ISSN 1110-0419

Annals Of Agric. Sc., Moshtohor,
Vol. 44(1): 175-193, (2006).

EFFECT OF GROWING MEDIA ON GROWTH AND CHEMICAL COMPOSITION OF *Ficus alii.* PLANTS.

BY

El-Khateeb, M.A; Effat E El-Maadawy, and Asmaa B El-Attar,
Ornamental Hort. Dept., Fac. of Agric., Cairo Univ.

ABSTRACT

Under Greenhouse conditions, a pot experiment was carried out during two successive seasons, 2003/2004 and 2004/2005, at Ornamental Horticulture Department, Faculty of Agriculture, Cairo University, to study the effect of growing media on growth and chemical composition of two cultivars of *Ficus alii.*

Generally, the mixtures of clay + peatmoss + perlite, clay + sand + vermiculite and clay + sand + peatmoss produced the tallest plants, whereas clay + peatmoss + perlite gave the thickest stems of the cv. Green .Using clay + sand + perlite showed the thickest stems of the cv. "Variegata". The "Green" cv formed more leaves than the "Variegata" cv and the mixtures of clay + peatmoss + perlite and clay + peatmoss + vermic, produced the highest number of leaves of the "Green" and "Variegata" cvs, respectively. Growing the "Green" cv. in sand + clay + perlite and "Variegata" cv. in clay + peat + vermiculite increased the leaf area. the fresh weight of leaves of the "Green" cv. was significantly heavier than that of the "Variegata" cv, and using clay + peatmoss + perlite, clay + peatmoss + vermiculite increased the fresh weights Green"and "Variegata" cultivars.

Using the mixtures of clay + peatmoss + vermiculite increased the dry weight of leaves of the "Green" cv and clay + peatmoss + perlite increased the dry weight of leaves of "Variegata" cv. the cv "Green" had heavier and longer branches than "Variegata" cv. The mixture of clay + peatmoss + vermic had a favorable effect on increasing the number and length of branches of the cv "Green", whereas the cv. "Variegata" formed more and longer branches when grown on clay + sand + peatmoss and clay + peatmoss + vermic .the fresh weight of roots of the "Green" cv increased in the clay + sand + perlite and clay + sand. the fresh weights of roots of the "Variegata" cv. increased in clay + sand + peatmoss .

Using clay + sand + vermiculite medium showed the highest content of chlorophyll -a in the leaves of "Green" and "Variegata" cultivars .growing the "Green" cv. in clay + peat + perlite, and the "Variegata" in clay + sand + vermiculite, increased the content of carbohydrates in the leaves whereas the highest content of carbohydrates in the roots of "Green" and "Variegated" cvs was obtained on media containing vermiculite. clay + sand + perlite medium showed

the highest content of nitrogen in the leaves and stems of the "Green" and "Variegata" growing the "Green" cv. in a mixture of clay + sand + peatmoss and "Variegata" cv on clay + sand + vermiculite increased K-content in the leaves

INTRODUCTION

Ficus alii (*F. binnendijkii "alii"* or, *F. maclellandi "alii"*, Family: Moraceae) is an interesting foliage plant, native to Philippines and Thailand. It is a tree of dense growth and pendant habit which may grow to several meters in height. Its relatively thick leaves are lance-shaped (willow-like leaves), shiny, deep Green up to 10" long and tapering to a slender point and leaf width depends on variety. New growth is sometimes tinted bronze and later matures to a deep, rich Green. *Ficus alii* tolerates a wide range of light, temperature, and watering conditions without loosing its leaves. It lacks the tendency to shed leaves. A plant that makes a good container specimen., looks attractive as a stand-alone specimen or as part of a mixed display. Larger specimens are especially useful as feature plants in warm, well-lit atria, shopping malls and offices. It is a good choice of specimen for an elegant bright room.

