

**EFFECT OF COMMERCIAL FERTILIZERS AND BIOMAGIC ON GROWTH AND
 CHEMICAL COMPOSITION OF *Schefflera actinophylla*, H.A.T. HARMS PLANTS.**

BY

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ABSTRACT

This experiment was carried out in the glasshouse of the nursery of Ornamental Horticulture Department, Faculty of Agriculture, Cairo University, during the two successive seasons of 2006 and 2007. The objective of this investigation was to study the effect of commercial fertilizers (Viva Rose, Kristalon, Nitrokeem or Union Fert) and Biomagic on vegetative growth and chemical composition of Umbrella Tree plants (*Schefflera actinophylla*). The results indicated that Nitrokeem and Kristalon gave the best results. These treatments significantly increased the average plant height, stem diameter, number of leaves/plant, leaf area, fresh and dry weight of leaves, stems and roots as well as leaf chlorophyll content and N K content. Also, Union Fert increased the vegetative growth followed by Viva Rose, as compared with the untreated plants.

Spraying the plants with Biomagic at the rate of 2.5 g/one month or 5 g/2 months encouraged the vegetative growth compared with the untreated plants, Biomagic at the rate of 2.5 g/one month was the most effective treatment.

The interaction between commercial fertilizers and Biomagic showed that Nitrokeem × Biomagic at 2.5 g/one month could be recommended for the production of *Schefflera actinophylla* plants.

Key words: *Schefflera actinophylla*, Biomagic, commercial fertilizers, Nitrokeem, Kristalon, Union Fert, Viva Rose, vegetative growth chlorophyll, NPK content.

INTRODUCTION

Umbrella Tree plant (*Schefflera actinophylla*, H.A.T. Harms) Fam. Araliaceae is used as indoor and outdoor plant; some investigators studied the effect of commercial fertilizers on the vegetative growth and chemical composition of foliage plants. Abou-Dahab (1996) on *Schefflera arboricola* cv. Gold Capella plants, concluded that commercial fertilizers (Irral and Sangral) increased plant height, number of leaves, leaf area, fresh and dry weights of roots and fresh weight of leaves and chlorophyll content. Saleh *et al.* (1998) found that Kristalon and ammonium nitrate increased plant height, number of leaves per plant, fresh and dry weight of shoots of *Ficus benjamina*. Moghazy (2007) on *Senecio cruentus* plants, found that Kristalon fertilizer at 3.0 g/liter increased the growth parameters, represented as plant height, num-

ber of leaves per plant, root length, fresh and dry weights of shoots and leaves and NPK content. Similar results were obtained by Jimenez and Lao (2005) on *Dieffenbachia amoena* 'Tropic Snow', Lumis *et al.* (2000) on *Euonymus fortunei* cv. 'Emerald Gaiety' plants, Srivastava and Sharma (1990) on *Artemisia annua* plants, Nasr (1997) on *Gerbera jamesonii* plants and Fan *et al.* (2000) on *Spathiphyllum* plants.

The effect of biopromoter (Biomagic) was studied by Aly (2002) on *Pisum sativum*, Salama (2005) on *Cynara scolymus* and Mohamed (2006) on the olive seedlings. They reported that Biomagic improved the vegetative growth of these plants. Also, Biomagic increased total chlorophyll and NK contents in the leaves.

MATERIALS AND METHODS

This experiment was carried out in the glasshouse of the nursery of Ornamental Horticulture Department, Faculty of Agriculture, Cairo University, during the two successive seasons of 2006 and 2007. On February 1st, rooted cuttings of *Schefflera actinophylla* were planted in 20 cm plastic pots filled with sand and peat moss (1 : 1 v/ v). On March 1st, plants were fertilized with the following commercial fertilizers (at the rate of 1000 ppm/2 weeks) in addition to the control plants. Each plant was irrigated at the rate of 1/2 l/ pot, containing 1/2 g of commercial fertilizer (1000 ppm). Each plant was irrigated at the rate of 1/2 l/ pot, containing 1/2 g of commercial fertilizer (1000 ppm). These commercial fertilizers were Viva Rose, Kristalon, Nitrokeem and Union Fert.

Each fertilization treatment was divided into 3 sub treatments sprayed with biomagic at the rate of 2.5 or 5 g/l every 1 or 2 months, respectively, in addition to the untreated plants.

Viva Rose consists of N 22%, P₂O₅ 8%, K₂O 11%, Zn 0.07%, Fe 0.05%, Mn 0.07%, Citric acid 0.5 % and Sucrose 0.3%. Kristalon contains N 20%, P₂O₅ 20%, K₂O 20%, MgO and trace element. Nitrokeem

includes N 19%, P₂O₅ 19%, K₂O 19%, Fe 0.04%, Zn 0.02%, and Mn 0.02%. Union Fert contains N 19%, P₂O₅ 19%, K₂O 19%, MgO 0.5% and trace element.

Biomagic is a biopromoter consists of amino acids 1.907 %, vitamins 0.038 %, macro elements and micro elements. The statistical layout of this experiment was factorial experimental design as commercial fertilizers represented the main factor, and biomagic represented the sub main factors. The experiment contained 180 potted plants. Each commercial fertilizer included 36 plants at three levels of Biomagic which replicated three times (4 plants/ replicate). On September 1st the following data were recorded: plant height (cm), stem diameter (mm), number of leaves/ plant, leaf area (cm²); fresh and dry weight of leaves, stems and roots (g/plant). The data were statistically analyzed using New L.S.D. test according to Steel and Torrie (1980). Leaf chlorophyll content was determined according the method described by Saric *et al.* (1967). Also, N P content were determined in the dry leaves according to Pregel (1945) and King (1951), respectively. K content was determined by flamphotometer method as described by Piper (1950).

