obtained by **Atawia and El-Desouky (1997)** on orange.

4-I-1-1-6-c-Phosphorus: -

Data in Table (2) show that yeast application at (1gm/L) increased the P % in the leaves in the first season but was no effect in the second one. Also it was increased with yeast application at (2gm and 3gm/L). In this connection **Atawia and El-Desouky (1997)** on orange.

4-I-1-1-6-d-Potassium: -

Concerning the effect of yeast on K % in the leaves of *Lilium longiflorum* var lasio, data in Table (2) show that all yeast levels (1,2 and 3gm/L) increased the potassium percentage. The highly increasing was with highest level of yeast. **Atawia and EL-Desouky (1997)** on orange gave the same result.

Table (1) :- Effect of Yeast on vegetative growth in *Lilium longiflorum* var. Lasio

Treatment	Number Of leaves		Spike length (cm)		Spike diameter (cm)		Fresh weight of leaves (gm)		Dry weight of leaves (gm)	
	1 st.	2 nd.	1 st.	2 nd.	1 st.	2 nd.	1 st.	2 nd.	I st.	2 nd.
Control	90.00	88.33	69.33	74.00	0.68	0.86	5.33	6.25	1.14	1.28
1 gm / L	98.25	87.50	73.50	82.83	0.66	0.93	10.98	11.66	2.01	2.80
2 gm / L	102.50	106.33	89.33	87.50	0.75	1.00	11.38	12.41	2.58	3.86
3 gm / L	108.75	106.50	90.00	92.66	0.98	1.23	12.78	12.46	3.01	3.98
L. S. D 0.05	N.S	14.69	12.10	N.S	0.19	0.20	2.48	1.63	0.47	0.28
L. S. D 0.01	N.S	N.S	N.S	N.S	0.29	0.30	3.76	2.47	0.71	0.43

st=first season nd=second season

Table (2) :- Effect of Yeast on chemical content in leaves of *Lilium longiflorum* var. Lasio

Treatment	Carbohydrate %		Nitrogen %		Phosphrus %		Potassium %	
	1 st.	2 nd.	1 st.	2 nd.	1 st.	2 nd.	1 st.	2 nd.
Control	18.00	22.00	2.33	3.44	0.35	0.11	1.31	1.56
1 gm / L	14.75	16.75	1.75	3.50	0.40	0.11	2.28	2.31
2 gm / L	23.50	27.75	2.43	4.29	0.40	0.38	2.30	2.32
3 gm / L	26.50	28.75	2.63	4.69	0.55	0.47	2.40	2.44

st=first season nd=second season

4-I-1-2-Effect of Yeast on flowering: -

4-I-1-2-2-Number of florets per plant: -

Data in Table (3) showed that only medium and high level of yeast treatments was increased florets number per plant compared with control treatment. The highest floret number per plant was obtained from treated plants with high level of yeast, which attained to 21.59 and 33.48 % over control plants in the first and second seasons, respectively. **El- Desouky *et al.* (1998)** on squash, **Fathy *et al.* (2000)** on tomato gave the similar results.

4-I-1-2-3-floret diameter: -

Data in Table (3) showed that different yeast treatments significant by increased floret diameter compared with control plants, the floret diameter increased was gradually increased as application of yeast where the largest value of floret diameter was obtained from treating the plant with the highest level of yeast in both seasons it gave 24.98 and 44.49% over control plants in the first and second seasons, respectively. These results of flowering parameters agree with those obtained by **El-Desouky *and Wanas* (1998)** on cucumber.

4-I-1-2-4-Fresh weight of floret: -

All different yeast treatments increased floret fresh weight in both seasons comparing with control treatment. Fresh weight of floret was increased with increasing the concentrations of yeast. The highest value for this character was attained from treating the plants with high level of yeast. It gave 20.81 and 32.23 % over the control plants in the first and second seasons, respectively (Table, 3). **Khedr and Farid (2000)** on tomato.

4-I-1-2-4-Dry weight of floret: -

Data in Table (3) cleared that floret dry weight was highly significant by increased with different levels of yeast treatment. The high level of yeast was the most effective on this concern of both seasons compared with medium and low levels of yeast treatment. **Khedr and Farid (2000)** on tomato gave the similar results.

4-I-1-2-5-Fresh weight of spike: -

Data tabulated in Table (3) cleared that the fresh weight of spike was increased with different yeast concentrations in both seasons .The heaviest weight was produced by treating lilium plants with high level of yeast (3gm/L) followed by medium and low level of yeast they attained of 47.79, 31.58 and 16.07 or 41.23, 28.82 and 19.63 % over control plants in the first and second seasons, respectively.

4-I-1-2-6-Dry weight of spike: -

Data in Table (3) showed that different yeast levels increased the spike dry weight in both seasons. The high level of yeast produced the heaviest dry weight of spike in both seasons followed by medium and low level. On the other hand, control treatment gave the best dry weight of spike in both seasons.

4-I-1-2-7-Vase life (Number of day to wilting): -

Results in Table (3) cleared that; the vase life of lilium florets was increased with different yeast concentrations in both seasons. The maximum number of day was produced with using high level of yeast followed by medium and low levels of yeast, in this respect we can say that all different treatments highly significant increased floret vase life in both seasons. The rate of increasing reached to 45.0 and 40.37 % for high level of yeast in the first and second seasons, respectively.

4-I-1-2-8-Effect of yeast on chemical constituents of florets:-

4-I-1-2-8-aCarbohydrate %: -

Data in Table (4) show that the high concentration of yeast increased the carbohydrate % in both seasons. At the mean time the low and medium (1,2gm/L) levels of yeast led to decreasing the carbohydrate % in the second season only. **Fathy *et al.*, (2000)** on tomato gave the same result.

4-I-1-2-8-b-Nitrogen: -

Data in Table (4) show that low level of yeast (1g/L)

increased N% in flowers in first season but decreased it in the second season. The medium and high levels (2gm and 3gm/L) was increased the N% in both seasons. The high level of yeast gave the maximum percentage of nitrogen in both seasons.

4-I-1-2-8-c-Phosphorus:-

Data in Table (4) show that the low and medium level (1gm and 2gm/L) increased P% in florets compared with control plants but the result in two treatments was equals in both seasons. The highly increase was recorded with the high level of yeast (3gm/L) in both seasons.

4-I-1-2-8-d-Potassium: -

Data in Table (4) show that, potassium percentage in the lilium florets was increased with all levels of yeast compared with control plants. The maximum potassium percentage was produced with the highest concentration of yeast.

Table (3) :- Effect of Yeast on flowering growth in *Lilium longiflorum* var. Lasio

Treatment	Number of florets		Diameter of florets (cm)		Fresh weight of florets (gm)		Dry weight of florets (gm)		Fresh weight of spike (gm)		Dry weight of spike (gm)		Vase life (Day)	
	1 st.	2 nd.	1 st.	2 nd.	1 st.	2 nd.	1 st.	2 nd.	1 st.	2 nd.	1 st.	2 nd.	1 st.	2 nd.
Control	6.30	6.66	10.13	8.99	7.16	7.23	1.31	1.35	34.36	36.33	5.96	6.20	10.00	10.33
1 gm / L	6.16	6.50	11.33	10.50	7.70	8.50	1.93	1.96	39.88	43.46	6.88	7.75	12.00	12.83
2 gm / L	7.00	7.83	12.50	12.80	8.60	9.45	2.25	2.28	45.21	46.80	7.33	8.91	13.50	14.33
3 gm / L	7.66	8.89	12.66	12.99	8.65	9.56	2.56	2.88	50.78	51.31	8.13	9.60	14.50	14.50
L. S. D 0.05	N.S	1.73	1.78	2.56	N.S	0.80	0.42	0.18	7.91	7.32	0.88	1.64	1.25	0.57
L. S. D 0.01	N.S	N.S	N.S	N.S	N.S	1.22	0.64	0.27	N.S	N.S	1.34	2.48	1.89	0.87

st=first season nd=second season

Table (4) :- Effect of Yeast on chemical content in florets of *Lilium longiflorum* var. Lasio

Treatment	Carbohydrate %		Nitrogen %		Phosphrus %		Potassium %	
	1 st.	2 nd.	1 st.	2 nd.	1 st.	2 nd.	1 st.	2 nd.
Control	33.00	34.50	3.17	2.78	0.23	0.24	1.25	1.04
1 gm / L	34.50	31.50	3.32	2.71	0.40	0.28	1.85	1.52
2 gm / L	38.50	33.75	3.56	2.84	0.40	0.28	1.90	1.98
3 gm / L	41.00	36.00	3.89	2.91	0.52	0.30	2.40	2.21

st=first season nd=second season

4-1-1-3-Effect of yeast on bulbs characteristics:-

4-1-1-3-1Bulb diameter: -

Data in Table (5) showed that all different yeast treatments increased bulb diameter in the first season but only medium and high levels of yeast increased bulb diameter in the second season .The high level of yeast produced the highest value in both seasons.

4-1-1-3-2-Scales number per bulb: -

Data in Table (5) showed that each of low, medium and high levels in yeast was increased number of scales /plant in both seasons the highest value of this concern was produced by using high level of yeast followed by medium and low levels of yeast. The control plant produced the minimum number of scales per bulb in both seasons.

4-1-1-3-3-Fresh weight of bulb: -

Data in Table (5) cleared that only medium and high levels of yeast increased bulb fresh weight in the first season but all different concentrations of yeast increased bulbs fresh weight in the second seasons. However, the high level of yeast treatment was the most effective in this respect.

4-1-1-3-4-Dry weight of bulb: -

Data tabulated in Table (5) showed that the different treatments of yeast highly significant increased the dry weight character in both seasons. The high levels of yeast was the most effective treatment followed by medium and low level of yeast compared with control plants.

4-1-1-3-5-Effect of yeast on chemical constituents of bulbs:-

4-1-1-3-5-a-Carbohydrate %: -

Carbohydrate % in the bulbs of lilium plants responded to increase of yeast level as shown from data in Table (6). The minimum total carbohydrate was produced by control plants.

Bluzmanas and **Dringilien (1966), Bluzmanas *et al.*, (1971)** on sugar beat, **Fathy *et al.*, (2000)** on tomato gave the same result.

4-1-1-3-5-b-Nitrogen: -

Data in Table (6) also show that nitrogen % in bulbs of Lilium longiflorum was increased by increasing yeast level compared with control plants.

4-1-1-3-5-c-Phosphorus: -

Data in Table (6) show that low level of yeast (1gm/L) had no effect on P% content in the first season only but the medium and high level of yeast was increased P% in both seasons. **Starchnkov (1964)** on sugar beet gave the same result.

4-1-1-3-5-d-Potassium: -

For K%, data in Table (6) show that yeast treatments at (1gm and 2gm/L) increased K% in the bulbs in the first season but decreased it in the second season. The concentration of yeast at 3gm/L increased K% in the first season and second one.

Table (5) :- Effect of Yeast on bubls production in *Lilium longiflorum* var. Lasio

Treatment	Diameter of bulb (cm)		Number of scales		Fresh weigth of bulbs (gm)		Dry weigth of bulbs (gm)	
	1 st.	2 nd.	1 st.	2 nd.	1 st.	2 nd.	1 st.	2 nd.
Control	3.38	4.70	40.33	43.00	40.80	43.33	5.38	4.91
1 gm / L	4.31	4.61	42.83	46.33	40.00	45.00	7.33	7.61
2 gm / L	4.71	5.68	44.83	49.16	42.50	47.50	8.58	8.98
3 gm / L	4.99	5.89	48.00	50.83	51.66	49.16	10.33	9.81
L. S. D 0.05	N.S	0.49	N.S	N.S	6.48	N.S	0.98	1.53
L. S. D 0.01	N.S	0.75	N.S	N.S	N.S	N.S	1.49	2.32

st=first season nd=second season

Table (6) :- Effect of Yeast on chemical content in bulbs of *Lilium longiflorum* var. Lasio

Treatment	Carbohydrate %		Nitrogen %		Phosphrus %		Potassium %	
	1 st.	2 nd.	1 st.	2 nd.	1 st.	2 nd.	1 st.	2 nd.
Control	24.00	21.00	2.19	2.17	0.34	0.32	1.70	1.42
1 gm / L	36.25	33.75	3.08	2.25	0.34	0.36	1.47	1.23
2 gm / L	39.00	36.75	3.25	2.58	0.61	0.44	1.60	1.25
3 gm / L	39.00	39.25	3.50	3.04	0.88	0.64	1.72	1.65

st=first season nd=second season

4-1-2-Effect of Yeast on *Lilium longiflorum* var poliana -

4-1-2-1.Effect of Yeast on vegetative growth: -

4-1-2-1-1-Number of leaves: -

Data in Table (7) show that all yeast treatments increased the number of leaves compared with control plants in both seasons. The increasing in the mean leaves number was parallel to the increased levels of yeast.

4-1-2-1-2-Spike length: -

The plant hight of lilium plants was significantly increased by most concentrations of yeast as shown in Table (7). The tallest spike length was obtained with highly rate of yeast while the control plants gave the shortest spike length in both seasons.(**El-Desouky *et al.*, 1998**) on squash gave the same result.

4-1-2-1-3-Spike diameter: -

Data in Table (7) show that all concentrations of yeast increased spike diameter in the first and second seasons compared with control plants. The highest level of yeast gave the thickness spike diameter. The results are to those reported by **Mansour (1998)** on apple.

4-1-2-1-4- Fresh weight of leaves: -

Concerning the effect of yeast on fresh weight of leaves, data in Table (7) show that different levels of yeast gave significant increase in the fresh weight of leaves. Also the highest concentration of yeast produced the heaviest fresh weight of leaves. While the control plants gave the light fresh weight of leaves during two seasons. Similar results were obtained by **Khedr and Farid (2000)** on tomato.

4-1-2-1-5- Dry weight of leaves: -

Data in Table (7) show that, all levels of yeast gave a highly significant positive effect on the dry weight of leaves in both seasons. The effect was parallel to the increased levels.

These results were harmony with the results, which obtained of fresh weight. **Khedr and Farid (2000)** on tomato gave the same results.