The production of Greenhouse foliage plants involves a number of cultural inputs, among these, perhaps the most important is the type of growing medium used. The composition of a growing medium should be well drained, low in soluble salts, with an adequate exchange capacity. Since innumerable amendment combinations can produce a growing medium with these characteristics, it is important to consider the economic, cultural optimums, transportation, labor and handling .Clay has a relatively high cation exchange and water holding capacity, peatmoss is the most desirable organic matter for the preparation of growing media, sand is the least expensive and the heaviest of all inorganic amendments, lightness and uniformity make perlite very useful for increasing aeration and drainage and vermiculite has a very high water holding capacity, excellent ex-change, buffering capacities and aid in aeration and drainage it is less durable than sand and perlite. The effects of potting media composed of clay, sand, vermiculite, perlite and peat on the growth of different ficus species and other foliage plants, were investigated by several workers. Matysiak and Nowak(1998) on *Ficus benjamina*, stated that peat + perlite resulted in the highest shoot and root fresh weights and the greatest leaf area. Tillmann *et al.* (1994) on *Codiaeum variegatum* found that vermiculite was the most suitable medium for root growth, it gave the longest and heaviest roots Only soil and sand were totally unsatisfactory. Soyergin *et al.* (1994) on Dieffenbachia cv. Camilla, found that of 10 potting mixtures, a mixture of peat + soil + perlite gave the tallest and best quality plants Also, Karakir *et al.* (1994) on fig cv Sarilop obtained the best root growth in sand + perlite. Hall *et al.* (1994) on *Ficus elastica* cv. Robusta, obtained a higher marketable quality plants with perlite substrate than those grown in peat. Abo-Hassan *et al.* (1994) on *Ficus infectoria* obtained the best rooting (rooting percentage, number of roots, root length and DW per cutting) with perlite + peatmoss medium, followed by sand + perlite + peatmoss. Ishtiaq (1995) on *Ficus benjamina, F. elastica, F. elastica* cv Tricolor and *F. microcarpa* cv. Hawaii, showed that the medium had no significant effect

plant height and plant thickness, and root length and weight . The number of leaves and number of branches were highest in medium containing sand, while species had a significant effect .El-Sallami (1996) on *Ficus benjamina*, found that plants grown in clay + peat had the widest stems and high numbers of leaves/plant. Media composed of peat + clay or vermiculite produced tall plants with many branches and high fresh weights of branches and roots, the leaf contents of N,P,K, Mg and carbohydrates showed a positive relationship with growth for the 2 media, which gave the best growth. Mukhtar *et al.* (1996) on *F. elastica* plants, found that growing medium (sand, silt and clay)had no significant effect on shoot growth or rooting. Zaghloul *et al.* (1996) on *Philodendron domesticum* stated that peat alone or peat + sand (1:1) gave the greatest plant height and leaf and root fresh weights. Ryu *et al.* (1996) on *Ficus benjamina,* observed a negative correlation between plant height and media porosity, and a positive correlation with bulk density. Using 5 different growing media, Ziaullah, *et al.* (1999) on *Cordyline terminalis* and *C. fruticosa* stated that media had no appreciable effect on root length and plant height, but significantly affected leaf area and number of roots per plant. Stamps and Evans (1999) on *Dracaena marginata* and Spathiphyllum prepared growing media using pine bark, vermiculite and/or perlite in different proportions. Dracaena root growth was not affected by treatments but there were significant effect on plant top growth parameters. Treder *et al.* (1999) reported that *F. benghalensis* and *F. lyrata* grown in peat had greater leaf surface area than plants grown in peat + rockwool. .Garcia, *et al.* (2001)on *Epipremnum aureum* and *Spathiphyllum wallisii*, using observed that the best plant productivity and quality were present in those substrates based on peat: perlite medium. Saleh (2000) on *Ficus benjamina* "Starlight" grew plants in different planting media, and indicated that peatmoss + sand + clay mixture resulted in higher yield and yield components than the other planting media, and higher total content of carbohydrates a and b, N, P and K, but low concentration of carotenoids in the leaves. Papafotiou *et al.* (2001) on *Euphorbia pulcherrima* cv. Peterstar white, *Codiaeum variegatum* var. pictum, *Syngonium podophyllum* and *Ficus benjamina*, found that medium consisting of peat and perlite (1:1) gave the highest foliage fresh weight. Son, *et al.* (2000) grew *Pachira aquatica*, *Saintpaulia ionantha* and *Spathiphyllum patinii* in different composition of peat: perlite: clay loam. Increasing the ratio of clay loam decreased porosity, while increasing the ratio of peat increased moisture capacity. Singh *et al.* (2002) on *Maranta bicolor* obtained the longest root, soil + cocopeat mixture (1:1). Singh and Nair (2003) stated that on some foliage plants, found that height, number of leaves, number of shoots, number and length of roots, was maximum with soil, sand, and compost at the ratio of 2:1:1. Wazir *et al.* (2003) on *Dracaena deremensis*. The soil medium consisting of silt + garden soil + leaf mould + sawdust resulted in the greatest number of leaves, thickness of stem number of roots and root weight per plant