RESULTS AND DISCUSSION

Plant height:

Data presented in Table (1) show that, all commercial fertilizers at the rate of 1000 ppm/2 weeks significantly increased the average plant height of Umbrella Tree plants. In the first season, the average plant height ranged from 46.4 to 64.8 cm, as comparing to 44.2 cm in the control plants. Nitrokeem fertilizer resulted in the highest value (64.8 cm), followed by Kristalon (59.2cm). Whereas, Union Fert and Viva Rose slightly increased the plant height, these treatments resulted in 48.8 and 46.4 cm, respectively. The results in the second season were in the harmony with those obtained in the first one, as the average plant height varied from 47.9 to 65.6 cm compared with 44.7 cm in the control plants. Nitrokeem and Kristalon fertilizers resulted in

65.6 and 60.5 cm, respectively. Meanwhile, Union Fert and Viva Rose recorded 50.8 and 47.9 cm, respectively.

Spraying *Schefflera actinophylla* plants with Biomagic significantly increased the average plant height; Biomagic at the rate of 2.5 g/l/one month produced the highest plants resulting in 56.1 and 57.5 cm in the first and second seasons, respectively, compared with 48.0 and 49.5 cm in the untreated plants. Whereas, Biomagic at the rate of 5 g/l/2 months produced medium results 54.0 and 54.7 cm in both seasons, respectively.

Regarding the interaction between commercial fertilizers and Biomagic, the results show that plants fertilized with Nitrokeem at 1000 ppm/2 weeks and sprayed with

Biomagic at the rate of 2.5 g/l/one month produced the highest plants 67.6 and 68.6 cm in the first and second seasons, respectively. Whereas, the lowest values 38.5 and 39.2 cm were obtained with the untreated plants. These results agreed with the finding of Moghazy (2007) on *Senecio cruentus*.

Stem diameter:

Data presented in Table (2) show that all commercial fertilizers at the rate of 1000 ppm/2 weeks recorded significant differences compared with the control plants in both seasons. In the first season, the average stem diameter varied from 8.67 to 10.40 mm, as

comparing to 7.83 mm in the control plants. Nitrokeem fertilizer, which produced the highest plants, produced also the thicket stems resulting in 10.40 mm, followed by Kristalon which recorded 9.88 mm. Union Fert and Viva Rose fertilizers recorded 9.32 and 8.67 mm, respectively. Similar results were recorded in the second season, as the average stem diameter ranged from 8.79 to 11.60 mm compared with 6.95 mm in the control plants. Nitrokeem and Kristalon resulted in 11.60 and 10.96 mm, respectively, whereas Union Fert and Viva Rose recorded 9.82 and 8.79 mm.

Table (1): Effect of commercial fertilizers and Biomagic levels on plant height (cm) of *Schefflera actinophylla*, H.A.T. Harms. during two successive seasons (2006 and 2007).

Commercial fertilizers (F)	Biomagic (B), g/l				Biomagic (B), g/l			
	0	2.5	5	Mean	0	2.5	5	Mean
	First season (2006)				Second season (2007)			
Control	38.5	48.4	45.7	44.2	39.2	48.7	46.2	44.7
Viva Rose	41.5	50.4	47.4	46.4	43.0	52.3	48.5	47.9
Kristalon	55.9	61.9	59.8	59.2	57.5	63.2	60.7	60.5
Nitrokeem	61.2	67.6	65.6	64.8	62.5	68.6	65.8	65.6
Union Fert	42.7	52.4	51.3	48.8	45.3	54.7	52.3	50.8
Mean	48.0	56.1	54.0		49.5	57.5	54.7	

New LSD (5 %)

F	2.1	2.2
B	1.8	1.7
F × B	4.3	4.3

Spraying the plants with Biomagic significantly increased the average stem diameter. Biomagic at the rate of 2.5 g/l/one month produced the thicket stems 9.53 and 10.12 mm in the first and second seasons, respectively, as comparing to 8.90 and 9.12 mm in the untreated plants. Whereas Biomagic at the rate of 5 g/l/2 months produced medium results 9.23 and 9.58 mm in both seasons, respectively.

Plants fertilized with Nitrokeem at the rate of 1000 ppm/2 weeks and sprayed with Biomagic at the rate of 2.5 g/l/one month produced the highest values 10.98 and 12.18 mm in the first and second seasons, respectively. Meanwhile, the lowest values 7.41 and 6.49 mm were recorded in the untreated plants.

Number of leaves/plant:

Data presented in Table (3) show that all commercial fertilizers at the rate of 1000 ppm/2 weeks significantly increased the average number of leaves/plant. In the first season, it was observed that the most effective fertilizers were Nitrokeem and Kristalon, these two commercial fertilizers resulted in 23.9 and 22.4, respectively, compared with 15.1 in the control plants. Union Fert and Viva Rose were less effective than Nitrokeem and Kristalon, resulting in 20.7 and 17.4, respectively. Similar results were obtained in the second season, as the average number of leaves/plant ranged from 16.8 to 25.8, as comparing to 13.9 in the control plants. Both Nitrokeem and Kristalon gave the largest number of leaves/plant and were more effective than the other commercial fertilizers.