4-1-2-1-6- Effect of yeast on chemical constituent of leaves: -

4-1-2-1-6-a-Carbohydrate %: -

Concerning the effect of yeast on carbohydrate % in the leaves of lilium plants, data in Table (8) show that all yeast concentrations (1gm, 2gm and 3gm/L) increased carbohydrate percentage. The maximum of carbohydrate % was obtained with 3g/L in the two seasons. The same result with **Khedr and Farid *et al.*, 2000** on tomato.

4-1-2-1-6-b-Nitrogen: -

Data in Table (8) show that all yeast applications (1gm, 2gm and 3gm/L) increased nitrogen percentage in the leaves of lilium plants with a peak at 3gm/L.While control plants gave the minimum nitrogen percentage in both seasons. Similar result was obtained by **Atawia and El-Desouky (1997)** on orange.

4-1-2-1-6-c-Phosphorus: -

Data in Table (8) show that using yeast at 2gm and 3gm/L increased P% in the first season. phosphorus percentage. P% with (1gm and 2gm/L). While, using yeast at 3gm/L increased P%. These results were similar with those reported by **Atawia and El-Desouky (1997)** on orange.

4-1-2-1-6-d-Potassium: -

Concerning the effect of yeast on potassium percentage in the dry leaves of lilium plants, data in Table (8) show that all yeast concentrations (1gm, 2gm and 3gm/L) increased it with a peak at 3gm/L. These result are in accordance with to **Atawia and El-Desouky (1997)** who found that on orange.

Table (7) :- Effect of Yeast on vegetative growth in *Lilium longiflorum* var. Poliana

Treatment	Number Of leaves		Spike length(cm)		Spike diameter(cm)		Fresh weight of leaves(gm)		Dry weight of leaves(gm)	
	1 st.	2 nd.	1 st.	2 nd.	1 st.	2 nd.	1 st.	2 nd.	1 st.	2 nd.
Control	34.66	36.00	40.00	45.33	0.68	0.48	8.58	7.60	1.76	1.80
1 gm / L	37.83	41.33	50.83	58.75	0.83	0.61	12.80	12.71	2.32	2.85
2 gm / L	45.00	49.50	53.75	58.91	0.86	0.66	13.18	13.78	2.70	3.16
3 gm / L	45.50	50.00	58.66	64.25	0.86	0.68	16.10	14.56	2.83	3.93
L. S. D 0.05	6.20	10.58	2.22	4.98	N.S	N.S	1.44	1.57	0.19	0.58
L. S. D 0.01	N.S	N.S	3.37	7.54	N.S	N.S	2.19	2.38	0.30	0.88

st=first season nd=second season

Table (8) :- Effect of Yeast on chemical content in leaves of *Lilium longiflorum* var. Poliana

Treatment	Carbohydrate %		Nitrogen %		Phosphrus %		Potassium %	
	1 st.	2 nd.	1 st.	2 nd.	1 st.	2 nd.	1 st.	2 nd.
Control	16.00	18.00	3.05	3.09	0.20	0.15	1.02	1.96
1 gm / L	17.00	20.50	3.25	4.15	0.25	0.19	1.21	2.08
2 gm / L	20.00	24.25	3.36	4.23	0.40	0.24	1.28	2.45
3 gm / L	21.00	24.75	3.47	4.29	0.45	0.26	1.35	2.68

st=first season nd=second season

4-1-2-Effect of Yeast on flowering: -

4-1-2-2-Number of florets: -

Data in Table (9) show that the different levels of yeast applications were increased the florets number but it increasing was non-significant in both seasons. **El-Desouky *et al.*, (1998)** on squash, **Fathy *et al.*, (2000)** on tomato gave the same results.

4-1-2-2-Floret diameter: -

It is obvious from the data in Table (9) that the different levels of yeast slightly increased the floret diameter in both seasons compared with control plants. The largest diameter of floret was obtained from yeast at 3gm/L in both seasons. This increasing was significant in two seasons. **El-Desouky *et al.*, (1998)** on squash gave the same result.

4-1-2-3-Fresh and dry weights of florets: -

Data in Table (9) showed that, fresh weight of florets increased with using any level of yeast but the increasing was insignificant. **Khedr and Farid (2000)** on tomato. Concerning the dry weight of florets, data in Table (9) show that all levels of yeast gave high significantly increased it in the first and second seasons. This increase was greater at 3gm/L than any other concentrations. **Khedr and Farid (2000)** on tomato.

4-1-2-4-Fresh and dry weight of spike: -

Data in Table (9) showed that all levels of yeast increased the fresh weight of spike in both seasons but it is insignificant increasing. As for dry weight, data in the same table show that different yeast treatments increased dry weight of spike in both seasons. The high level of yeast (3gm/L) produced the heaviest dry weight of spike followed by low and medium concentrations.

4-1-2-5-Vase life: -

With respect to effect of yeast levels on floret vase life(number of day until 75% of flowes were wilt), data in Table (9) show that, the vase life was increased with increasing the

yeast level, where this increase was high significant in lilium plants in the first and second seasons.

4-1-2-6-Effect of yeast on chemical constituents of florets:-

4-1-2-6-a-Carbohydrate %: -

Data in Table (10) show that yeast applications increased carbohydrate % in the dry florets of *Lilium longiflorum* .It increased with increasing concentration of yeast in both seasons compared with control plants. **Fathy *et al.*, (2000)** on tomato gave the same result.

4-1-2-6-b-Nitrogen: -

Results in Table (10) show that yeast applications increased N% in the dry flowers of lilium plants. The highly increase was with highest concentration (3gm/L) in the two seasons. While control plants gave the minimum percentage of nitrogen in both seasons.

4-1-2-6-c-Phosphorus: -

Data in Table (10) show that yeast applications decreased P% with low level (1gm/L) in the first season only compared with control plant, but medium and high levels (2gm and 3gm/L) increased P% in the flowers in the first season. While in the second season all level (1gm, 2gm and 3gm/L) increased P% in the florets of lilium plants. Also 3gm/L gave the best value in this concern.

4-1-2-6-d-Potassium: -

For K%, data in Table (10) show that yeast application at (1gm, 2gm and 3gm/L) increased K% in the florets of lilium plants in the two seasons. The level of 3gm/L obtained the highest increase in the both seasons.

Table (9) :- Effect of Yeast on flowering growth in *Lilium longiflorum* var. Poliana

Treatment	Number of florets		Diameter of florets (cm)		Fresh weight of florets (gm)		Dry weight of florets (gm)		Fresh weight of spike (gm)		Dry weight of spike (gm)		Vase life (Day)	
	1 st.	2 nd.	1 st.	2 nd.	1 st.	2 nd.	1 st.	2 nd.	1 st.	2 nd.	1 st.	2 nd.	1 st.	2 nd.
Control	4.00	4.16	14.00	16.51	13.25	11.91	2.76	2.46	29.80	45.33	5.48	5.93	10.00	10.83
1 gm / L	4.10	4.33	14.66	18.00	15.38	14.71	3.13	3.45	34.05	41.26	6.15	6.83	11.50	12.50
2 gm / L	4.16	5.00	15.00	18.66	16.91	15.71	3.96	4.11	35.91	47.85	8.05	7.91	13.00	14.00
3 gm / L	4.30	5.00	16.83	18.83	18.21	15.86	4.36	4.40	41.48	49.80	8.65	9.28	15.00	16.00
L. S. D 0.05	N.S	N.S	1.72	1.18	N.S	N.S	0.63	0.32	N.S	N.S	N.S	N.S	1.73	1.63
L. S. D 0.01	N.S	N.S	N.S	N.S	N.S	N.S	0.96	0.48	N.S	N.S	N.S	N.S	2.62	2.47

st=first season nd=second season

Table (10) :- Effect of Yeast on chemical content in florets of *Lilium longiflorum* var. Poliana

Treatment	Carbohydrate %		Nitrogen %		Phosphrus %		Potassium %	
	1 st.	2 nd.	1 st.	2 nd.	1 st.	2 nd.	1 st.	2 nd.
Control	32.00	34.00	2.35	2.11	0.26	0.24	1.75	1.70
1 gm / L	36.00	34.25	2.82	3.37	0.24	0.27	2.15	2.50
2 gm / L	40.00	34.50	3.31	3.43	0.29	0.34	2.33	2.62
3 gm / L	42.50	37.25	4.22	3.57	0.34	0.47	2.45	2.84

st=first season nd=second season

4-1-2-3-Effect of Yeast on bulbs characteristics: -

4-1-2-3-1-Bulb diameter: -

Data in Table (11) show that all different yeast treatments increased bulb diameter in both seasons and this increasing was significant. Also the largest diameter of bulb was 4.10, 5.05 cm in first and second seasons, respectively were produced with 3gm/L yeast. While the control plants gave the minimum diameter of bulb in both seasons.

4-1-2-3-2-Number of scales: -

Data in Table (11) showed that, the scales number was increased with increasing the level of yeast in both seasons but it insignificant in both seasons while the control plants produced the least number of scales in both seasons.

4-1-2-3-3-Fresh and dry weights of Bulb: -

Data in Table (11) showed that, the fresh weight of bulbs was increased with increasing yeast levels also this increasing was significant in the second season but in the first season was insignificant. As for dry weight data in same table (11) showed that the dry weight of bulbs was increased with increasing yeast levels in both seasons, but the best increasing with the highest level of yeast and this increasing was significant in both seasons.

4-1-2-3-4- Effect of yeast on chemical constituents of bulbs:-

4-1-2-3-4- a-Carbohydrate %: -

Data in Table (12) show that yeast application increased carbohydrate percentage with all concentrations (1gm, 2gm and 3gm/L) in the first season of lilium bulbs. While in the second season produced the same result with control plants. **Bluzmanas and Dringilien (1966), Bluzmanas *et al.*, (1971) on** sugar beet, **Fathy *et al.*, (2000)** on tomato gave the same results.

4-1-2-3-4- b-Nitrogen: -

Data in Table (12) show that N% was increased with increasing yeast level in the first season, while slightly increase with low and medium levels (1gm and 2gm/L) and highly

increased with high level (3gm/L)were recorded in the second season. Generally it can be say that all levels of yeast increased N % comparing with control plants.

4-1-2-3-4- c-Phosphorus: -

Data in Table (12) show that P% was increased with all levels of yeast application in the first season but in the second season it was decreased with low and medium levels (1gm and 2gm/L) and increased with high level (3gm/L) of lilium bulbs. These results obtained by **Starchnkov (1964)** on sugar beet.

4-1-2-3-4- d-Potassium: -

Concerning the effect of yeast on K% in the bulbs of lilium plants, data in Table (12) show that the low and medium levels of yeast gave slightly decreased of K% in the first season comparing with control plants in both seasons but the high level of yeast (3gm/L) increased the K% in two seasons.

Table (11) :- Effect of Yeast on bubls production in *Lilium longiflorum* var. Poliana

Treatment	Diameter of bulb (cm)		Number of scales		Fresh weigth of bulbs (gm)		Dry weigth of bulbs (gm)	
	1 st.	2 nd.	1 st.	2 nd.	1 st.	2 nd.	1 st.	2 nd.
Control	3.18	4.43	28.66	35.00	18.83	27.16	5.16	5.00
1 gm / L	3.71	4.81	29.00	36.66	21.25	29.16	5.28	5.71
2 gm / L	3.86	4.96	34.16	37.00	22.08	30.00	6.18	7.03
3 gm / L	4.10	5.05	36.66	41.16	24.16	34.83	7.56	7.63
L. S. D 0.05	0.56	0.37	N.S	N.S	N.S	2.87	1.48	0.95
L. S. D 0.01	N.S	N.S	N.S	N.S	N.S	4.35	N.S	1.44

st=first season nd=second season

Table (12) :- Effect of Yeast on chemical content in bulbs of *Lilium longiflorum* var. Poliana

Treatment	Carbohydrate %		Nitrogen %		Phosphrus %		Potassium %	
	1 st.	2 nd.	1 st.	2 nd.	1 st.	2 nd.	1 st.	2 nd.
Control	41.00	48.09	3.28	3.31	0.52	0.51	1.75	1.54
1 gm / L	42.00	48.02	3.36	3.41	0.55	0.42	1.57	1.49
2 gm / L	44.00	48.06	3.45	3.51	0.70	0.46	1.85	1.71
3 gm / L	47.00	48.00	3.51	4.03	0.70	0.61	2.05	2.20

st=first season nd=second season

4-2-Effect of Phosphorus: -

4-2-1-Effect of Phosphorus fertilization on Lilium *longiflorum* var lasio: -

4-2-1-1-Effect of vegetative growth:-

4-2-1-1-1- Number of leaves: -

Phosphorus fertilizer at all concentrations increased the number of leaves per plant over the untreated plants except low level in the second season, in both seasons the recorded values were not significantly, Table (13). Although the high level of phosphorus produced 17.5 and 20.38 % over control plant in the first and second seasons respectively. **El-Shoura and Hosni (1996)** on *Strelitzia reginae* gave the same results.

4-2-1-1-2-Spike length: -

It is obvious from date in Table (13) that all the P treatments increased spike length compared with control plants. The higher concentration (6cm/L) gave the largest spike length in both seasons. That trend has been noticed in both the first and second seasons. These results obtained by **Aoki and Endo (1992)** on cyclamen.

4-2-1-1-3-Spike diameter: -

Only the two higher levels of phosphorus were able to increase the spike diameter compared with control plant in the first season but all concentrations of phosphorus increased this character in the second season. The highest level of P (6cm /L) gave the highest effect in both seasons. While the control plants produced the minimum spike diameter, Table (13). **Roy *et al.* (1995)** on gladiolus gave the same results.

4-2-1-1-4-Fresh and dry weights of Leaves: -

Phosphorus fertilizer at all levels increased the leaves fresh weight per plant over the untreated plants in both seasons. The effect was highly significant with all the used levels. The heaviest weight was produced from phosphorus application at rate of 6cm/L it attained 167.17 and 156.48 % over control

plants in the first and second seasons respectively. (Table, 13). Concerning the dry weight of leaves all levels of phosphorus showed a highly significant effect on the dry weight of leaves in both seasons. The effect was parallel to the increased levels, Table (13). **Zile-Singh and Gupt (1996)** on dahlia gave the same results.