MATERIALS AND METHODS

This study was carried out at the Experimental Nursery of the Department of Ornamental Horticulture, Faculty of Agriculture, Cairo University, Giza, during the two successive seasons of 2003/2004 and 2004/2005. The aim of

the study was to investigate the effects of growing media on growth and chemical composition of *Ficus alii L.* plants. On 1st April, uniform small plants of "Green" and "Variegata" cultivars of *Ficus alii* (from the local market) with an average length of 15-18 cm, were planted in 30-cm diameter plastic pots filled with one of the following growing media (1:1:1 v/v/v):

1-Clay + sand	2-Clay + sand + vermculate
3-Clay + sand + peatmoss	4-Clay + sand + perlite
5-Clay + peatmoss + vermculate	6-Clay + peatmoss + perlite.

The plants were fertilized with NPK at 1:1:1 at 5 g/ pot at monthly intervals. The plants were grown in these media for 10 months for each season.

Data recorded: at the end of the each season and the following data were recorded: Plant height, stem diameter, number of leaves, number of branches, length of branches, fresh and dry weights of roots, stems and leaves.

Chemical composition: Chlorophyll-a & b and carotenoids contents were determined according to Fahmy (1970), total carbohydrates were determined according to Herbert *et al.* (1971). Nitrogen, phosphorus and potassium were determined using the wet digestion procedure (Piper, 1947), total nitrogen content using Nesslar method (Koch and Michelin, 1924), phosphorus according to Troug and Meyer (1939) and the content of potassium was determined by using operation chart of Shimadzu Atomic Absorption/Flame Spectrophotometer A646 with a boiling air acetylene burner and recorded read out.

Statistical analysis: The treatments were replicated 3 times and each replicate contained 3 pots. The layout of this experiment was split plot design, using cultivars as main plots and growing media as subplots. The data were statistically analyzed using the L.S.D. test to compare the means of the different treatments as recommended by Steel and Torrie (1980) Normal agricultural practices for the plants were done.

RESULTS AND DISCUSSION

1-Effect of media on vegetative growth

Plant height

The responses of seedling height of the "Green" and "Variegata" cultivars of *Ficus alii* to the different growing media are shown in Table (1). The data showed significant differences, in both seasons, between the seedling height of the cv "Green" and cv. "Variegata",it was 58.90 and 63.22 cm, in the first and second seasons, respectively for cv. "Green", against 44.02 and 46.89 cm, for the cv "Variegata". Data on the effect of growing media on the average seedling height,indicated that, in the first season, growing the plants in a mixture of clay + peatmoss + perlite resulted in the tallest plants (59.62 cm), followed by mixture of clay + sand + vermiculite (53.28cm). In the second season, also the mixtures of clay + peatmoss + perlite (62.60cm), and clay + sand + peatmoss (57.81 cm), resulted in the tallest plants, compared to the other mixtures. The interaction effect between showed that in the first season, growing the cv, "Green" as well as cv "Variegata" in a mixture of clay + peatmoss + perlite gave the tallest. In the second season, the cv "Green" the mixture of clay + peatmoss + perlite increased the height of the cv. "Green" to the maximum

value (76.46cm), whereas cv "Variegata" showed the highest response to media composed of clay + sand + vermic (53.33cm). Generally, clay + peat + perlite followed by clay + sand + vermic mixtures gave the best results. In this respect, Mohamed (1994) on tuberose, stated that loamy + sand + peat (1:1:1) produced the tallest plants. Soyergin *et al.* (1994) on Dieffenbachia cv. Camilla, found that a mixture of peat + soil + perlite gave the tallest plants. Ishtiaq (1995) on *Ficus benjamina, F. elastica, F. elastica* cv. Tricolor and *F. microcarpa* cv. Hawaii, showed that the medium had no significant effect plant height.