Table (2): Effect of commercial fertilizers and Biomagic levels on stem diameter (mm) of *Schefflera actinophylla*, H.A.T. Harms. during two successive seasons (2006 and 2007).

Commercial fertilizers (F)	Biomagic (B), g/l				Biomagic (B), g/l			
	0	2.5	5	Mean	0	2.5	5	Mean
	First season (2006)				Second season (2007)			
Control	7.41	8.24	7.83	7.83	6.49	7.42	6.94	6.95
Viva Rose	8.54	8.82	8.65	8.67	8.61	8.97	8.79	8.79
Kristalon	9.60	10.15	9.90	9.88	10.63	11.28	10.96	10.96
Nitrokeem	9.79	10.98	10.44	10.40	10.93	12.18	11.69	11.60
Union Fert	9.15	9.47	9.33	9.32	9.28	10.68	9.51	9.82
Mean	8.90	9.53	9.23		9.12	10.12	9.58	

New LSD (5 %)

F	0.56	0.58
B	0.32	0.37
F × B	0.79	0.81

Table (3): Effect of commercial fertilizers and Biomagic levels on number of leaves of *Schefflera actinophylla*, H.A.T. Harms. during two successive seasons (2006 and 2007).

Commercial fertilizers (F)	Biomagic (B), g/l				Biomagic (B), g/l			
	0	2.5	5	Mean	0	2.5	5	Mean
	First season (2006)				Second season (2007)			
Control	13.8	16.2	15.2	15.1	12.4	15.8	13.6	13.9
Viva Rose	15.6	19.0	17.6	17.4	15.7	18.6	16.2	16.8
Kristalon	20.3	24.6	22.4	22.4	19.2	23.9	22.5	21.9
Nitrokeem	21.8	26.1	23.8	23.9	22.2	28.8	26.3	25.8
Union Fert	18.2	22.5	21.3	20.7	21.5	23.3	22.7	22.5
Mean	17.9	21.7	20.1		18.2	22.1	20.3	

New LSD (5 %)

F	0.8	0.8
B	0.3	0.5
F × B	1.1	1.2

Biomagic at the rate of 2.5 g/l/one month slightly increased the average number of leaves/plant in the first season resulting in 21.7, as comparing to 17.9 in the untreated plants. Similarly, this treatment significantly increased the average number of leaves/plant in the second season resulting in 22.1, compared with 18.2 in the untreated plants. Biomagic at the rate of 5 g/l/2 months recorded a significant increase on the average number of leaves/plant in both seasons.

Regarding the interaction between commercial fertilizers and Biomagic, the results show that *Schefflera actinophylla* plants which were fertilized with Nitrokeem and sprayed with Biomagic at the rate of 2.5 g/l/one month produced the largest number of leaves/plant 26.1 and 28.8 in both seasons, respectively, as comparing to 13.8 and 12.4 in

the untreated plants. These results were in the agreement with those obtained by Jimenez and Lao (2005) on *Dieffenbachia amoena* 'Tropic Snow'

Leaf area:

Data presented in Table (4) show that all commercial fertilizers significantly increased the average leaf area. In the first season, the results ranged from 59.6 to 67.9 cm², as comparing to 53.2 cm² in the control plants. Nitrokeem and Kristalon produced the largest leaves 67.9 and 64.5 cm², respectively, followed by Union Fert and Viva Rose which resulted in 61.5 and 59.6 cm². Similar trend was obtained in the second season, as the results varied from 60.8 to 68.6 cm², compared with 53.8 cm² in the control plants. Nitrokeem and Kristalon produced the largest values 68.6 and 65.8 cm², respectively, these

treatment were followed by Union Fert and Viva Rose. It was observed that leaf area of Umbrella Tree plants was mainly controlled

by genetic factor and secondarily by environmental factors such as chemical fertilization.

Table (4): Effect of commercial fertilizers and Biomagic levels on leaf area (cm²) of *Schefflera actinophylla*, H.A.T. Harms. during two successive seasons (2006 and 2007).

Commercial fertilizers (F)	Biomagic (B), g/l				Biomagic (B), g/l			
	0	2.5	5	Mean	0	2.5	5	Mean
	First season (2006)				Second season (2007)			
Control	51.5	55.1	53.0	53.2	51.2	56.1	54.0	53.8
Viva Rose	56.1	63.3	59.3	59.6	57.1	65.9	59.5	60.8
Kristalon	61.9	66.7	65.0	64.5	62.5	68.5	66.3	65.8
Nitrokeem	64.0	70.9	68.9	67.9	64.8	71.4	69.6	68.6
Union Fert	58.3	65.5	60.6	61.5	59.8	66.6	62.1	62.8
Mean	58.4	64.3	61.4		59.1	65.7	62.3	

New LSD (5 %)

F	2.9	3.0
B	2.3	2.6
F × B	3.4	3.5

Biomagic at 5 g/ 1/2 months and 2.5 g/l/one month significantly increased the average leaf area, as comparing to the untreated plants. Biomagic at the rate of 2.5 g/l/one month produced the largest values 64.3 and 65.7 cm² in the first and second seasons, respectively, compared with 58.4 and 59.1 cm² in the untreated plants. Whereas, Biomagic at the rate of 5 g/1/2 months produced medium results 61.4 and 62.3 cm² in both seasons, respectively.