4-2-1-1-5-Effect of phosphorus on chemical constituents of leaves:-

4-2-1-1-5-a-Carbohydrate %: -

Data in Table (14) show that carbohydrate % was increased with low level of phosphorus in the first season but decreased in the second season. The medium and high levels (4cm and 6cm/L) increased the carbohydrate percentage in both seasons. **El-Hanafy (1985)** on dahlia gave the same results.

4-2-1-1-5-b-Nitrogen: -

Data in Table (14) show that all concentrations of phosphorus increased N% in both seasons. On the other hand using 6cm/L gave the high percentage of N in both seasons. While the control plants produced the least Nitrogen percentage in leaves in two seasons. The same result was obtained by **El-Leithy (1987)** on *Tagetes patula.*

4-2-1-1-5-c-Phosphorus:-

Data the same Table show that P application slightly affected in phosphorus percentage in the leaves of lilium plants in the first season. However, using P fertilizer increased P% in the second season compared with control plants. The high concentration of phosphorus (6cm/L) gave the maximum phosphorus percentage in both seasons. **El-Hanafy (1985)** on dahlia, **EL-Leithy (1987)** on *Tagetes patula* gave the same results.

4-2-1-1-5-d-Potassium: -

Concerning the effect of P on K% in the leaves of *Lilium longiflorum* plants, data in Table (14) show that K% was increased with all levels of phosphorus and this increasing was high with 4cm or 6 cm/L in both seasons. While control plants gave the least percentage of potassium in both seasons. The results presented with **El-Leithy (1987)** on *Tagetes patula*.

Table (13) :- Effect of Phosphorus on vegetative growth in *Lilium longiflorum* var. Lasio

Treatment	Number Of leaves		spike length(cm)		Spike diameter(cm)		Fresh weight of leaves(gm)		Dry weight of leaves(gm)	
	1 st.	2 nd.	1 st.	2 nd.	1 st.	2 nd.	1 st.	2 nd.	1 st.	2 nd.
Control	90.00	88.33	69.33	74.00	0.68	0.86	5.33	6.25	1.14	1.28
2 cm / L	98.00	87.50	77.50	82.83	0.63	0.99	9.85	10.38	1.88	2.60
4 cm / L	104.75	89.50	83.33	87.50	0.83	1.05	13.10	13.86	2.60	2.76
6 cm / L	105.75	106.33	90.00	92.66	0.91	1.18	14.24	16.03	2.93	2.88
L. S. D 0.05	N.S	N.S	12.48	N.S	0.11	0.14	1.47	1.66	0.36	0.52
L. S. D 0.01	N.S	N.S	N.S	N.S	0.17	0.21	2.22	2.51	0.55	0.79

st=first season nd=second season

Table (14) :- Effect of Phosphorus on chemical content in leaves of *Lilium longiflor*

var. Lasio

Treatment	Carbohydrate %		Nitrogen %		Phosphrus %		Potassium %	
	1 st.	2 nd.	1 st.	2 nd.	1 st.	2 nd.	1 st.	2 nd.
Control	18.00	22.00	2.33	3.44	0.35	0.30	1.31	1.56
2 cm / L	20.50	18.50	2.62	3.49	0.36	0.33	1.38	1.60
4 cm / L	22.00	22.00	3.08	3.83	0.38	0.51	1.42	1.65
6 cm / L	28.50	25.75	3.15	4.49	0.46	0.61	1.56	2.08

4-2-1-2-Effect of Phosphorus on flowering: -

4-2-1-2-1-Florets number: -

Only the two higher levels of P (6cm, 4cm/L) were able to increase the florets number compared with control plants. While the low level of phosphorus decreased this character in both seasons of this experiment. The higher level using, gave the higher effect in this concentration has been noticed in both seasons, Table (15). Control plants gave the least number of florets in the first and second seasons. **Gowda *et al.* (1991)** on tuberose gave the same results.

4-2-1-2-2-Floret diameter: -

It seemed that P played a pronounced effect on flowering characteristic. The effect was proportional to the levels, so the highest level of P gave the highest record of floret diameter 12.5 and 14.4 cm in the two seasons respectively, that treatment proved to be the best one of all the applied fertilizer (Table, 15). And the plants with out any treatment gave the minimum diameter in both seasons. These results obtained by **Gopalakrishlnan *et al.* (1995)** on tuberose.

4-2-1-2-3-Fresh and dry weights of floret: -

It is obvious from the data in Table (15) that P had a remarkable significant effect on the floret fresh weight. The effect was parallel to the level used, the highest level (6cm/L) gave the values of 9.06 and 10.05gm in the first and second seasons, respectively. While control plants gave the least fresh weight of floret in both seasons. As for dry weight of florets the different level of P fertilizer was effective on the floret weight all treatments highly significant affected on flowering dry weight. The highest level of 6cm/L increased the dry flowering weight to 2.60 and 3.30gm compared with 1.31 and 1.35 for the control in two seasons, respectively (Table, 15). **Mostafa *et al.* (1996)** on tuberose gave the same results.

4-2-1-2-4-Fresh and dry weights of spike: -

The P treatments showed a remarkable influence on the spike fresh weight as it could be seems from table (15). The highest level produced higher value compared with all other treatments Almost the same trend took place in the second seasons. As respect of dry weight of spike, phosphorus at all concentrations had highly significantly effect on the dry weight of spike in both seasons Table (15). The all levels of P almost doubled the dry weight compared with the untreated plants. **Mostafa *et al.* (1996)** on tuberose gave the same results.

4-2-1-2-5-Vase life: -

All levels of P significantly increased the vase life in the two seasons. However the vase life of the flowering was higher affected by the two highest levels of 4cm and 6cm/L Table (15). The control plants gave the minimum number of day (from opening to wilt) in both seasons. **Fisher and Kalthoff** (1987) on anemones.

4-2-1-2-6-Effect of phosphorus on the chemical constituents of florets:-

4-2-1-2-6-a-Carbohydrates%: -

Data in Table (16) show that carbohydrate % was increased with low level of phosphorus in the first season but no effect in the second season. While, the percentage was increased with medium and high levels of P (4cm and 6cm/L) in the both seasons. The plants without any addition (control plants) gave the least carbohydrate percentage in both seasons.

4-2-1-2-6-b-Nitrgen: -

N% in the florets was increased by all phosphorus treatments (2cm, 4cm and 6cm/L) in both seasons of *Lilium longiflorum*. The highest increase in N% was obtained with (6cm/L).(Table,16). **El-Leithy (1987)** on *Tagetes patula* the same results

4-2-1-2-6-c-Phosphorus: -

Data in Table (16) show that P% in the florets of lilium plants was increased in all treatments of phosphorus, it comparing to control in the two seasons. **El-Leithy (1987)** on *Tagetes patula* gave the same results.

4-2-1-2-6-d-Potassium: -

Trend of increase in K% was similar in the florets of the two seasons. Data in Table (16) show that all concentrations of phosphorus (2cm, 4cm and 6cm/L) increased K% in the flowers during the two seasons. **El-Leithy (1987)** on *Tagetes patula* the same results.

Table (15) :- Effect of Phosphorus on flowering growth in *Lilium longiflorum* var. Lasio

Treatment	Number of florets		Diameter of florets (cm)		Fresh weight of florets (gm)		Dry weight of florets (gm)		Fresh weight of spike (gm)		Dry weight of spike (gm)		Vase life (Day)	
	1 st.	2 nd.	1 st.	2 nd.	1 st.	2 nd.	1 st.	2 nd.	1 st.	2 nd.	1 st.	2 nd.	1 st.	2 nd.
Control	6.30	6.66	10.13	8.99	7.16	7.23	1.31	1.35	34.36	36.33	5.96	6.20	10.00	10.33
2 cm / L	5.83	6.00	11.33	13.16	7.33	8.06	2.31	2.53	39.95	36.35	12.26	13.95	20.00	19.33
4 cm / L	7.00	7.50	12.33	14.00	7.55	9.41	2.38	3.23	40.96	46.16	12.60	15.53	20.50	21.33
6 cm / L	9.16	7.83	12.50	14.40	9.06	10.05	2.60	3.30	46.50	46.33	14.16	16.28	21.50	22.16
L. S. D 0.05	2.13	N.S	1.47	1.88	N.S	1.69	0.41	0.28	N.S	5.33	1.36	1.86	1.27	1.52
L. S. D 0.01	N.S	N.S	N.S	2.85	N.S	N.S	0.63	0.43	N.S	8.07	2.06	2.81	1.92	2.31

st=first season nd=second season

Table (16) :- Effect of Phosphorus on chemical content in florets of *Lilium longiflorum* var. Lasio

Treatment	Carbohydrate %		Nitrogen %		Phosphrus %		Potassium %	
	1 st.	2 nd.	1 st.	2 nd.	1 st.	2 nd.	1 st.	2 nd.
Control	33.00	34.50	3.17	2.78	0.23	0.24	1.25	1.04
2 cm / L	38.00	34.40	3.32	3.11	0.45	0.44	1.70	1.96
4 cm / L	38.75	36.25	3.25	3.34	0.45	0.45	2.35	2.07
6 cm / L	39.00	37.75	3.69	3.34	0.50	0.57	2.40	2.47

st=first season nd=second season

4-2-1-3-Effect of phosphorus fertilization on bulbs aracteristics:

4-2-1- 3-1-Diameter of Bulb: -

The phosphorus treatments showed remarkable influence on the Bulb diameter behavior as it could be seem from Table (17). The highest-level 6cm /L gave the highest value for this character in both two season followed by medium and low level of phosphorus compared with untreated plants. Similar findings were reported by **Mukherjee *et al.* (1994)** on gladiolus.

4-2-1- 3-2-Scales number: -

All levels of P increased the number of scales per plant in the first and second seasons, however the recorded differences were insignificant Table (17). The high level of P produced 12.4 and 13.95 % over control plants in the first and second seasons respectively. While the control plants gave the minimum number of scales in both seasons

4-2-1- 3-3-Fresh and dry weight of bulbs: -

It is obvious from data in table (17) that the all P treatments increased the bulb weight compared with untreated plants. Only higher level of phosphorus gave significant value for this character also same trend has been noticed in both seasons. **Mostafa *et al.* (1996)** on tuberose. Concerning the dry weight in the same table that P had a remarkable effect on the bulb weight. The effect was parallel to the rate of levels used the highest level (6cm /L) gave the heaviest values as 9.68and 9.55 g in the two seasons compared with control treatment which gave 5.38 and 4.91 g in the first and second seasons respectively. **El-Sayed *et al.* (1987)** on tuberose gave the same results.

4-2-1- 3-4-Effect of phosphorus on chemical constituents of bulbs:-

4-2-1- 3-4-a-Carbohydrate %: -

Data in Table (18) show that carbohydrate percentage was

increased with increasing phosphorus concentration in the both seasons compared with control plants of *Lilium longiflorum*. **Habib (1992)** on *Pelargonium peltatum*.

4-2-1- 3-4-b-Nitrogen: -

Data in Table (18) show that N% was decreased with low treatment of phosphorus (2cm/L) in the first season but increased in the second season. In this connection **El-Leithy (1987)** on *Tagetes patula*.

4-2-1- 3-4-c-Phosphorus: -

Data in Table (18) show that P% in the bulbs was increased with increasing phosphorus concentrations (2cm, 4cm and 6cm/L). The control plants gave the least phosphorus percentage in the first and second seasons. **El-Leithy (1987)** on *Tagetes patula* gave the same results.

4-2-1- 3-4-d-Potassium:-

For K%, data in Table (18) show that P treatments at concentrations (2cm, 4cm and 6cm/L) increased K% in the bulbs in the both seasons compared with control plants. **El-Leithy (1987)** on *Tagetes patula.*

Table (17) :- Effect of Phosphorus on bubls production in *Lilium longiflorum* var. Lasio

Treatment	Diameter of bulb (cm)		Number of scales		Fresh weigth of bulbs (gm)		Dry weigth of bulbs (gm)	
	1 st.	2 nd.	1 st.	2 nd.	1 st.	2 nd.	1 st.	2 nd.
Control	3.38	4.70	40.33	43.00	40.80	43.33	5.38	4.91
2 cm / L	4.41	5.45	40.86	45.83	40.00	44.16	7.35	6.96
4 cm / L	5.01	5.81	42.66	47.50	42.50	51.66	8.63	7.80
6 cm / L	5.38	5.90	45.33	49.00	61.66	67.50	9.68	9.55
L. S. D 0.05	0.98	0.77	N.S	N.S	11.49	9.04	1.64	0.98
L. S. D 0.01	N.S	N.S	N.S	N.S	N.S	13.69	2.48	1.49

st=first season nd=second season

Table (18) :- Effect of Phosphorus on chemical content in bulbs of *Lilium longiflorum* var. Lasio

Treatment	Carbohydrate %		Nitrogen %		Phosphrus %		Potassium %	
	1 st.	2 nd.	1 st.	2 nd.	1 st.	2 nd.	1 st.	2 nd.
Control	24.00	21.00	2.19	2.17	0.34	0.32	1.70	1.42
2 cm / L	43.50	32.50	2.15	2.31	0.57	0.64	1.98	1.53
4 cm / L	46.75	45.50	2.32	2.38	0.70	0.67	1.99	1.63
6 cm / L	55.00	50.25	2.50	2.77	0.77	0.70	2.72	1.89

st=first season nd=second season

4-2-2- Effect of Phosphorus of *Lilium longiflorum* var. poliana:-

4-2-2- 1-Effect of Phosphorus on vegetative growth:-

4-2-2- 1-1- Number of leaves: -

Data in Table (19) showed that, phosphorus fertilizer at all levels significantly increased number of leaves / plant over the control treatment on both seasons. The highest value for this character was produced with treating the lilium plants with high level of phosphorus fertilizer following by medium and low level. Which resulted 29.82,25.50 and 16.85 or 41.19,25.92 and 18.50% over control plants in the first and second seasons, respectively. **El-Shoura and Hosni (1996)** on *Strelitzia reginae* gave the same results.