Table (1): Effect of growing media on plant height (cm) and, stem diameter (cm) of *Ficus alii* cvs "Green" and "Variegata",during the two successive seasons 2003/2004 and 2004/ 2005.

Growing media (1:1 v/v)	Plant height (cm)					
	First Season, 2003/2004			Second Season, 2004/2005		
	Green	Vareig.	Mean (B)	Green	Vareig.	Mean (B)
Clay+Sand	55.47	42.00	48.73	60.37	46.33	53.35
Clay+Sand+Vermic.	61.10	45.46	53.28	62.28	53.33	57.81
Clay+Sand+Peatmoss	55.50	38.88	47.19	59.66	48.00	53.83
Clay+Sand+Perlite	54.13	44.20	49.165	54.34	42.00	48.16
Clay+Peatmoss+Vermic	57.90	43.66	50.78	66.22	43.33	54.77
Clay+Peatmoss+Perlite	69.32	49.92	59.62	76.46	48.33	62.60
Mean (A)	58.90	44.02		63.22	46.89	
LSD at 5 % For A		5.72			4.06	
For B		3.30			4.08	
For Ax b		8.08			9.99	
	Stem diameter(cm)					
Clay+Sand	0.90	0.80	0.85	1.08	0.57	0.83
Clay+Sand+Vermic.	0.90	0.83	0.87	0.96	0.90	0.93
Clay+Sand+Peatmoss	0.83	0.73	0.78	1.03	0.97	1.00
Clay+Sand+Perlite	0.83	1.03	0.93	1.13	0.83	0.98
Clay+Peatmoss+Vermic	0.97	0.77	0.87	0.83	1.03	0.93
Clay+Peatmoss+Perlite	1.10	0.77	0.94	0.93	0.87	0.90
Mean (A)	0.92	0.82		0.99	0.86	
LSD at 5 % For A		N.S			N.S	
For B		N.S			0.14	
For Ax b	0.20				0.29	

Stem diameter

The responses of stem diameter of *Ficus alii* cvs. to the the different growing media are shown in Table (1). The data showed no significant differences, in both seasons, between the stem thickness of the two cvs. Concerning the effect of growing media, data in Table (1) showed that in the first season, growing plants in a mixture of clay + sand + perlite or clay + peatmoss + perlite insignificantly increased stem diameter of seedlings as compared with that grown in clay + sand mixture, in the second season, however using clay + sand + peatmoss and clay + sand + perlite as growing media significantly increased it. The interaction effects showed that, in the

first season, clay + peatmoss + perlite had a significant effect on stem diameter of *Ficus alii* cv. Green, when compared with the other media (expect for clay + peatmoss + vermiculite), whereas the cv. "Variegata" showed significantly thicker stems on clay + sand + perlite mixture . Ishtiaq (1995) on *Ficus benjamina, F. elastica, F. elastica cv. Tricolor and F. microcarpa* cv. Hawaii,showed that the medium had no significant effect on plant thickness.

Number of leaves

As shown in Table (2), in both seasons, the "Green" cv of ficus seedlings significantly formed more leaves than the "Variegata" cv. Also, the data indicated that that in the first season, the mixtures of clay + peatmoss + vermiculite and clay + peatmoss + perlite significantly increased the formation of leaves, compared with the other media, whereas in the second season, the mixture of clay + peatmoss + vermiculite, was the most effective medium, which significantly increased the number of leaves per seedling over the other media.

Table (2): Effect of growing media on number of leaves and leaves area (cm^2) of *Ficus allii* cvs "Green" and"Variegata", during the two successive seasons 2003/2004 and 2004/ 2005..