Regarding the interaction between commercial fertilizers and Biomagic, the data confirmed the above mentioned results as Nitrokeem accompanied with Biomagic at the rate of 2.5 g/l/one month was the best effective treatment resulting in 70.9 and 71.4 cm² in both seasons, respectively. Meanwhile, plants which were not treated with either commercial fertilizers or Biomagic produced the lowest values 51.5 and 51.2 cm² in the first and second seasons, respectively.

Fresh weight of leaves:

Data presented in Table (5) show that all commercial fertilizers significantly increased the average fresh weight of leaves in both seasons. In the first season, the results varied from 99.3 to 127.1 g, as comparing to 71.7 g in the control plants. Nitrokeem and Kristalon produced the heaviest fresh weight resulting 127.1 and 120.1 g, respectively; Union Fert and Viva Rose increased also the average

fresh weight of leaves resulting in 106.9 and 99.3 g, respectively. Similar trend was recorded in the second season, as the results ranged from 103.5 to 124.2 g, compared with 71.2 g in the control plants; the largest value (124.2 g) was obtained from Nitrokeem followed by Kristalon which resulted in 119.3 g. Whereas, Union Fert and Viva Rose produced the lowest values 104.8 and 103.5 g, respectively.

Biomagic at the rate of 2.5 g/l/one month slightly increased the average fresh weight of leaves in the first season resulting in 116.9 g, as comparing to 91.6 g in the untreated plants. Similarly, this treatment significantly increased the average fresh weight of leaves in the second season resulting in 117.8 g, compared with 89.7 g in the untreated plants. Biomagic at the rate of 5 g/1/2 months recorded a significant increase on the average number of leaves/plant in both seasons.

Regarding the interaction between commercial fertilizers and Biomagic, the results show that plants which were fertilized with Nitrokeem at the rate of 1000 ppm/2 weeks and sprayed with Biomagic at 2.5 g/l/one month recorded the maximum values 139.4 and 141.4 g in both seasons, respectively. Meanwhile, the minimum values (67.5 and 66.9 g) were obtained with the untreated plants. These results were in the harmony with the findings of Dorgham (2005) on *Dieffenbachia*, *Philodendron* and *Syngonium* plants.

Table (5): Effect of commercial fertilizers and Biomagic levels on fresh weight of leaves (g/plant) of *Schefflera actinophylla*, H.A.T. Harms. during two successive seasons (2006 and 2007).

Commercial fertilizers (F)	Biomagic (B), g/l				Biomagic (B), g/l			
	0	2.5	5	Mean	0	2.5	5	Mean
	First season (2006)				Second season (2007)			
Control	67.5	75.9	71.7	71.7	66.9	76.7	70.0	71.2
Viva Rose	84.7	114.6	98.7	99.3	87.7	119.9	102.8	103.5
Kristalon	103.8	131.9	124.6	120.1	104.8	130.7	122.4	119.3
Nitrokeem	110.0	139.4	131.9	127.1	99.4	141.4	131.8	124.2
Union Fert	91.9	122.6	106.1	106.9	89.6	120.5	104.3	104.8
Mean	91.6	116.9	106.6		89.7	117.8	106.3	

New LSD (5 %)

F	3.5	3.5
B	2.1	1.9
F × B	4.1	4.0

Fresh weight of stems:

Data presented in Table (6) show that, all commercial fertilizers at the rate of 1000 ppm/2 weeks significantly increased fresh weight of stems of *Schefflera actinophylla* plants. In the first season, the fresh weight of stems ranged from 29.9 to 44.1 g, as comparing to 21.7 g in the control plants. Nitrokeem fertilizer resulted in the highest value (44.1 g), followed by Kristalon (39.3 g). Whereas, Union Fert and Viva Rose produced

the lowest values 35.4 and 21.7 g, respectively. The results in the second season were in the harmony with those obtained in the first one, as the average fresh weight of stems varied from 31.6 to 45.5 g, compared with 23.4 g in the control plants. Nitrokeem and Kristalon fertilizers resulted in 45.5 and 42.0 g, respectively. Meanwhile, Union Fert and Viva Rose recorded 36.4 and 31.6 g, respectively.

Table (6): Effect of commercial fertilizers and Biomagic levels on fresh weight of stems (g/plant) of *Schefflera actinophylla*, H.A.T. Harms. during two successive seasons (2006 and 2007).

Commercial fertilizers (F)	Biomagic (B), g/l				Biomagic (B), g/l			
	0	2.5	5	Mean	0	2.5	5	Mean
	First season (2006)				Second season (2007)			
Control	19.7	23.1	22.4	21.7	21.3	25.1	23.9	23.4
Viva Rose	27.4	32.2	30.2	29.9	29.4	33.9	31.6	31.6
Kristalon	36.2	42.0	39.7	39.3	37.7	45.6	42.7	42.0
Nitrokeem	39.6	47.9	44.9	44.1	41.3	49.6	45.7	45.5
Union Fert	31.9	38.9	35.4	35.4	33.0	38.7	37.5	36.4
Mean	31.0	36.8	34.5		32.5	38.6	36.3	

New LSD (5 %)

F	3.4	3.7
B	2.1	2.3
F × B	3.9	4.1

Spraying the plants with Biomagic at 2.5 g/l/one month significantly increased the average fresh weight of stems resulting in 36.8 and 38.6 g in both seasons, respectively, compared with 31.0 and 32.5 g in the untreated plants. Whereas, Biomagic at the rate of 5 g/l/2 months produced the medium value in the first and second season.