4-2-2- 1-2-Spike lengths: -

Different levels of phosphorus fertilizer were able to increase the spike length compared with control plants in both seasons. The effect was parallel to the level used. The highest values of spike length were obtained from application phosphorus fertilizer at high level (Table, 19).Control plants gave the shortest spike length in both seasons. The results presented with **Aoki and Endo (1992)** on cyclamen.

4-2-2- 1-3-Spike diameters: -

Data in Table (19) cleared that in the first season only high level of phosphorous fertilizer increased spike diameter compared with control plants. But in the second season the all levels of phosphorous fertilizer increased this character compared with control plant, the rate of increase reached to 14.58,16.67 and 35.42% over control plant for low, medium and high levels of phosphorus fertilizer. Similar results were demontred by **Roy *et al.* (1995)** on gladiolus.

4-2-2- 1-4- Fresh and dry weights of leaves: -

Phosphorus fertilizer at all levels highly significant by increased the leaves fresh weight over control plants in both

seasons .The effect was parallel to the levels used. The heaviest weight was resulted from phosphorus at high level (6cm/L) which attained 86.83 and 126.32 % over untreated plants in the first and second seasons, respectively (Table, 19). Concerning the dry weight of leaves, it is obvious from the data in the same Table that all levels of phosphorus nutrition highly significant increased the dry weight in the leaves of lilium plant in both seasons. The effect was parallel to the level using. The rate of increases reached to 126.14 and 128.33% over control plant in the first and second seasons respectively for using phosphorus fertilizer at high level. **Zile –Singh and Gupt (1996)** on dahlia gave the same results.

4-2-2- 1-5-Effect of phosphorus on chemical constituents of leaves:-

4-2-2- 1-5-a-Carbohydrate %: -

Data in Table (20) show that all applied phosphorus concentrations increased the carbohydrate percentage in the leaves of lilium plants compared with control plants in both seasons. Similar result was obtained by **El-Hanafy (1985)** on dahlia.

4-2-2- 1-5-b-Nitrogen: -

N% in the leaves of lilium plants was increased by levels of phosphorus as shown in Table (20). The highest N% was obtained with highly rate of P. **El-Leithy (1987)** on *Tagetes patula* gave the same results.

4-2-2- 1-5-c-Phosphorus: -

Data in Table (20) show that all different concentrations of phosphorus increased P% in the first and second seasons compared with control plants. Control plants gave the least phosphorus percentage of leaves in both seasons. **El-Hanafy (1985)** on dahlia, **El-Leithy (1987)** on *Tagetes patula* gave the

same results.

4-2-2- 1-5-d-Potassium: -

Concerning the effect of phosphorus levels on K%, data in Table (20) show that different levels of P increased K% during two seasons. The concentration of phosphorus (6cm/L) gave the highest value of potassium percentage. While control plants produced the least value in this concern. In this connection **El-Leithy (1987)** on *Tagetes patula.*

Table (19) :- Effect of Phosphorus on vegetative growth in *Lilium longiflorum* var. Poliana

Treatment	Number Of leaves		spike length(cm)		Spike diameter(cm)		Fresh weight of leaves(gm)		Dry weight of leaves(gm)	
	1 st.	2 nd.	1 st.	2 nd.	1 st.	2 nd.	1 st.	2 nd.	1 st.	2 nd.
Control	34.66	36.00	40.00	45.33	0.68	0.48	8.58	7.60	1.76	1.80
2 cm / L	40.50	42.66	54.16	59.66	0.68	0.55	12.70	13.33	2.93	3.78
4 cm / L	43.50	45.33	55.41	60.50	0.68	0.56	14.66	15.50	3.45	3.99
6 cm / L	45.00	50.83	56.66	61.66	0.78	0.65	16.03	17.20	3.98	4.11
L. S. D 0.05	4.65	5.39	2.38	4.81	0.12	N.S	1.89	1.42	0.26	0.91
L. S. D 0.01	7.05	8.17	3.61	7.28	N.S	N.S	2.88	2.15	0.39	1.38

st=first season nd=second season

Table (20) :- Effect of Phosphorus on chemical content in leaves of *Lilium longiflorum* var. Poliana

Treatment	Carbohydrate %		Nitrogen %		Phosphrus %		Potassium %	
	1 st.	2 nd.	1 st.	2 nd.	1 st.	2 nd.	1 st.	2 nd.
Control	16.00	18.00	3.05	3.09	0.20	0.24	1.02	1.96
2 cm / L	20.50	26.50	3.41	4.16	0.46	0.31	1.13	2.36
4 cm / L	22.00	29.25	4.43	4.29	0.46	0.32	1.16	2.36
6 cm / L	25.50	30.00	3.68	5.55	0.47	0.54	1.20	3.00

st=first season nd=second season

4-2-2-2-Effect of phosphorus on flowering: -

4-2-2-2-1-Florets number: -

Data in Table (21) showed that only high level of phosphorous fertilizer increased that character compared with control plant. But low and medium level decreased florets number /plant in both seasons compared with control treatment in both seasons. **Gowda *et al.* (1991)** on tuberose gave the same results.

4-2-2-2-2-Floret diameter: -

Data in Table (21) showed that the trend of results was not constant in both seasons. The different levels of phosphorous fertilizer increased floret diameter compared with control plant. But in the second season the contrary of result was obtained from treating the lilium plants with different levels of phosphorous fertilizer. The differences between treatments in the both seasons were not significant. **Gopalakrishnan *et al.* (1995)** on tuberose gave the same results.

4-2-2-2-3-Fresh and dry weighs of floret: -

Data in Table (21) showed that in the first season the low and medium levels of phosphorus fertilizer decreased floret fresh weight compared with control plants while, the high level of phosphorus 6cm/L increased it character. In the second season all levels of phosphorus increased floret weight compared with control plants and the effect was parallel the level used. The differences between treatments were significant at 5% only in both seasons. As for dry weight of florets it is obvious from the data in the same table that P had remarkable and high significantly effect on the floret dry weight. The effect was parallel with to the levels used, the highest level 6cm/L produced 41.67 and 82.93 % over the control plants in the first and second seasons respectively. **Mostafa *et al.* (1996)** on tuberose gave the same results.

4-2-2-2-4-Fresh and dry weights of spike: -

Data in Table (21) showed that, the effect of phosphorous fertilizer of fresh weight of spike was non-constant in both seasons of this experiment. Although the different levels of phosphorous increased this character in the first season but in the second season the trend of result was contrary. For dry weight of spike phosphorus treatments showed a remarkable influence on the spike dry weight behavior of the plant as it could be seem from Table (21). The phosphorous at levels was significant effect on the dry weight of spike in both seasons, Table (21). The effect was parallel to the level using. The results presented with **Mostafa *et al.* (1996)** on tuberose.

4-2-2-2-5-Vase life: -

All the levels of phosphorus increasing the vase life in two seasons. However the vase life of the flowering was higher affected by the two highest levels of phosphorous fertilizer ,Table (21) which produced 65.0 and 56.97 and 61.59% over control plants in the first and second season respectively. **Fisher and Kalthoff (1987)** on anemones gave the same results.

4-2-2-2-6-Effect of phosphorus on chemical constituents of flowering :-

4-2-2-2-6-a-Carbohydrate %: -

Data in Table (22) show that the carbohydrate percentage in lilium's florets was increased with increasing P concentration in the first season. In the second season low level of P decreased carbohydrate % but medium and high increased carbohydrate.

4-2-2-2-6-b-Nitrogen: -

Phosphorus treatments increased N percentage in florets of lilium plants. Data in Table (22) show that all concentrations of phosphorus (2cm, 4cm and 6cm/L) caused a highly increase in this parameter with a peak at (6cm/L) in the two seasons of florets of lilium plants. **El-Leithy (1987)** on *Tagetes patula* gave

the same results.

4-2-2-2-6-c-Phosphorus: -

Data in Table (22) show that P% in the florets of lilium plants was in the same trend as in N%. Phosphorus at (2cm, 4cm and 6cm/L) increased it comparing to control of the two seasons. The high level of phosphorus gave the high percentage of phosphorus. While control plant gave the low percentage of phosphorus in the first and second seasons **El-Leithy (1987)** on *Tagetes patula* gave the same results.

4-2-2-2-6-d-Potassium: -

Data in Table (22) show that all the used treatments of phosphorus (2cm, 4cm and 6cm/L) increased K% in the florets of the lilium plants through the two seasons under this study. The highest level of phosphorus produced the maximum percentage of potassium comparing with control plants, which gave the minimum percentage of potassium of florets. These results presented by **El-Leithy (1987)** on *Tagetes patula.*

Table (21) :- Effect of Phosphorus on flowering growth in *Lilium longiflorum* var.Poliana

Treatment	Number of florets		Diameter of florets (cm)		Fresh weight of florets (gm)		Dry weight of florets (gm)		Fresh weight of spike (gm)		Dry weight of spike (gm)		Vase life (Day)	
	1 st.	2 nd.	1 st.	2 nd.	1 st.	2 nd.	1 st.	2 nd.	1 st.	2 nd.	1 st.	2 nd.	1 st.	2 nd.
Control	4.00	4.16	14.00	16.51	13.25	11.91	2.76	2.46	29.80	45.33	5.48	5.93	10.00	10.83
2 cm / L	3.16	3.50	14.75	14.75	11.38	12.86	2.88	3.98	30.98	37.88	8.80	7.71	15.00	15.50
4 cm / L	3.33	4.00	15.66	15.83	13.10	13.81	3.43	4.13	32.16	40.93	9.38	9.01	16.50	17.00
6 cm / L	4.33	5.16	16.08	16.08	14.45	15.58	3.91	4.50	35.90	41.01	10.40	10.86	16.50	17.50
L. S. D 0.05	0.79	N.S	N.S	N.S	1.78	2.36	0.55	0.38	N.S	N.S	3.07	2.66	2.38	2.02
L. S. D 0.01	N.S	N.S	N.S	N.S	N.S	N.S	0.83	0.57	N.S	N.S	4.65	N.S	3.60	3.06

st=first season nd=second season

Table (22) :- Effect of Phosphorus on chemical content in florets of *Lilium longiflorum* var. Poliana

Treatment	Carbohydrate %		Nitrogen %		Phosphrus %		Potassium %	
	1 st.	2 nd.	1 st.	2 nd.	1 st.	2 nd.	1 st.	2 nd.
Control	32.00	34.00	2.35	2.11	0.26	0.24	1.75	1.70
2 cm / L	36.00	32.50	3.11	3.31	0.32	0.45	2.30	2.80
4 cm / L	36.75	34.25	3.26	3.57	0.39	0.52	2.60	2.82
6 cm / L	37.00	34.50	3.36	3.57	0.44	0.56	2.68	2.83

st=first season nd=second season

4-2-2-3-Effect of phosphorus fertilization on bulbs characteristics:-

4-2-2-3-1-Diameter of bulb: -

Data in Table (23) showed that, the P treatments showed a remarkable in fluency on the bulb diameter. The different levels of P increased diameter bulb in both seasons. The effect was parallel to the level used. The control treatment gave the minimum diameter of bulbs in both seasons. **Mukherjee *et al.*(1994)** on gladiolus gave the same results.

4-2-2-3-2-Scales number: -

All levels of P were used increased the number of scales per bulb in both seasons compared with control plants the highest level of P produced 57.01 and 41.89 % over control plants in the first and second seasons, respectively (Table, 23). While the medium level (4cm/L) of phosphorus gave the next value in this concern.

4-2-2-3-3-Fresh and dry weights of bulb: -

All concentration of P slightly increased the bulb fresh weight in both seasons. The highest value for this character was produced by using P fertilizer at high level (6cm/L) followed by medium and low levels of P Table (23). Control plants gave the least fresh weight of bulbs in the first season and second one. **Mostafa *et al.* (1996)** on tuberose gave the same results. As for dry weight of bulb data in Table (23) showed that the dry weight of bulbs was highly significant increased with using any level of P fertilizer. The effect was parallel to the level using .The high level of P attained 106.98 and 137.0 % over control plants in the first and second seasons respectively. Similar results were obtained by **El-Sayed *et al.* (1987)** on tuberose.

4-2-2-3-4-Effect of phosphorus on chemical constituents of bulbs:-

4-2-2-3-4-a-Carbohydrate %: -

Data in Table (24) show that carbohydrate % was decreased with phosphorus application in the first season of bulbs. In the second season all treatments decreased carbohydrate percentage compared with control plants. **Habib (1992)** on *Pelargonium peltata.*

4-2-2-3-4-b-Nitrogen: -

Data in Table (24) show that N % was decreased with P application (2cm/L) in the two seasons. While increased with (4cm and 6cm/L) increased during the two seasons in the bulbs of lilium plants. **El-Leithy (1987)** on *Tagetes patula.*

4-2-2-3-4-c-Phosphorus: -

Data in Table (24) show that all used concentration of phosphorus increased P% in the bulbs of lilium plants compared with control plants in the first season. The highly increase was recorded with the highest concentration of phosphorus. **El-Leithy (1987)** on *Tagetes patula* gave the same results.