Growing media (1:1 v/v)	Number of leaves					
	First Season, 2003/2004			Second Season, 2004/2005		
	Green	Vareig.	Mean (B)	Green	Vareig.	Mean (B)
Clay+Sand	31.62	21.00	26.31	34.00	18.33	26.17
Clay+Sand+Vermic.	33.77	16.33	25.05	43.67	24.00	33.84
Clay+Sand+Peatmoss	27.80	19.00	23.40	38.67	24.00	31.34
Clay+Sand+Perlite	29.02	19.67	24.35	30.67	22.67	26.67
Clay+Peatmoss+Vermic	34.70	25.00	29.85	39.33	36.67	38.00
Clay+Peatmoss+Perlite	36.40	22.67	29.54	37.00	29.00	33.00
Mean (A)	32.22	20.61		37.22	25.78	
LSD at 5 % For A		4.48			6.88	
For B		3.08			4.81	
For Ax b		6.93			8.90	
	Leaf area (cm2)					
Clay+Sand	33.54	31.34	32.44	31.37	28.21	29.79
Clay+Sand+Vermic.	39.29	30.68	34.99	34.62	28.60	31.60
Clay+Sand+Peatmoss	32.91	26.71	29.81	31.77	29.02	30.40
Clay+Sand+Perlite	40.50	32.35	36.43	35.70	30.10	32.90
Clay+Peatmoss+Vermic	33.33	36.40	34.87	33.57	33.64	33.61
Clay+Peatmoss+Perlite	37.33	30.71	34.02	35.14	32.50	33.82
Mean (A)	36.15	31.37		33.70	30.35	
LSD at 5 % For A		3.40			N.S	
For B		3.27			3.98	
For Ax b		547			6.11	

The interaction effects between *ficus cultivars* and growing media showed that clay + peatmoss + perlite in the first season, and clay + sand + vermic.,in the second one were the most effective media in increasing the number of leaves per seedling of the "Green" cv.,but the "Variegata" cv, gave the highest number of leaves with the mixture of clay + peatmoss + vermic.

Leaf area

The responses of leaf area of *Ficus alii cvs "Green" and "Variegata"* to the different growing media are shown in Table (2). The data showed that "Green" cv produced larger leaves in the first season than "Variegata" one, but there was no significant difference, in the second one. Concerning the effect of growing media regardless ficus cultivars, the data showed that the mixture of clay + sand + perlite in the first season and clay + peatmoss + vermiculite in the second one, were the most effective in increasing the leaf area

Regarding the interaction effect on leaf area,the data in Table (2) revealed that in the both seasons, the mixture of sand + clay + perlite increased the leaf area of the "Green" cv. of *Ficus alii* to the maximum value. On the other side, growing the "Variegata" cv. in a mixture of clay + peat + vermiculite, in both seasons, increased the leaf area to the maximum value (36.40and 33.64cm2, respectively).In this regard, Hassan (1996) on *Aspidistra* plants found that using a mixture of peat + sand (1:1) increased the leaf area. Whereas, Matysiak and Nowak (1988) on *Ficus benjamina,* stated that peat + perlite resulted in the greatest leaf area. Treder *et al.* (1999) reported that *F. benghalensis* and *F. lyrata* grown in peat had greater leaf surface area than plants grown in peat + rockwool.

Fresh and dry weights of leaves

Regarding the effect of growing media on fresh and dry weights of leaves. data in Table (3), indicated that in both seasons the fresh weight of leaves of the "Green" cv. was significantly heavier than that of the "Variegata" cv. In the first season the fresh weight of leaves of the "Green" cv increased when plants were grown in the following mixtures clay + peatmoss + perlite, clay + sand + vermiculite and clay + sand + vermiculite, in descending order giving the values of 33.16, 32.36 and 31.07 gm. respectively. In the second season, it was noticed that using a mixture containing vermiculite (clay + peatmoss + vermiculite or clay + peatmoss + vermiculite) were more effective in increasing the fresh weight of leaves. In both seasons, growing the seedling of the "Variegata" cultivar in the following mixtures clay + peatmoss + vermiculite or clay + peatmoss + perlite had a pronounced effect on in increasing the fresh weight of leaves giving 21.86, 19.7, 26.33 and 26.09 gm, in the first and second seasons, respectively. Concerning the effect growing media on dry weight of leaves, the data clearly indicated. In the first season, that the fresh weight of leaves of the "Green" cv increased when plants were grown in the following mixtures clay + peatmoss + vermiculite and clay + peatmoss + perlite, giving the values of 8.20 and 8.62gm, respectively, whereas in the second season, using the mixture of clay + peatmoss + vermiculite was the most effective in increasing the dry weight of leaves. In the first season, growing the seedling of the "Variegata" cultivar in the mixtures clay + peatmoss + vermiculite and clay + sand markedly increased the dry weight of