Regarding the interaction between commercial fertilizers and Biomagic, the results show that plants which were fertilized with Nitrokeem at the rate of 1000 ppm/2 weeks and sprayed with Biomagic at 2.5 g/l/one month recorded the maximum values 47.9 and 49.6 g in both seasons, respectively. Meanwhile the minimum values (19.7 and

21.3 g) were obtained by the untreated plants. These results agreed with those obtained by Wazir *et al.* (2004) on *Schefflera actinophylla* plants.

Fresh weight of roots:

Data presented in Table (7) show that the average root fresh weight ranged from 40.2 to 50.0 g in the first season, compared with 35.1 g in the control plants. Nitrokeem and Kristalon significantly increased the average root fresh weight resulting in 50.0 and 49.5 g, respectively. Whereas Union Fert and

Viva rose slightly increased the average root fresh weight resulting in 43.0 and 40.2 g, respectively. In the second season, the results were in the agreement with those obtained in the first one; the average root fresh weight varied from 38.5 to 50.9 g, as comparing to 34.5 g in the control plants. Plants which were fertilized with Nitrokeem resulted in the largest value (50.9 g), followed by Kristalon which recorded 47.4 g. Meanwhile, Union Fert and Viva Rose slightly increased the average root fresh weight.

Table (7): Effect of commercial fertilizers and Biomagic levels on fresh weight of roots (g/plant) of *Schefflera actinophylla*, H.A.T. Harms. during two successive seasons (2006 and 2007).

Commercial fertilizers (F)	Biomagic (B), g/l				Biomagic (B), g/l			
	0	2.5	5	Mean	0	2.5	5	Mean
	First season (2006)				Second season (2007)			
Control	32.7	37.6	35.0	35.1	31.3	37.4	34.8	34.5
Viva Rose	38.9	41.6	40.2	40.2	36.2	41.1	38.3	38.5
Kristalon	46.2	52.7	49.6	47.5	43.3	51.3	47.6	47.4
Nitrokeem	47.7	52.5	49.8	50.0	46.9	54.9	50.9	50.9
Union Fert	40.2	46.9	42.0	43.0	40.2	45.4	42.8	42.8
Mean	41.1	46.3	43.3		39.6	46.0	42.9	

New LSD (5 %)

F	2.9	2.9
B	2.3	2.2
F × B	3.4	3.1

Spraying plants with Biomagic, at either 2.5 g/l/one month or 5/2 months, slightly increased the average root fresh weight; Biomagic at 2.5 g/l/one month resulted in 46.3 and 46.0 g in both seasons, respectively, as comparing to 41.1 and 39.6 g in the untreated plants. Whereas, Biomagic at 5 g/l/2 months resulted in 43.3 and 42.9 g in both seasons, respectively.

Plants which were fertilized with Nitrokeem at 1000 ppm/2 weeks accompanied with Biomagic at 2.5 g/l/one month produced the heaviest root fresh weight resulting in 52.5 and 54.9 g in the first and second seasons, respectively, whereas the untreated plants produced the lowest root fresh weight (32.7 and 31.3 g).

Dry weight of leaves:

Data presented in Table (8) show that, in the first season, the average dry weight of leaves ranged from 21.8 to 34.3 g, as comparing to 18.9 g in the control plants.

Nitrokeem and Kristalon produced the heaviest leaf dry weight resulting in 34.3 and 31.6 g, respectively. These commercial fertilizers were followed by Union Fert which resulted in 28.0 g, whereas Viva Rose produced the lowest dry weight of leaves (21.8 g). Similar trend was recorded in the second season, as the average leaf dry weight varied from 19.1 to 36.3 g, compared with 18.0 g in the control plants. Also, Nitrokeem and Kristalon produced the largest values 36.3 and 30.3 g, respectively, whereas Union Fert and Viva Rose resulted in 26.4 and 19.1 g, respectively.

Biomagic at the rate of 2.5 g/l/one month significantly increased the average dry weight of leaves resulting in 29.0 and 28.4 g in both seasons, respectively, as comparing to 24.5 and 23.5 g in the untreated plants. Meanwhile, Biomagic at the rate of 5/2 months slightly increased the average leaf dry weight resulting in 27.3 and 26.2 g in the first and second seasons, respectively.

Table (8): Effect of commercial fertilizers and Biomagic levels on dry weight of leaves (g/plant) of *Schefflera actinophylla*, H.A.T. Harms. during two successive seasons (2006 and 2007).