4-2-2-3-4-d-Potassium: -

Data in Table (24) show that K% in the bulbs of lilium plants was in the same trend as in the P%. Phosphorus at (2cm, 4cm and 6cm/L) increased K% comparing to control of the two seasons. The best value was 2.57 or 2.03 in the first and second seasons, respectively with the high concentration (6cm/L) **El-Leithy (1987)** on *Tagetes patula.*

Table (23) :- Effect of Phosphorus on bubls production in *Lilium longiflorum* var. Poliana

Treatment	Diameter of bulb (cm)		Number of scales		Fresh weigth of bulbs (gm)		Dry weigth of bulbs (gm)	
	1 st.	2 nd.	1 st.	2 nd.	1 st.	2 nd.	1 st.	2 nd.
Control	3.18	4.43	28.66	35.00	18.83	27.16	5.16	5.00
2 cm / L	3.70	4.81	35.50	35.16	24.16	30.41	8.50	10.25
4 cm / L	3.83	4.95	37.83	40.66	25.41	30.83	9.51	10.88
6 cm / L	4.13	5.23	45.00	49.66	25.83	31.66	10.68	11.85
L. S. D 0.05	0.45	N.S	3.51	6.98	4.16	N.S	0.85	1.68
L. S. D 0.01	N.S	N.S	5.32	10.57	N.S	N.S	1.29	2.55

st=first season nd=second season

Table (24) :- Effect of Posphorus on chemical content in bulbs of *Lilium longiflorum* var. Poliana

Treatment	Carbohydrate %		Nitrogen %		Phosphrus %		Potassium %	
	1 st.	2 nd.	1 st.	2 nd.	1 st.	2 nd.	1 st.	2 nd.
Control	41.00	48.00	3.28	3.31	0.52	0.51	1.75	1.54
2 cm / L	35.00	37.12	3.20	3.11	0.69	0.71	2.30	1.89
4 cm / L	37.25	42.25	3.46	3.44	0.74	0.78	2.50	1.98
6 cm / L	42.50	44.00	3.64	3.64	0.76	0.79	2.57	2.03

st=first season nd=second season

4-3-Effect of Potassium: -

4-3-1-Effect of potassium on *Lilium longiflorum* var. Lasio: -

4-3-1-1-Effect of Potassium on vegetative growth:-

4-3-1-1-1- Number of leaves: -

It could be noticed from the data in Table (25) that all the applied potassium treatments increased the leaves number compared with control plants in both seasons. The improvement in the mean leaf number was parallel to increasing the concentration of potassium. The high concentration of potassium produced 15.83 and 20-00% over control plant in the first and second seasons, respectively. The control plants produced the least number of leaves in the first and second seasons. **Bose *et al.* (1980)** on amaryllis gave the same results.

4-3-1-1-2-Spike length: -

It is obvious from the data in Table (25) that using potassium as fertilizer had a remarkable effect on the plant spike length. The effect was parallel to the concentration used, the highest concentration (6cm/L) gave the highest values of 87.50 and 91.66 cm in the two seasons respectively. However (4cm/L) of potassium gave the next value in this concern. While control plants gave the shortest length of spike in two seasons. **John *et al.* (1997)** on gladiolus gave the same results.

4-3-1-1-3-Spike diameter: -

Data in Table (25) showed that, all concentrations of potassium significantly increased the spike diameter compared with control treatment. The highest level of (6cm/L) increased the spike diameter to 1.12 and 1.43 cm compared with 0.68 and 0.86 for the control in the two seasons, respectively.

4-3-1-1-4-Fresh and dry weights of leaves: -

Results in Table (25) reported that all potassium treatments highly significant increased the fresh weight of leaves compared with control treatments the higher concentration using gave the higher effect. The same trend has been noticed in both

the two seasons. The same results obtained by **Zile-Singh and Gupt (1996)** on dahlia. Concerning the dry weight it seemed that potassium played a pronounced effect on leaves dry weight, the effect was proportional to the used concentration so the highest concentration gave the highest record of 2.75 and 2.98g the leaves of dry weight in the two seasons respectively. **Zile- Singh and Gupt (1996)** on dahlia gave the same results.

4-3-1-1-5-Effect of potassium on chemical constituents of leaves:-

4-3-1-1-5-a-Carbohydrate: -

Data in Table (26) show that potassium treatments led to an increase in the carbohydrate content of the leaves in the first season with increasing K level. In the second season low and medium level (2cm and 4cm/L) decreased carbohydrate % compared with control plants but increased with high level of potassium (6cm/L). **El-Hanafy (1985)** on dahlia, **Habib (1992)** on *pelargonium peltata* gave the same results.

4-3-1-1-5-b-Nitrogen: -

Data in Table (26) show that N % in the leaves was increased with increasing K treatments in the both seasons. The highly increase was with the highest level of K. The least of Nitrogen percentage was produced with control treatment. **El-Hanafy (1985)** on dahlia gave the same results.

4-3-1-1-5-c-Phosphorus: -

Result in Table (26) show that P % in the leaves of lilium plants was increased with increasing K level in both seasons. While control plants gave the minimum phosphorus percentage of leaves. **El-Hanafy (1985)** on dahlia, **El-Khateeb *et al.*, (1991)** on freesia gave the same results.

4-3-1-1-5-d-Potassium: -

Data in Table (26) show that all treatments using of K

(2cm, 4cm and 6cm/L) led to increase K % in the leaves in the both seasons. Comparing with control plant, which produced the least potassium percentage in, leaves in the first and second seasons. These results obtained by **El-Hanafy (1985)** on dahlia, **El-Khateeb *et al.* (1991)** on freesia and **Eid**

Table (25) :- Effect of Potassium on vegetative growth in *Lilium longiflorum* var. Lasio

Treatment	Number Of leaves		spike length(cm)		Spike diameter(cm)		Fresh weight of leaves(gm)		Dry weight of leaves(gm)	
	1 st.	2 nd.	1 st.	2 nd.	1 st.	2 nd.	1 st.	2 nd.	1 st.	2 nd.
Control	90.00	88.33	69.33	74.00	0.68	0.86	5.33	6.25	1.14	1.28
2 cm / L	103.75	93.33	82.50	88.33	0.83	1.11	9.03	9.78	2.01	2.56
4 cm / L	103.75	105.50	85.83	88.83	0.88	1.26	10.05	10.75	2.45	2.85
6 cm / L	104.25	106.00	87.50	91.66	1.12	1.43	11.63	11.16	2.75	2.98
L. S. D 0.05	8.99	N.S	3.69	N.S	0.16	0.25	1.06	1.38	0.32	0.29
L. S. D 0.01	N.S	N.S	5.59	N.S	0.24	0.37	1.60	2.08	0.48	0.43

st=first season nd=second season

Table (26) :- Effect of Potassium on chemical content in leaves of *Lilium longiflorum* var. Lasio

Treatment	Carbohydrate %		Nitrogen %		Phosphrus %		Potassium %	
	1 st.	2 nd.	1 st.	2 nd.	1 st.	2 nd.	1 st.	2 nd.
Control	18.00	22.00	2.33	3.44	0.34	0.11	1.31	1.56
2 cm / L	21.00	20.50	2.47	3.96	0.42	0.31	1.50	1.94
4 cm / L	24.00	21.50	2.72	4.03	0.45	0.34	1.66	2.08
6 cm / L	25.50	26.50	3.10	4.09	0.48	0.45	1.81	2.42

st=first season nd=second season

4-3-1-2-Effect of potassium fertilization on flowering:-

4-3-1-2-1-Florets number: -

The concentrations of potassium slightly increased the number of florets per plant in both seasons; the recorded differences were insignificant Table (27). The highest level of potassium produced 11.11 and 18.02% over control plant in the first and second seasons, respectively. The control plants gave the least number of florets in both seasons. **Gopalakrishanan *et al.* (1995)** on tuberose gave the same results.

4-3-1-2-2-Floret diameter: -

The potassium treatments showed a remarkable influence on the floret diameter, Table (27). The highest concentration attained the higher value for this character compared with all other treatments. While the untreated plants gave the minimum floret diameter in the first and second seasons. Almost the same trend took place in the second seasons. **Roychowdhury and Roychowdhury (1995)** on gladiolus gave the same results.

4-3-1-2-3-Fresh and dry weight of floret: -

The use of the levels of potassium led to increase in the fresh weight of floret in both seasons. The high concentration induced significant increase in the floret fresh weight, which attained 32.40 and 46.75 % over control plants in the first and second seasons respectively (Table, 27). However the medium level of potassium (4cm/L) gave the second value in this concern while the low level produced the third value(6 cm/L) in this respect. **El-Shoura and Hosni (1996)** on *Strelitzia reginae* gave the same results. Concerning dry weight of florets it could be seen from data in Table (27) potassium was effective on the floret dry weight. All concentration used produced significant increasing. The level of 6cm/L was the best one, it increased the dry weight to 2.43 and 2.83 in the two seasons, respectively compared with 1.31 and 1.35g / floret for the control in the both seasons.

4-3-1-2-4-Fresh and dry weights of spike: -

Potassium at all concentrations did not show significant effect on the fresh weight in both seasons. But the high concentration of potassium gave the best result in this connection. While control treatments produced the least fresh weight of spike. Table (27). **Bhuyan *et al.* (1996)** on tuberose. As for dry weight of spike the potassium treatments showed a remarkable on the dry weight behavior of the plant as it could be seem from Table (27). The highest concentration gave the higher value for this character followed by the medium and low concentration. While the control plants gave the least dry weight of spike. Almost the same trend took place in the second season. **Bhuyan *et al.* (1996)** on tuberose gave the same results.

4-3-1-2-5-Vase life: -

Although all the levels of potassium increased vase life (number of day until 75% of flower were wilte) compared with control treatment. The highest level of 6cm/L was the most effect for this character. It produced 14.5 day compared control plant, which produced 10.0 and 10.33 days in the first and second seasons, respectively (Table, 27). **Bhuyan *et al.* (1996)** on tuberose gave the same results.

4-3-1-2-6-Effect of potassium on chemical constituents of flowering:-

4-3-1-2-6-a-Carbohydrate %:-

Data in Table (28) show that carbohydrate % in the florets of *Lilium longiflorum* in the first season was increased with increasing K Concentration. In the second season the carbohydrate % was decreased with low and medium level of K (2cm and 4cm/L), while it was increased in the high level (6cm/L) compared with control plants.

4-3-1-2-6-b-Nitrogen: -

Nitrogen % in the florets of lilium plants was decreased

with treatment (2cm/L) in the first season but increased with two concentrations (4cm and 6cm/L) in the same season and increased with all concentrations in the second season as shown from data in Table (28). In this connection **El-Hanafy (1985)** on dahlia.

4-3-1-2-6-c-Phosphorus: -

Data in Table (28) show that all levels of K increased P % in the both seasons but that clearly responsed in the second season than the first season of lilium plants. On the other hand control plants gave the least phosphorus percentage in both seasons. Similar results were reported by **El-Hanafy (1985)** on dahlia, **El-Khateeb *et al.*, (1991)** on freesia.

4-3-1-2-6-d-Potassium: -

In Table (28) also show that K % in florets of lilium plants was increased by K application with different levels. Highly increases was recorded with the highest level of K.The medium level gave the next value in this respect. While the untreated plants produced the minimum percentage of potassium. **El-Hanafy (1985)** on dahlia, **El-Khateeb *et al.*(1991)** on freesia

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Table (27) :- Effect of Potassium on flowering growth in *Lilium longiflorum* var. Lasio

Treatment	Number of florets		Diameter of florets (cm)		Fresh weight of florets (gm)		Dry weight of florets (gm)		Fresh weight of spike (gm)		Dry weight of spike (gm)		Vase life (Day)	
	1 st.	2 nd.	1 st.	2 nd.	1 st.	2 nd.	1 st.	2 nd.	1 st.	2 nd.	1 st.	2 nd.	1 st.	2 nd.
Control	6.30	6.66	10.13	8.99	7.16	7.23	1.31	1.35	34.36	36.33	5.96	6.20	10.00	10.33
2 cm / L	6.50	6.83	11.66	12.33	7.40	8.00	2.45	2.60	38.41	36.55	7.45	7.38	12.50	11.16
4 cm / L	6.66	7.66	12.16	13.16	8.17	9.08	2.46	2.63	41.00	39.66	8.66	7.60	13.00	12.16
6 cm / L	7.00	7.86	12.50	13.16	9.48	10.61	2.48	2.83	41.30	42.10	9.70	8.68	14.50	14.50
L. S. D 0.05	N.S	N.S	1.30	2.45	N.S	1.20	0.21	0.29	N.S	N.S	1.81	N.S	1.55	1.78
L. S. D 0.01	N.S	N.S	N.S	N.S	N.S	1.82	0.32	0.43	N.S	N.S	N.S	N.S	2.35	2.69

st=first season nd=second season

Table (28) :- Effect of Potassium on chemical content in florets of *Lilium longiflorum* var. Lasio

Treatment	Carbohydrate %		Nitrogen %		Phosphrus %		Potassium %	
	1 st.	2 nd.	1 st.	2 nd.	1 st.	2 nd.	1 st.	2 nd.
Control	33.00	34.50	3.17	2.78	0.23	0.24	1.25	1.04
2 cm / L	35.75	33.75	3.10	2.90	0.24	0.43	1.70	2.21
4 cm / L	39.50	34.00	3.26	3.40	0.25	0.46	1.90	2.34
6 cm / L	40.00	36.75	3.80	3.57	0.28	0.57	2.20	2.39

st=first season nd=second season

4-3-1-3-Effect of potassium on bulbs characteristics:-

4-3-1-3-1-Bulb diameter: -

Data in Table (29) suggested that all levels of potassium element increased diameter of bulb compared with control plant, as this character it The highest level of potassium gave the highest value followed by medium and low value they produced 48.22,39.35 and 29.59 or 26.81, 21.91 and 8.09% over control plant in the first and second seasons respectively .**Eid *et al.* (1991)** on garlic gave the same results.

4-3-1-3-2-Scales number: -

All concentrations of potassium increased the scales number of bulb, however, the highest level of 6cm/L was the most effect in this regard it produced 49.33 and 48.33 compared with control plant which gave 40.33 and 43.0 in both seasons, respectively (Table, 29).

4-3-1-3-3-Fresh and dry weights of bulbs: -

Data in Table (29) show that, the all levels of potassium increased bulb fresh weight over control plants in both seasons except low level in the first season. The data in the second was the best compared in the first seasons. For dry weight of bulb data in Table (29) show that all levels of potassium approximately significantly increased the dry weight of bulb. The rate of increase was the best in the first seasons compared with the second seasons. The all levels of potassium produced 27.51, 50.56 and 97.96 or 47.56 and 79.23% over control plant for low, medium and high level of K in the first and second season, respectively. **El-Khateeb *et al.* (1991)** on freesia.