leaves giving 6.04 and 5.32gm, but in the second season, the heaviest dry weight was recorded with clay + peatmoss + perlite (7.84gm) clay + peatmoss + vermiculite (6.86gm) and clay + sand + vermiculite (6.84 gm). Matysiak and Nowak (1988) on *Ficus benjamina*, stated that peat + perlite resulted in the highest shoot fresh weights. Zaghloul *et al.* (1996) on *Philodendron domesticum* stated that peat alone or peat + sand (1:1) gave the greatest fresh weights.

Table (3): Effect of growing media on fresh and dry weights of leaves (gm) of *Ficus allii* cvs "Green" and "Variegata", during the two successive seasons 2002/2003 and 2003/ 2004 .

Growing media (1:1 v/v)	Fresh weight of leaves (gm)					
	First Season, 2003/2004			Second Season, 2004/2005		
	Green	Vareig.	Mean (B)	Green	Vareig.	Mean (B)
Clay+Sand	28.61	17.77	23.19	25.61	16.00	20.81
Clay+Sand+Vermic.	32.36	15.48	23.92	36.06	19.25	27.65
Clay+Sand+Peatmoss	25.00	14.75	19.875	32.82	18.51	25.66
Clay+Sand+Perlite	28.55	16.62	22.585	28.54	21.10	24.82
Clay+Peatmoss+Vermic	31.07	21.86	26.465	35.39	26.33	30.86
Clay+Peatmoss+Perlite	33.16	19.70	26.43	31.00	26.09	28.55
Mean (A)	29.79	17.70		31.57	21.21	
LSD at 5 % For A		5.45			6.77	
For B		3.50			5.22	
For Ax b		6.66			8.67	
	Dry weight of leaves (gm)					
Clay+Sand	6.48	5.32	5.90	6.69	6.23	6.46
Clay+Sand+Vermic.	7.72	5.24	6.48	7.43	6.84	7.14
Clay+Sand+Peatmoss	6.82	5.07	5.95	7.68	5.75	6.72
Clay+Sand+Perlite	7.16	5.06	6.11	7.23	5.27	6.25
Clay+Peatmoss+Vermic	8.20	6.04	7.12	8.34	6.86	7.60
Clay+Peatmoss+Perlite	8.62	5.15	6.89	7.38	7.84	7.61
Mean (A)	7.50	5.31		7.45	6.47	
LSD at 5 % For A		1.74			1.53	
For B		0.93			0.90	
For Ax b		2.62			1.95	

Number and length of branches

As shown in Table (4), there were significant differences, in both seasons, between the number and length of branches of the cv "Green" and cv "Variegata", the cv "Green" had heavier and longer branches . As for the effect of growing media on the number and length of branches of the cv "Green" and cv "Variegata", the data indicated that the mixture of clay + peatmoss + perlite in the first season and the mixture of clay + peatmoss + vermiculite in the second one had a favorable effect on the number and length of branches of the cv "Green" The response of the number and length of branches of the cv "Variegata", to the different growing media are shown in Table (4), showed growing the plants in

clay + sand + peatmoss in the first season and in clay + peatmoss + vermiculite in the second one had a significant effect on increasing the No.of branches, as compared with the other media. Concerning the effect of growing media on the length of branches of *the* cv. "Variegata", the data showed that in both seasons, growing the plants in the mixture of clay + peatmoss + vermiculite greatly increased it, as compared with the other mixtures, which increased the length of branches to 21.67 and 21.16 cm, in the first and second seasons, respectively. Ishtiaq (1995) on *Ficus benjamina*, *F. elastica*, *F. elastica* cv. Tricolor and *F. microcarpa* cv. Hawaii, showed that the number of branches were highest in medium containing sand. El-Sallami (1996) on *Ficus benjamina*, found that plants grown media composed of peat + clay or vermiculite produced tall plants with many branches.