Commercial fertilizers (F)	Biomagic (B), g/l				Biomagic (B), g/l			
	0	2.5	5	Mean	0	2.5	5	Mean
	First season (2006)				Second season (2007)			
Control	17.8	19.7	19.2	18.9	16.2	19.3	18.6	18.0
Viva Rose	20.4	23.7	21.4	21.8	21.5	21.7	18.0	19.1
Kristalon	28.2	34.6	32.1	31.6	26.2	33.8	30.9	30.3
Nitrokeem	30.7	37.2	34.9	34.3	33.8	38.3	36.9	36.3
Union Fert	25.2	29.9	28.9	28.0	23.6	28.7	26.8	26.4
Mean	24.5	29.0	27.3		23.5	28.4	26.2	

New LSD (5 %)

F	3.2	3.1
B	2.6	2.5
F × B	3.7	3.7

Schefflera actinophylla plants which were fertilized with Nitrokeem at the rate of 1000 ppm/2 weeks accompanied with Biomagic at the rate of 2.5 g/l/one month produced the largest values 37.2 and 38.3 g in both seasons, respectively, whereas the untreated plants produced the lowest values 17.8 and 16.2 g.

Dry weight of stems:

Data presented in Table (9) show that, in the first season, the average dry weight of stems ranged from 12.3 to 16.4 g, as comparing to 10.0 g in the control plants. Nitrokeem and Kristalon produced the heaviest stem dry weight resulting in 16.4 and 15.1 g, respectively. These commercial fertilizers were followed by Union Fert which resulted in 14.0 g, whereas Viva Rose produced the lowest dry weight of stems (12.3 g). In the second season, similar trend was recorded, as the average dry weight of stems varied from 11.1 to 18.6 g, compared with 9.6 g in the control plants. Also, Nitrokeem and Kristalon produced the largest values 18.6 and 16.7 g, respectively, whereas Union Fert and Viva Rose resulted in 14.6 and 11.1 g, respectively.

Spraying plants with Biomagic, at either 2.5 g/l/one month or 5 g/l/2 months, slightly increased the average dry weight of stems; Biomagic at 2.5 g/l/one month resulted in 14.7 and 15.3 g in both seasons, respectively, as comparing to 12.0 and 13.0 g in the untreated plants. Whereas, Biomagic at 5 g/l/2 months resulted in 13.4 and 14.0 g in both seasons, respectively.

Regarding the interaction between commercial fertilizers and Biomagic, the results show that plants which were fertilized with Nitrokeem at the rate of 1000 ppm/2 weeks and sprayed with Biomagic at 2.5 g/l/one month recorded the maximum values 18.3 and 19.8 g in both seasons, respectively, meanwhile the minimum values (9.2 and 8.7 g) were obtained by the untreated plants.

Dry weight of roots:

Data presented in Table (10) show that all commercial fertilizers significantly increased the average root dry weight in both seasons. In the first season, the average root dry weight ranged from 16.3 to 21.3 g, as comparing to 13.0 g in the control plants. Nitrokeem produced the heaviest root dry weight resulting in 21.3 g, whereas Kristalon followed by Union Fert resulted in 20.8 and 19.0 g, respectively. Similar results were recorded in the second season, as Nitrokeem resulted in the largest value 22.0 g, whereas Kristalon resulted in medium value 20.5 g followed by Union Fert and Viva Rose which resulted in 17.8 and 15.9 g, respectively.

Biomagic at both 5 g/l/2 months and 2.5 g/l/one month significantly increased the average root dry weight, as comparing to the untreated plants. Biomagic at the rate of 2.5 g/l/one month produced the largest values 19.6 g in the first and second seasons, compared with 16.3 and 16.1 g in the untreated plants. Whereas, Biomagic at the rate of 5 g/l/2 months produced medium results 18.3 and 17.6 g in both seasons, respectively.

Table (9): Effect of commercial fertilizers and Biomagic levels on dry weight of stems (g/plant) of *Schefflera actinophylla*, H.A.T. Harms, during two successive seasons (2006 and 2007).

Fertilization treatments (F)	Biomagic (B), g/l				Biomagic (B), g/l			
	0	2.5	5	Mean	0	2.5	5	Mean
	First season (2006)				Second season (2007)			
Control	9.2	11.0	9.8	10.0	8.7	10.2	9.9	9.6
Viva Rose	10.1	12.3	11.4	12.3	9.8	12.2	11.3	11.1
Kristalon	13.3	16.7	15.3	15.1	15.2	18.6	16.3	16.7
Nitrokeem	14.9	18.3	16.1	16.4	17.9	19.8	18.2	18.6
Union Fert	12.4	15.1	14.6	14.0	13.6	15.7	14.5	14.6
Mean	12.0	14.7	13.4		13.0	15.3	14.0	

New LSD (5 %)

F	0.81	0.79
B	0.57	0.53
F × B	0.95	1.02

Table (10): Effect of commercial fertilizers and Biomagic levels on dry weight of roots (g) of *Schefflera actinophylla*, H.A.T. Harms, during two successive seasons (2006 and 2007).