4-3-1-3-4-Effect of potassium on chemical constituents of bulbs:-

4-3-1-3-4-a-Carbohydrate %: -

For carbohydrate percentage, data in Table (30) show that K application at levels of (2cm, 4cm and 6cm/L) increased

carbohydrate % in the bulbs of lilium plants in the two seasons. The level of 6cm/L obtained the highest increase in the both seasons. The untreated plants gave the minimum of carbohydrate in both seasons. **El-Khateeb *et al.*, (1991)** on freesia gave the same results.

4-3-1-3-4-b-Nitrogen: -

Data in Table (30) reported that K treatments (2cm, 4cm and 6cm/L) increased N % in the bulbs of lilium plants in the two seasons comparing with control plants. The high level of potassium gave the highest percentage of Nitrogen in the both seasons. Similar results were reported by **Woltz (1959)** on gladiolus, **El-Hanafy (1985)** on dahlia and **El-Maadawy** (1984) on *Mathula incana.*

4-3-1-3-4-c-Phosphorus: -

Concerning the effect on P % in the bulbs of *Lilium longiflorum*, data in Table (30) show that K concentrations (2cm, 4cm and 6cm/L) increased P content with a peak at 6cm/L in both seasons compared with control plants. Which produced the least phosphorus percentage in both seasons. **Shen and Seeley (1988)** on *Pepromia obtusifolia,* **El-Leithy (1987)** on *Tagetes patula* and **El-Khateeb *et al.* (1991)** on freesia .

4-3-1-3-4-d-Potassium: -

In Table (30) show that K application increased K %in the bulbs of *Lilium longiflorum* with a peak at 6cm/L especially in the first season. While control plants gave the percentage of potassium in two seasons. **Woltz (1959)** on gladiolus, **El-Hanafy (1985)** on dahlia, **El-Leithy (1987)** on *Tagetes patula*, **El-Khateeb *et al.*(1991)** on freesia gave the same results.

Table (29) :- Effect of Potassium on bubls production in *Lilium longiflorum* var. Lasio

Treatment	Diameter of bulb (cm)		Number of scales		Fresh weigth of bulbs (gm)		Dry weigth of bulbs (gm)	
	1 st.	2 nd.	1 st.	2 nd.	1 st.	2 nd.	1 st.	2 nd.
Control	3.38	4.70	40.33	43.00	40.80	43.00	5.38	4.91
2 cm / L	4.38	5.08	45.66	48.00	35.83	41.66	6.86	6.13
4 cm / L	4.71	5.73	45.83	48.33	45.00	47.50	8.10	7.26
6 cm / L	5.01	5.96	49.33	48.33	50.83	56.00	10.65	8.80
L. S. D 0.05	N.S	0.71	N.S	N.S	N.S	N.S	1.53	1.01
L. S. D 0.01	N.S	N.S	N.S	N.S	N.S	N.S	2.32	1.53

1 st=first season 2 nd=second season

Table (30) :- Effect of Potassium on chemical content in bulbs of *Lilium longiflorum* var. Lasio

Treatment	Carbohydrate %		Nitrogen %		Phosphrus %		Potassium %	
	1 st.	2 nd.	1 st.	2 nd.	1 st.	2 nd.	1 st.	2 nd.
Control	24.00	21.00	2.19	2.17	0.34	0.32	1.70	1.42
2 cm / L	32.00	29.25	2.62	2.64	0.81	0.64	1.75	1.55
4 cm / L	35.75	45.25	2.63	2.64	0.86	0.68	1.77	1.71
6 cm / L	44.50	45.25	3.30	2.97	0.96	0.86	2.40	2.19

1st=first season 2 nd=second season

4-3-2-Effect of Potassium of *Lilium longiflorum* var. poliana:

4-3-2-1- Effect of Potassium on vegetative growth:

4-3-2-1- 1-Leaves number: -

Data in Table (31) relived that all the applied potassium treatments increased the number of leaves compared with untreated plants in both seasons. The increasing in the mean leaves number was parallel to the increased levels of potassium. The high level of potassium gave 26.95 and 34.25 % over control plant in the first and second seasons, respectively. **Bose *et al.* (1980)** on amaryllis.

4-3-2-1- 2-Spike length: -

It is obvious from the data in Table (31) that K fertilizer had a remarkable effect on the spike length of plant. The effect was parallel to the level used, the highest level (6cm / L) produced the values of 57.5 and 60.0 cm in the first and second seasons, respectively compared with control plant which gave 40.0 and 45.33cm in the first and second one, respectively. **Jhon *et al.* (1997)** on gladiolus.

4-3-2-1- 3-Spike diameter: -

Results in Table (31) reported that all levels of K significantly increased spike diameter compared with untreated plants. The highest value of this character was produced from plants received high level of K fertilizer, which gave. 0.98 and 0.71 cm in the first and second seasons, respectively.

4-3-2-1- 4-Fresh and dry weights of leaves: -

Data in Table (31) show that all the K treatments highly significantly increased the fresh weight of leaves compared with untreated plants. The best result was attained by using K at high level followed by medium and low level of K fertilizer. The trend has been noticed in both seasons. **Zile-Singh and Gupt (1996)** on dahlia. For dry weight of leaves it seemed that potassium at all levels highly significantly increased the dry weight of leaves compared with untreated plants in both seasons.

The higher level used the higher was the effects this character (Table, 31). While control plants gave the least dry weight of leaves in the first season and second one. **Zile- Singh and Gupt (1996)** on dahlia gave the same results.

4-3-2-1- 5-Effect of potassium on chemical constituents of Leaves: -

4-3-2-1- 5-a-Carbohydrate %: -

Data in Table (32) show that the total carbohydrate % in the leaves of lilium plants was increased by treatments of (2cm, 4cm and 6cm/L) in the two seasons. The highest increasing was achieved by 6cm/L in the both seasons. At the mean time untreated plants gave the lowest carbohydrate % the first and second seasons. These results obtained by **El-Hanafy (1985)** on dahlia and **Habib (1992)** on *Pelargonium peltata*

4-3-2-1- 5-b-Nitrogen: -

Nitrogen content % in the leaves of lilium plants was increased with K application as shown from data in Table (32). With *Lilium longiflorum* var poliana N % was increased by concentrations of 2cm, 4cm and 6cm/L of K treatments in the second season greater than the first season. **El-Hanafy (1985)** on dahlia gave the same results.

4-3-2-1- 5-c-Phosphorus: -

Data in Table (32) also show that P % in the leaves of lilium plants was increased by K application. Increasing the concentration of K compared with control plant increased this increasing. **El-Hanafy (1985)** on dahlia and **El-Khateeb *et al.*, (1991)** on freesia gave the same results.

4-3-2-1- 5-d-Potassium: -

For the percentage of potassium, data in Table (32) show that K application at concentration 2cm, 4cm and 6cm/L increased K % in the leaves of lilium plants in the two seasons.

The highest increase was obtained by the high concentrate of 6cm/L.While control plants decreased the potassium percentage in both seasons. **El-Hanafy (1985)** on dahlia, **El-Khateeb *et al.* (1991)** on freesia gave the same results.

Table (31) :- Effect of Potassium on vegetative growth in *Lilium longiflorum* var. Poliana

Treatment	Number Of leaves		spike length(cm)		Spike diameter(cm)		Fresh weight of leaves(gm)		Dry weight of leaves(gm)	
	1 st.	2 nd.	1 st.	2 nd.	1 st.	2 nd.	1 st.	2 nd.	1 st.	2 nd.
Control	34.66	36.00	40.00	45.33	0.68	0.48	8.58	7.60	1.76	1.80
2 cm / L	36.50	41.33	49.58	54.50	0.76	0.60	11.86	13.21	2.83	2.78
4 cm / L	41.16	45.00	53.33	60.00	0.85	0.70	12.65	14.95	3.06	3.08
6 cm / L	44.00	48.33	57.50	60.00	0.98	0.71	13.31	15.00	3.32	3.91
L. S. D 0.05	N.S	7.05	2.08	8.14	0.12	0.11	1.02	1.27	0.42	1.07
L. S. D 0.01	N.S	N.S	3.14	N.S	0.18	0.17	1.55	1.93	0.64	N.S

1 st=first season 2 nd=second season

Table (32) :- Effect of Potassium on chemical content in leaves of *Lilium longiflorum* var. Poliana

Treatment	Carbohydrate %		Nitrogen %		Phosphrus %		Potassium %	
	1 st.	2 nd.	1 st.	2 nd.	1 st.	2 nd.	1 st.	2 nd.
Control	16.00	18.00	3.05	3.09	0.20	0.24	1.02	1.96
2 cm / L	21.50	22.50	3.10	3.24	0.30	0.31	1.30	2.12
4 cm / L	23.00	22.75	3.49	4.36	0.40	0.35	1.38	2.45
6 cm / L	28.50	27.75	3.55	4.56	0.45	0.37	1.40	2.71

1st=first season 2 nd=second season

4-3-2-2-Effect of potassium on flowering:-

4-3-2-2-1-Florets number: -

Data in Table (33) showed that all different K levels slightly increased florets number /plant .The recorded differences were insignificant in the first and second seasons. Table (33). Similar result was obtained by **Gopalakrishanan *et al.* (1995)** on tuberose.

4-3-2-2-2-Floret diameter: -

It is obvious from the data in Table (33) that potassium at different levels slightly increased the floret diameter in both seasons compared with untreated plants. The recorded differences were insignificant in both seasons Table (33). **Roychowdhury and Roychowdhury (1995)** on gladiolus.

4-3-2-2-3-Fresh and dry weights of florets: -

The fresh weight of florets was slightly increased with using any level of K fertilizer. The heaviest weight of floret was attained from plants treated with high level of K fertilizer (Table, 33). The plants without any addition gave the least fresh weight of florets in both seasons. **El-Shoura and Hosni (1996)** on *Strelitzia reginae.* As for dry weight of florets it could be seen from data in Table (33) potassium was more effective in the floret dry weight. The high level of K gave the higher value of this character which attained 63.41and 81.30 % over control treatment and the medium level of potassium gave the second value in this concern. While control plants gave the least dry weight of leaves in both seasons.

4-3-2-2-4-Fresh and dry weight of spike: -

Data tabulated in Table (33) showed that potassium at all levels slightly increased fresh weight of spike. The higher value for this character were produced by using the higher level of K 6cm/L which attained 17.72 and 5.80 % over control plants in the first and second seasons respectively. **Bhuyan *et al.* (1996)** on tuberose gave the same results; As for the potassium

treatments showed a remarkable on the dry weight of spike as it could be seem from the same table the highest level gave the higher value for its character. Almost the same trend took place in the second season. **Bhuyan *et al.* (1996)** on tuberose gave the same results.

4-3-2-2-5-Vase life (number of day): -

Data in Table (33) showed that all levels of K fertilizer increased floret vase life compared with control, treatment the plants which treated with 6cm/L resulted higher floret vase life compared with all other treatment which attained 50 and 47.74% over control treatment in the first and second seasons respectively. **Bhuyan *et al.* (1996)** on tuberose

4-3-2-2-6-Effect of potassium on chemical constituents of florets:-

4-3-2-2-6-a-Carbohydrate %: -

Data in Table (34) show that K concentrations (2cm, 4cm and 6cm/L) increased carbohydrate % in the florets of lilium plants in the both seasons comparing with control plants.

4-3-2-2-6-b-Nitrogen: -

Data in Table (34) show that K application (2cm, 4cm and 6cm/L) increased N % in the florets of *Lilium longiflorum* with a peak at 6cm/L .All treatments increased N % in the florets. There was higher increase by increasing K concentrations in the two seasons (Table, 34). **El-Hanafy (1985)** on dahlia, **Eid *et al.*, (1991)** on garlic gave the same results

4-3-2-2-6-c-Phosphorus: -

Results in Table (34) show that K applications increased P % in the florets of lilium plants. This increase was increased with increasing K level in the both seasons compared with control plants. In this connection **El-Hanafy (1985)** on dahlia and **El-Khateeb *et al.*(1991)** on freesia.

4-3-2-2-6-d-Potassium: -

Concerning the effect of potassium on K % in the florets of lilium plants, data in Table (34) show that all K concentrations (2cm, 4cm and 6 cm/L) increased it with a peak at 6cm/L. While untreated plants produced the lowest value of potassium percentage. **El-Hanafy (1985)** on dahlia, **El-Khateeb *et al.* (1991)** on freesia and **Eid *et al.*, (1991)** on garlic gave the results.

Table (33) :- Effect of Potassium on flowering growth in *Lilium longiflorum* var. Poliana

Treatment	Number of florets		Diameter of florets (cm)		Fresh weight of florets (gm)		Dry weight of florets (gm)		Fresh weight of spike (gm)		Dry weight of spike (gm)		Vase life (Day)	
	1 st.	2 nd.	1 st.	2 nd.	1 st.	2 nd.	1 st.	2 nd.	1 st.	2 nd.	1 st.	2 nd.	1 st.	2 nd.
Control	4.00	4.16	14.00	16.51	13.25	11.91	2.76	2.46	29.80	45.33	5.48	5.93	10.00	10.83
2 cm / L	4.16	4.83	14.08	16.00	13.60	13.78	2.83	3.73	30.55	45.66	5.75	6.15	11.50	12.50
4 cm / L	4.83	4.83	14.58	16.50	13.21	13.95	3.81	4.05	31.50	46.01	6.43	6.63	12.00	13.00
6 cm / L	4.88	5.00	15.58	16.50	14.43	14.88	4.51	4.46	35.08	47.96	7.76	7.26	15.00	16.00
L. S. D 0.05	N.S	N.S	N.S	N.S	N.S	N.S	1.08	0.19	N.S	N.S	N.S	N.S	2.09	2.29
L. S. D 0.01	N.S	N.S	N.S	N.S	N.S	N.S	N.S	0.29	N.S	N.S	N.S	N.S	3.18	3.47

1 st=first season 2nd=second season

Table (34) :- Effect of Potassium on chemical content in florets of *Lilium longiflorum* var. Poliana

Treatment	Carbohydrate %		Nitrogen %		Phosphrus %		Potassium %	
	1 st.	2 nd.	1 st.	2 nd.	1 st.	2 nd.	1 st.	2 nd.
Control	32.00	34.00	2.35	2.11	0.26	0.24	1.75	1.70
2 cm / L	36.25	34.25	3.06	3.64	0.39	0.36	2.04	2.53
4 cm / L	36.50	36.75	3.34	3.96	0.53	0.37	2.31	2.70
6 cm / L	40.00	37.25	3.56	4.36	0.55	0.43	2.50	2.76

1 st=first season 2 nd=second season

4-3-2-3-Effect of potassium on bulbs characteristics:-

4-3-2-3-1-Bulb diameter: -

Data in Table (35) cleared that the different levels of potassium nutrition increased bulb diameter in the first season of this experiment, but only medium and high level of potassium nutrition increased its character in the second season. In this respect it could be seen that the higher value was produced by treating the lilium plants with high level of potassium (6cm/L), which produced 14.78 and 7.22 % over control plants in the both seasons of this experiment .**Eid, *et al.* (1991)** on garlic gave the same results.