Table (4): Effect of growing media on number of branches and length of branches cm (cm) of *Ficus allii* cvs "Green" and"Variegata" during the two successive seasons 2003/2004 and 2004/ 2005.

Growing media (1:1 v/v)	Number of branches					
	First Season, 2003/2004			Second Season, 2004/2005		
	Green	Vareig.	Mean (B)	Green	Vareig.	Mean (B)
Clay+Sand	4.21	3.67	3.94	2.33	2.50	2.42
Clay+Sand+Vermic.	3.79	2.98	3.39	4.00	2.66	3.33
Clay+Sand+Peatmoss	3.76	4.09	3.88	4.33	3.34	3.84
Clay+Sand+Perlite	4.24	3.33	3.78	3.00	2.35	2.68
Clay+Peatmoss+Vermic	3.40	3.33	3.37	6.33	2.83	4.58
Clay+Peatmoss+Perlite	5.44	3.00	4.22	5.33	3.50	4.42
Mean (A)	4.14	3.38		4.22	2.86	
LSD at 5 % For A		0.63			0.47	
For B		0.44			0.33	
For Ax b		0.70			0.52	
	Length of branches (cm)					
Clay+Sand	19.00	15.67	17.34	26.82	16.53	21.68
Clay+Sand+Vermic.	19.33	16.33	17.83	23.00	19.72	21.36
Clay+Sand+Peatmoss	15.00	13.67	14.34	27.60	16.53	22.07
Clay+Sand+Perlite	18.67	14.33	16.50	23.33	18.85	21.09
Clay+Peatmoss+Vermic	24.33	21.67	23.00	29.52	21.16	25.34
Clay+Peatmoss+Perlite	24.33	17.00	20.67	27.97	18.27	23.12
Mean (A)	20.11	16.45		26.37	18.51	
LSD at 5 % For A		2.47			2.25	
For B		1.67			1.48	
For Ax b		2.63			2.38	

Fresh and dry weights of stem and branches

As shown in Table (5), in both seasons, there were significant differences in fresh weights of stem and branches between the two cvs., the Green cv. had heavier stems than the "Variegata" cv. Concerning the effect of growing

mixtures, it is clear that the mixture of clay + sand + perlite and clay + peatmoss + vermiculite in the first season and clay + sand + peatmoss and clay + peatmoss + vermic in the second one had a favorable effect on increasing the fresh weight of branches. The interaction effect revealed that using a mixture of clay + peatmoss + vermiculite and clay + peatmoss + perlite in the both seasons, were the most effective in increasing the fresh weight of the "Green" cv., whereas the "Variegata" cv. had no clear trend in this respect. Concerning the effect of growing mixtures on dry weight, the data clearly indicated that, in both seasons, there were significant differences in fresh weights of stem and branches between the two cvs., the Green cv. had heavier stems than the "Variegata" cv. It is clear that the mixtures of clay + sand + perlite, clay + peatmoss + vermiculite clay + peatmoss + perlite, in both seasons had a favorable effect on increasing the dry weight of branches. the interaction effect revealed that using a mixture of clay + peatmoss + perlite in the both seasons, was the most effective in increasing the fresh weight of the "Green" cv., whereas the "Variegata" cv. had no clear trend in this respect. El-Sallami (1996) on *Ficus benjamina*, found that plants grown in peat + clay or vermiculite produced high fresh weights

Table (5): Effect of growing media on fresh and dry weight of stems (gm) of *Ficus alii* cvs "Green" and "Variegata" during the two successive seasons, 2003/2004 and 2004/ 2005.