Fertilization treatments (F)	Biomagic (B), g/l				Biomagic (B), g/l			
	0	2.5	5	Mean	0	2.5	5	Mean
	First season (2006)				Second season (2007)			
Control	11.0	14.3	13.8	13.0	11.3	14.3	12.2	12.6
Viva Rose	14.4	17.9	16.6	16.3	13.9	18.8	15.0	15.9
Kristalon	19.7	22.0	20.6	20.8	19.2	21.6	20.7	20.5
Nitrokeem	19.3	23.2	21.5	21.3	19.7	23.3	22.9	22.0
Union Fert	17.3	20.6	19.1	19.0	16.2	19.9	17.2	17.8
Mean	16.3	19.6	18.3		16.1	19.6	17.6	

New LSD (5 %)

F	1.4	1.3
B	0.9	0.8
F × B	1.7	1.9

Regarding the interaction between fertilization and Biomagic, the results show that plants received Nitrokeem at the rate of 1000 ppm /2 weeks accompanied with Biomagic at 2.5 g/l/one month produced the largest values 23.2 and 23.3 g in both seasons, respectively, meanwhile the untreated plants produced the lowest values 11.0 and 11.3 g.

recorded in the second season, as total chlorophyll content ranged from 2.35 to 3.97 mg/g F.W., as comparing to 1.94 mg/g F.W. in the control plants. It was concluded that commercial fertilizers which gave the best results in the vegetative growth (Nitrokeem and Kristalon) produced also the highest values of total chlorophyll.

Total chlorophyll:

Data presented in Table (11) show that all commercial fertilizers tended to increase total chlorophyll in the leaves of *Schefflera actinophylla* plants. In the first season, the most effective treatment (Nitrokeem at the rate of 1000 ppm/2 weeks) produced the highest values of total chlorophyll which resulted in 2.00 mg/g F.W. Also, Union Fert and Viva Rose relatively increased total chlorophyll resulting in 2.80 and 2.45 mg/g F.W., respectively. Similar results were

Regarding the effect of Biomagic on total chlorophyll content, the results show that Biomagic at the rate of 2.5 g/l/one month produced the highest values 3.38 and 3.25 mg/g F.W. in the first and second seasons, respectively, as comparing to 2.53 and 2.48 mg/g F.W. in the untreated plants. Biomagic at the rate of 5 g/l/2 months produced medium values. These results were in the agreement with those obtained by Fan *et al.* (2000) on *Spathiphyllum* plants.

Table (11): Effect of commercial fertilizers and Biomagic levels on total chlorophyll (mg/g F.W.) of *Schefflera actinophylla*, H.A.T. Harms. during two successive seasons (2006 and 2007).

Fertilization treatments	Biomagic (B), g/l				Biomagic (B), g/l			
	0	2.5	5	Mean	0	2.5	5	Mean
	First season (2006)				Second season (2007)			
Control	1.69	2.23	2.07	2.00	1.72	2.13	1.98	1.94
Viva Rose	2.19	2.71	2.46	2.45	2.14	2.59	2.32	2.35
Kristalon	2.81	3.92	3.17	3.30	2.79	3.89	3.15	3.28
Nitrokeem	3.41	4.87	4.25	4.18	3.36	4.63	3.92	3.97
Union Fert	2.54	3.19	2.68	2.80	2.39	3.01	2.56	2.65
Mean	2.53	3.38	2.93		2.48	3.25	2.79	

NPK contents:

Data presented in Table (12) show that, in the first season, the average N content ranged from 3.03 to 4.26 %, as comparing to 2.70 % in the control plants. Plants that received Nitrokeem fertilizer, contained the highest N content 4.26 %, followed by Kristalon, which resulted in 3.99 %. Union Fert and Viva Rose resulted in 3.22 and 3.03 %, respectively, compared with the control plants which produced the lowest value (2.70 %). In the second season, leaf N content varied from 2.79 to 4.07 % and had a similar trend that obtained in the first one. Biomagic at either 2500 or 5000 ppm slightly increased N content in the leaves of *Schefflera actinophylla* plants resulting in 3.78 and 3.40 %, respectively in the first season, as comparing to 3.15 % in the untreated plants. The results recorded in the second season confirmed those obtained in the first one.

Phosphorus content had no obvious trend, as Union Fert produced the highest P content (1.53 %) followed by Viva Rose which resulted in 1.38 % in the first season. Whereas, Nitrokeem and Kristalon resulted in relatively lower P content 1.19 and 1.06 %. The lowest value still produced by the control plants (0.91 %). A similar trend was obtained in the second season, as the results ranged from 1.02 to 1.23 %, compared with 0.87 % in the control plants. Biomagic treatments did not increase the average P content, as the

untreated plants produced the highest P content 1.32 and 1.25 % in both seasons, respectively. Whereas, Biomagic at 2.5 and 5 g/l resulted in 1.11 and 1.21 %, respectively in the first season, and recorded 1.05 and 0.99 % in the second one.

Regarding the effect of using commercial fertilizers on K content, the results recorded in the first season show that the average K content varied from 0.64 to 1.37 %, as comparing to 0.67 % in the control plants. Nitrokeem and Kristalon fertilizers produced the highest K content 1.37 and 1.29 %, respectively; these treatments were followed by Union Fert and Viva Rose which resulted in 0.85 and 0.64 %, respectively. In the second season, the results varied from 0.97 to 1.48 %, as comparing to 0.46 % in the control plants. And a similar trend was obtained in the second season. Biomagic at either 2.5 or 5 g/l increased K content in the leaves resulting in 1.11 and 0.99 %, respectively in the first season, as comparing to 0.79 % in the untreated plants, the results of the second season confirmed those obtained in the first one. These results were confirmed by Srivastava and Sharma (1990) on *Artemisia annua* plants.

Cocclusively, the interaction between *Nitrokeem* × *Biomagic* at 2.5 g/l/one month could be recommended for the production of *Schefflera actinophylla* plants.