4-3-2-3-2-Scals number: -

Data in Table (35) reported that potassium nutrition led to slight increase on scales number of lilium plant, The high level of potassium fertilizer was more effect in this respect. Table (35). The difference between treatments and control was not significant in both seasons.

4-3-2-3-3-Bulb Fresh and dry weights of bulbs: -

Data in Table (35) show that medium and high level of potassium increased bulbs fresh weight compared with non-nutrition plants in the first season, but in the second season all different potassium levels slightly increased that character compared with control plants. The difference between treatments was significant in the first season and insignificant in the second season. As for dry weight of bulbs the data in Table (35) show that all different potassium treatments significant increased bulbs dry weight compared with control plants. The heaviest dry weight of bulbs was produced by fertilizing the plants with high level of potassium (6cm/ L). **El-Khateeb *et al.* (1991)** on freesia.

4-3-2-3-4-Effect of potassium on chemical constituents of bulbs:-

4-3-2-3-4-a-Carbohydrate %: -

Potassium treatments increased carbohydrate % in bulbs of lilium plants in the first season. Data in Table (36) show that low and medium levels of K decreased the carbohydrate content while it increased with high level in the second season. But the highly increase in this parameter with a peak at 6cm/L in the both seasons. **El-Khateeb *et al.*, (1991)** on freesia gave the same results.

4-3-2-3-4-b-Nitrogen: -

N % in the bulbs of *Lilium longiflorum* was increased by K treatments (2cm, 4cm and 6cm/L). The highest increase in K was obtained from 6cm/L K in both seasons (Table, 36). Similar findings were reported by **Woltz (1959)** on gladiolus, **El-Hanafy (1985)** on dahlia and **El-Maadawy (1984)** on *Mathiola incana.*

4-3-2-3-4-c-Phosphorus: -

Data in Table (36) show that P % in the bulbs of lilium plants was in the same trend as in N %. Potassium at (2cm, 4cm and 6cm/L) increased the phosphorus percentage comparing to control plants. Similar results was obtained by **Shen and seeley (1988)** on *Pepromia obtuifolia*, **El-Leithy (1987)** on *Tagetes patula*, **El-Khateeb *et al.* (1991)** on freesia.

4-3-2-3-4-d-Potassium: -

Trend of increase in K % was similar in the bulbs of the two seasons. Data in Table (36) show that all the treatments of K (2cm, 4cm and 6cm/L) increased K % in the bulbs of lilium through the two seasons of this study. **Woltz (1959)** on gladiolus, **El-Hanafy (1985)** on dahlia, **El-Leithy (1987)** on *Tagetes patula*, **El-Khteeb *et al.* (1991)** on freesia

Table (35) :- Effect of Potassium on bubls production in *Lilium longiflorum* var. Poliana

Treatment	Diameter of bulb (cm)		Number of scales		Fresh weigth of bulbs (gm)		Dry weigth of bulbs (gm)	
	1 st.	2 nd.	1 st.	2 nd.	1 st.	2 nd.	1 st.	2 nd.
Control	3.18	4.43	28.66	35.00	18.83	27.16	5.16	5.00
2 cm / L	3.36	4.31	29.83	34.16	18.58	27.30	6.86	6.13
4 cm / L	3.60	4.73	30.33	36.00	19.58	28.16	8.10	7.26
6 cm / L	3.65	4.75	30.83	36.33	20.75	29.30	9.65	8.80
L. S. D 0.05	0.28	N.S	N.S	N.S	1.24	N.S	1.42	1.04
L. S. D 0.01	N.S	N.S	N.S	N.S	N.S	N.S	2.16	1.57

1st=first season 2 nd=second season

Table (36) :- Effect of Potassium on chemical content in bulbs of *Lilium longiflorum* var. Poliana

Treatment	Carbohydrate %		Nitrogen %		Phosphrus %		Potassium %	
	1 st.	2 nd.	1 st.	2 nd.	1 st.	2 nd.	1 st.	2 nd.
Control	41.00	48.00	3.28	3.31	0.52	0.51	1.75	1.54
2 cm / L	43.50	45.75	3.53	3.44	0.75	0.60	2.60	2.11
4 cm / L	44.25	47.00	3.87	4.10	0.76	0.70	2.65	2.16
6 cm / L	48.50	49.25	4.43	4.29	0.86	0.70	2.70	2.17

1st=first season 2nd=second season

For comparison between three different fertilizers of *Lilium longiflorum* on both varieties it was clear that: -

I-Var. Lasio: -

A-Vegetative characteristics: -

Using potassium gave the best effect of number of leaves, spike length and diameter. While spraying phosphorus produced the heaviest fresh weight of leaves but extract of yeast gave the maximum dry weight of leaves. Fig (1).

B-Flowering characteristics: -

Using extract of yeast produced the maximum of number of floret, fresh weight of floret and fresh weight of spike.

On the other hand, using phosphorus increasing the diameter of floret, dry weight of floret, dry weight of spike and vas life of florets. Fig (2).

C-Bulb characteristics: -

Spraying phosphorus as fertilizer gave the best effect of diameter of bulb, fresh weight of bulb, while using the extract of yeast produced the maximum number of scales and dry weight of bulbs in Fig (3).

D-Chemical characteristics: -

Phosphorus as fertilizer gave the maximum nitrogen and phosphorus percentage in leaves. On the same time using the yeast produced the maximum percentage of potassium. While using potassium as foliar gave the maximum carbohydrate percentage only in leaves. Fig (4).

On the other side, using phosphorus as foliar nutration gave the best percentages of N, P, K and carbohydrates in flowers Fig (5). As for bulbs, using phosphorus produced the best results of potassium and carbohydrates percentages while using extract of yeast gave the maximum nitrogen percentage. Also, using potassium gave the best percentage of phosphorus in Fig (6).

II-Var. Poliana:

A-Vegetative characteristics: -

Using phosphorus as foliar nutration gave the best results of length of spike, fresh and dry weight of leaves. While spraying extract of yeast as fertilizer produced the maximum

number of leaves and spike diameter. Fig (7).

B- Flowers characteristics: -

Using the extract of yeast gave the maximum diameter of floret, fresh and dry weight of floret and fresh weight of spike. While phosphorus treatment increased the dry weight of spike and vase life .Fig (8).

C-Bulbs characteristics: -

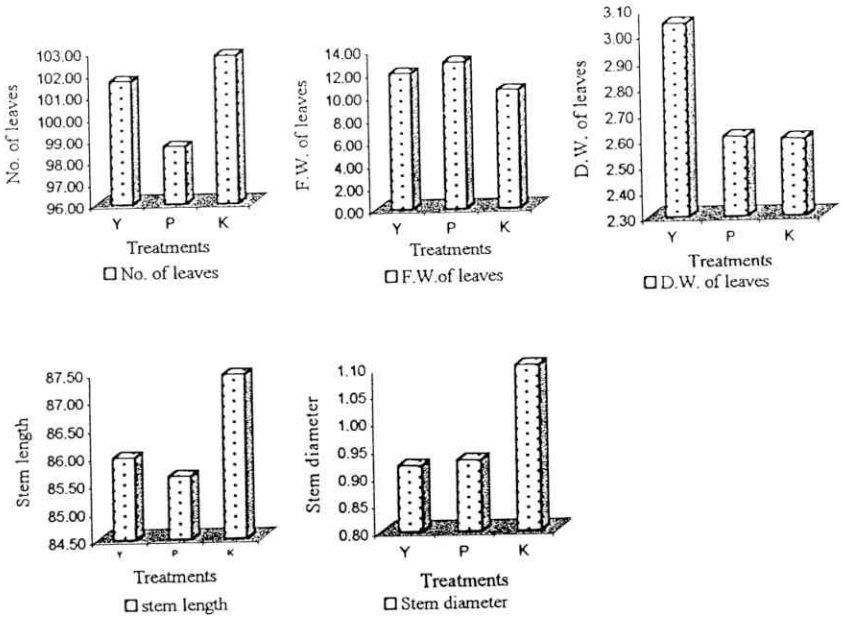
Generally using phosphorus gave the best of diameter of bulb, number of scale, fresh and dry weight of bulbs in Fig (9).

D-Chemical characteristics: -

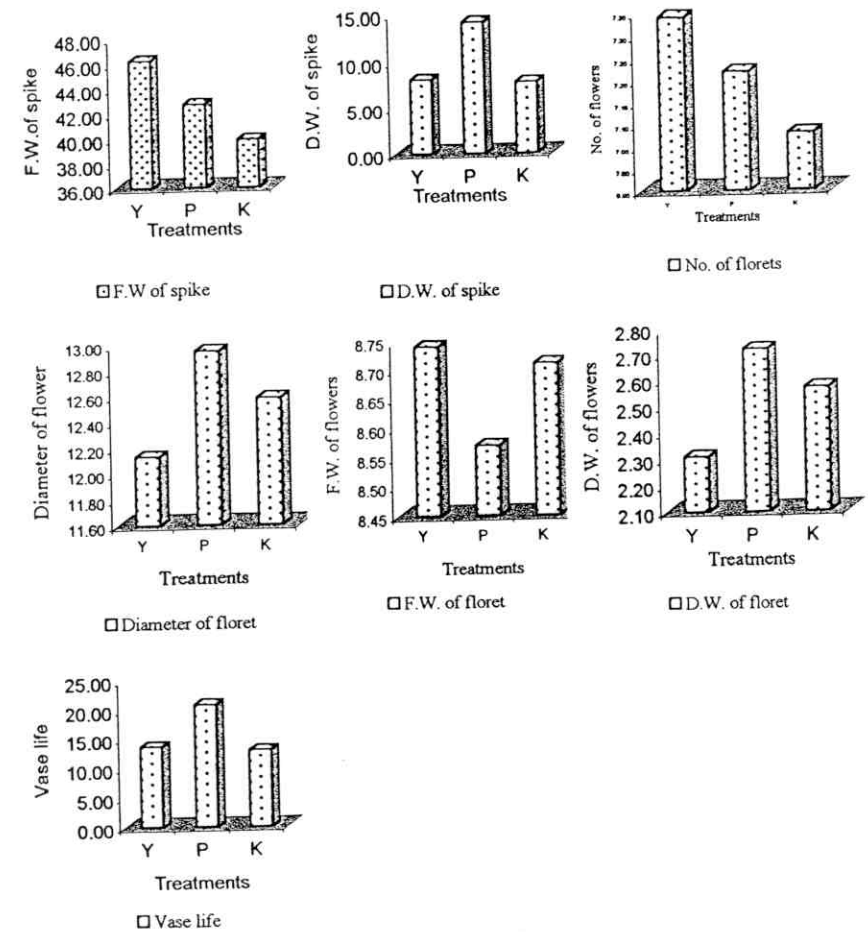
For leaves, spray phosphorus as fertilizer increased the N,P and carbohydrates percentages while using potassium as foliar nutration increased the potassium percentage in leaves Fig(10).

Concerning the florets in Fig (11) using potassium as foliar nutration increase the nitrogen percentage while using phosphorus increased the phosphorus and potassium percentages. On the same time using the yeast increased the carbohydrates percentage.

As for bulbs, using potassium as foliar nutration increased the nitrogen and potassium percentages in bulbs. On the other hand the yeast increased the carbohydrates percentage. Fig (12).



Fig(1): Effect of Y,P & K on vegetative growth of Lilium longiflorum var lasio .



Fig(2) : Effect of Y,P & K on flowering of Lilium longiflorum var. lasio.

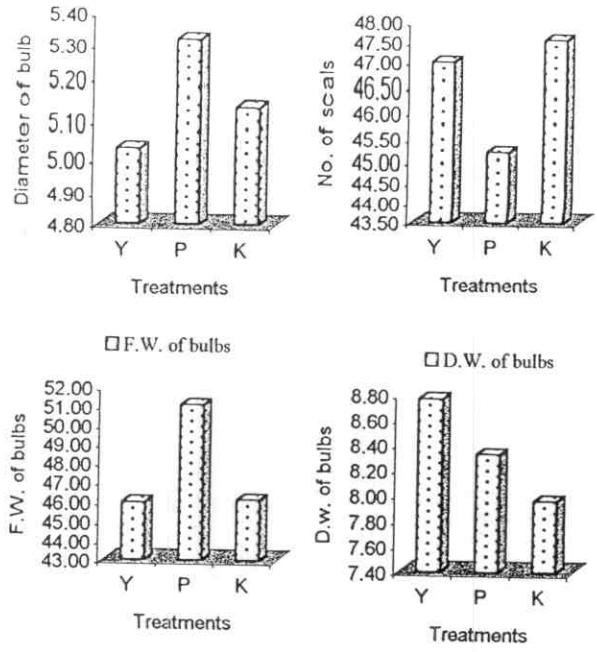


Fig (3) : Effect of Y , P & k on bulbs of *Lilium longiflorum* var. lasio .

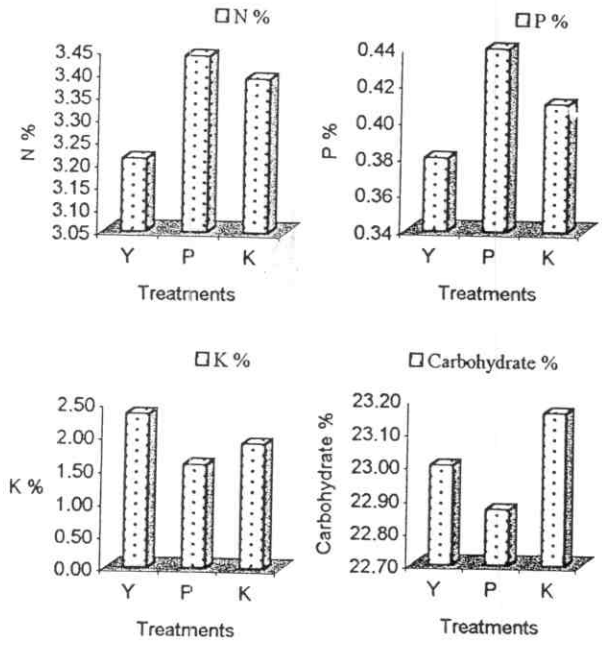


Fig (4) : Effect of Y,P & K on chemicals content of *Lilium longiflorum leaves* var. lasio.

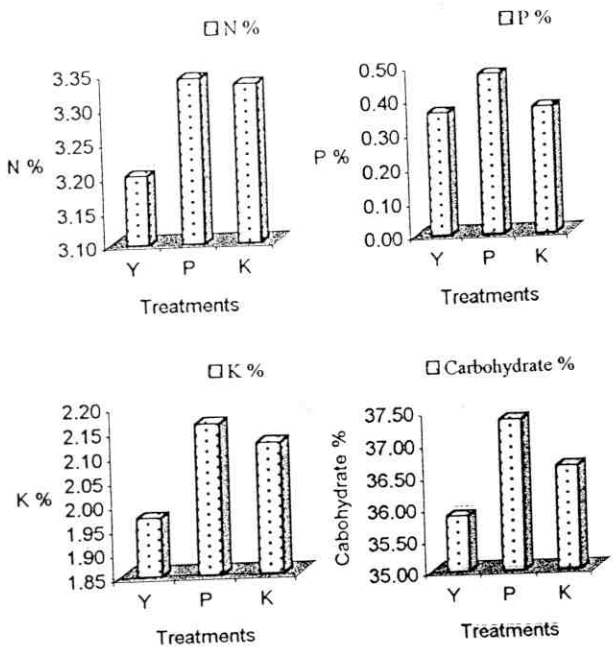


Fig (5) : Effect of Y,P & K on chemicals content of Lilium longiflorum florets var. lasio.

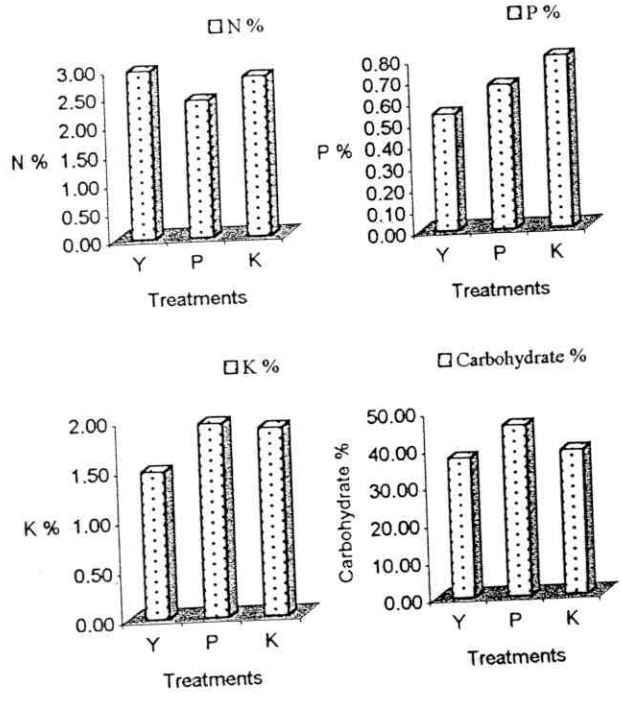
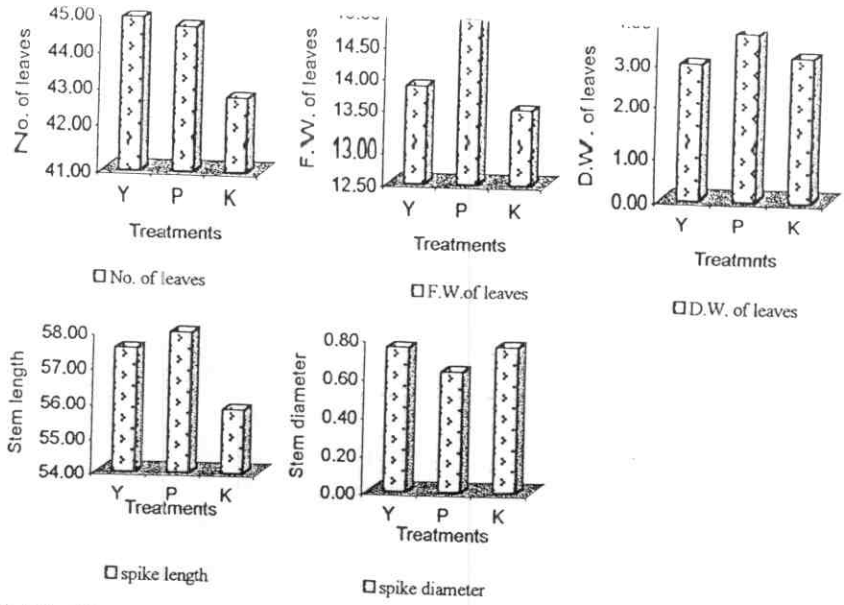


Fig (6) : Effect of Y,P & K on chemicals content of *Lilium longiflorum* bulbs var. lasio.



Fig(7) : Effect of Y,P & K on vegetative growth of *Lilium longiflorum* var. poliana .

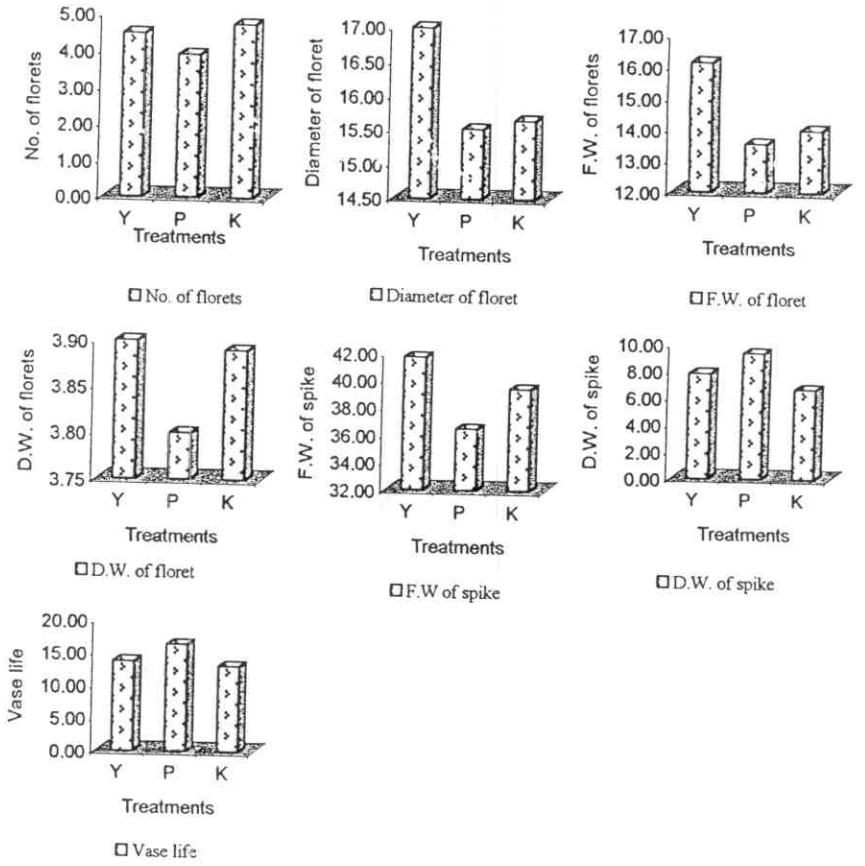


Fig (8) : Effect of Y,P & K on flowering of Lilium longiflorum var. poliana .

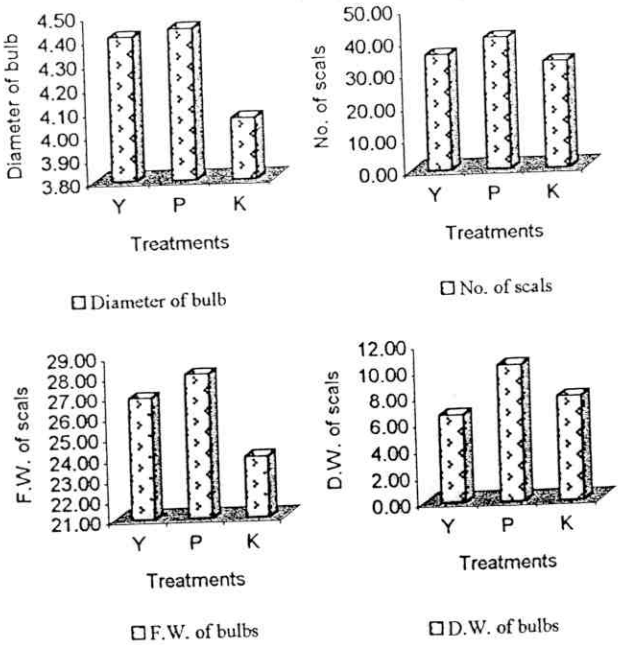


Fig (9) : Effect of Y , P & k on bulbs of *Lilium longiflorum* var. poliana.

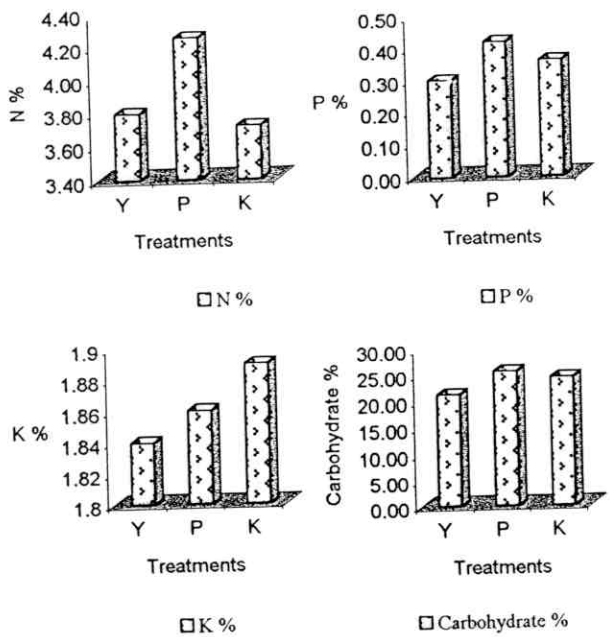


Fig (10) : Effect of Y,P & K on chemicals content of *Lilium longiflorum* leaves var. poliana.

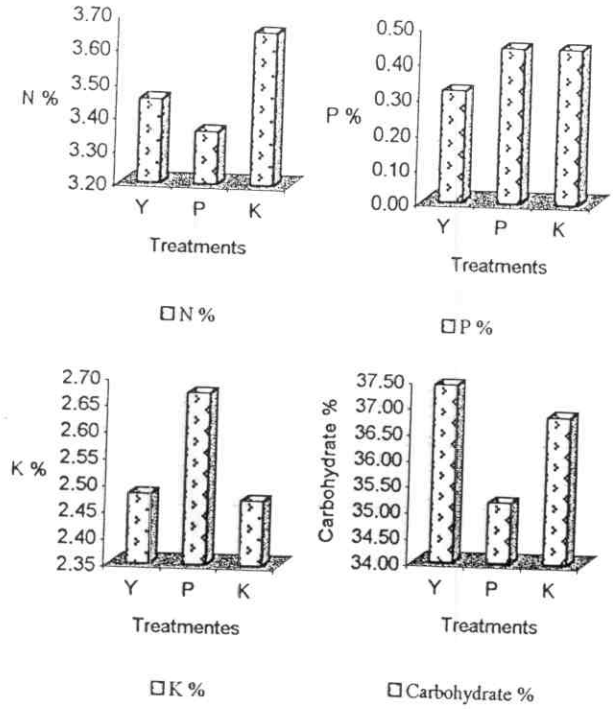


Fig (11) : Effect of Y,P & K on chemicals content of Lilium longiflorum florets var. poliana.

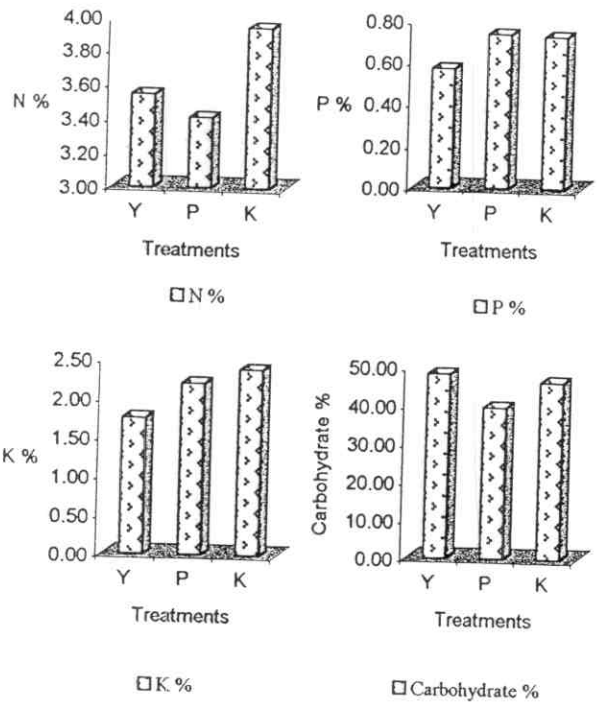


Fig (12) : Effect of Y,P & K on chemicals content of *Lilium longiflorum* bulbs var. poliana.