Table (12): Effect of commercial fertilizers and Biomagic levels on NPK contents (%) of *Schefflera actinophylla*, L. during two successive seasons (2006 and 2007).

Commercial fertilizers	Biomagic (B), g/l				Biomagic (B), g/l			
	0	2.5	5	Mean	0	2.5	5	Mean
	first season (2006)				Second season (2007)			
N content								
Control	2.39	2.98	2.74	2.70	2.12	2.82	2.64	2.53
Viva Rose	2.81	3.37	2.92	3.03	2.41	3.21	2.75	2.79
Kristalon	3.75	4.20	4.02	3.99	3.19	4.06	3.86	3.70
Nitrokeem	3.89	4.79	4.11	4.26	3.76	4.36	4.08	4.07
Union Fert	2.91	3.56	3.19	3.22	2.48	3.61	3.16	3.08
Mean	3.15	3.78	3.40		2.79	3.61	3.30	
P content								
Control	0.83	0.97	0.92	0.91	0.79	0.91	0.92	0.87
Viva Rose	1.63	1.39	1.13	1.38	1.31	1.24	0.99	1.18
Kristalon	0.82	0.72	1.63	1.06	1.12	0.95	0.98	1.02
Nitrokeem	1.61	0.93	1.02	1.19	1.73	0.98	0.84	1.18
Union Fert	1.72	1.52	1.36	1.53	1.32	1.16	1.21	1.23
Mean	1.32	1.11	1.21		1.25	1.05	0.99	
K content								
Control	0.51	0.91	0.59	0.67	0.40	0.52	0.46	0.46
Viva Rose	0.42	0.76	0.73	0.64	0.57	1.42	0.93	0.97
Kristalon	1.09	1.44	1.34	1.29	1.11	1.60	1.36	1.36
Nitrokeem	1.23	1.49	1.39	1.37	1.23	1.74	1.48	1.48
Union Fert	0.69	0.97	0.88	0.85	0.59	0.88	0.74	0.74
Mean	0.79	1.11	0.99		0.78	1.23	0.99	

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تأثير التسميد بالاسمدة التجارية والبيوماجيك على النمو والتركيب الكيماوى في نباتات الشفيرا

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- أجرى هذا البحث داخل الصوبة الزجاجية بمشغل قسم بساتين الزينة بكلية الزراعة - جامعة القاهرة، خلال موسمين متتاليين (٢٠٠٦ و ٢٠٠٧)، حيث تم زراعة العقل المجذرة في أول فبراير من كل موسم في أصص بلاستيك قطر ٢٠ سم مملوءة بالرمل والبيوتريت بنسبة ١ : ١ وتم تسميد النباتات ابتداء من أول مارس بالاسمدة التجارية التالية (بتركيز ١٠٠٠ جزء في المليون/أسبوعين): فيفا روز Viva Rose - كريستالون Kristalon - نيتروكيم Nitrokeem - يونيون فيرت Union Fert بالإضافة إلى نباتات المقارنة، وإشتملت كل معاملة سادية على ٣٦ نبات مقسمة إلى ثلاثة تحت معاملات وهى: الرش بالبيوماجيك بتركيز ٢,٥ جم/لتر/شهر - الرش بالبيوماجيك بتركيز ٥ جم/لتر/شهرين بالإضافة إلى النباتات الغير معاملة. وتم أخذ البيانات في أول سبتمبر من كل موسم وفيما يلي ملخصاً لأهم النتائج المتحصل عليها:
- أدى التسميد بالاسمدة التجارية إلى تحسين النمو الخضري مقارنة بالنباتات الغير مسمدة، وأعطى التسميد بالنيتروكيم والكريستالون أعلى القيم من حيث القياسات المورفولوجية وهى ارتفاع النبات، قطر الساق، عدد الأوراق، مساحة الورقة، الوزن الطازج والجاف لكل من الأوراق والسيقان والجذور، وأدى التسميد باليونيون فيرت والفيفا روز إلى زيادة ملحوظة في قياسات النمو الخضري بالمقارنة بالنباتات الغير مسمدة.
 - أوضحت النتائج أن التحسن في النمو الخضري الناتج من التسميد بالاسمدة التجارية كان مصحوباً بزيادة في محتوى الأوراق من الكلوروفيل و محتواها من عناصر النيتروجين والبوتاسيوم ولم يكن لمحتواها من الفوسفور اتجاه ثابت.
 - أوضحت النتائج أن رش النباتات بالبيوماجيك بتركيز ٢,٥ جم/لتر/شهر أو ٥ جم/لتر/شهرين أدى إلى زيادة قياسات النمو الخضري، وكانت المعاملة بتركيز ٢,٥ جم/لتر/شهر هى أفضل نسبياً من المعاملة بتركيز ٥ جم/لتر/شهرين من حيث تأثيرها على قياسات النمو الخضري وكان التحسن في النمو الخضري مصحوباً بزيادة بسيطة في محتوى الأوراق من الكلوروفيل والنيتروجين والبوتاسيوم.
 - أدى التسميد بالنيتروكيم بمعدل ١٠٠٠ جزء في المليون/أسبوعين مصحوباً برش النباتات بالبيوماجيك بتركيز ٢,٥ جم/لتر/شهر إلى الحصول على أعلى القيم مقارنة بالنباتات الغير مسمدة والتي لم ترش بالبيوماجيك التي أعطت أقل القيم