Growing media (1:1 v/v)	Fresh weight of branches (gm)					
	First Season, 2003/2004			Second Season, 2004/2005		
	Green	Vareig.	Mean (B)	Green	Vareig.	Mean (B)
Clay+Sand	17.13	15.08	16.11	20.84	18.45	19.65
Clay+Sand+Vermic.	19.00	14.07	16.54	23.07	20.85	21.96
Clay+Sand+Peatmoss	19.20	13.87	16.54	27.33	20.91	24.12
Clay+Sand+Perlite	18.95	15.78	17.37	24.58	18.29	21.44
Clay+Peatmoss+Vermic	22.96	16.82	19.89	30.60	19.19	24.90
Clay+Peatmoss+Perlite	27.10	14.48	20.79	32.83	21.77	27.30
Mean (A)	20.72	15.02		26.54	19.91	
LSD at 5 % For A		2.34			3.54	
For B		1.39			2.38	
For Ax b		3.55			4.47	
	Dry weight of branches (gm)					
Clay+Sand	5.27	5.47	5.37	5.22	5.23	5.23
Clay+Sand+Vermic.	6.09	4.77	5.43	6.26	7.40	6.83
Clay+Sand+Peatmoss	6.60	4.40	5.50	7.68	7.23	7.46
Clay+Sand+Perlite	6.24	4.77	5.51	8.39	6.68	7.54
Clay+Peatmoss+Vermic	7.09	5.82	6.46	7.94	6.16	7.05
Clay+Peatmoss+Perlite	8.22	4.88	6.55	9.59	7.52	8.56
Mean (A)	6.59	5.02		7.51	6.70	
LSD at 5 % For A		0.64			0.83	
For B		0.37			0.48	
For Ax b		0.90			1.18	

Fresh and dry weights of roots

Regarding the effect of growing media on fresh and dry weights of roots, the data in Table (6), indicated that in the both seasons the fresh weight of roots of the "Green" cv increased when plants were grown in the following mixtures of clay + sand + perlite and clay + sand, giving the values of 5.017, 4.277, 5.730 and 6.127 gm, respectively. The fresh weights of roots of the "Variegata" cv. was greatly increased when plants were grown in 5.460 clay + sand + peatmoss in the first season, and in clay + sand followed by clay + sand peatmoss in the second season.

Table (6): Effect of growing media on fresh and dry weight of roots (gm) of *Ficus alii* cvs "Green" and "Variegata" during the two successive seasons, 2003/2004 and 2004/ 2005.

Growing media (1:1 v/v)	Fresh weight of roots (gm)					
	First Season, 2003/2004			Second Season, 2004/2005		
	Green	Vareig.	Mean (B)	Green	Vareig.	Mean (B)
Clay+Sand	4.277	4.047	4.162	6.127	7.497	6.812
Clay+Sand+Vermic.	3.427	3.590	3.509	4.580	6.243	5.412
Clay+Sand+Peatmoss	2.933	5.460	4.197	3.617	7.100	5.359
Clay+Sand+Perlite	5.017	4.307	4.662	5.730	5.600	5.665
Clay+Peatmoss+Vermic	3.143	2.253	2.698	5.310	5.170	5.240
Clay+Peatmoss+Perlite	4.153	2.453	3.303	5.657	4.433	5.045
Mean (A)	3.825	3.685		5.170	6.007	
LSD at 5 % For A		N.S			0.66	
For B		0.38			0.47	
For Ax b		0.86			1.09	
	Dry weight of roots (gm)					
Clay+Sand	0.85	0.76	0.805	1.19	1.740	1.465
Clay+Sand+Vermic.	0.77	0.76	0.765	0.96	1.368	1.164
Clay+Sand+Peatmoss	0.58	0.85	0.715	0.67	1.464	1.067
Clay+Sand+Perlite	0.88	0.49	0.685	1.04	1.572	1.306
Clay+Peatmoss+Vermic	0.81	0.45	0.630	1.22	1.236	1.228
Clay+Peatmoss+Perlite	0.90	0.55	0.725	1.34	1.428	1.384
Mean (A)	0.80	0.64		1.07	1.468	
LSD at 5 % For A		0.19			0.17	
For B		0.15			0.14	
For Ax b		0.37			0.33	

Concerning the effect growing media on dry weight of roots, the data clearly indicated, in the first season, the fresh weight of roots of the "Green" cv increased when plants were grown in the following mixtures clay + sand, clay + sand + perlite and clay + peatmoss + perlite, giving the values of 0.85, 0.88 and 0.90 gm, respectively, whereas in the second season, using the mixture of clay + sand, clay + peatmoss + vermiculite and clay + peatmoss + perlite were the most effective in

increasing the dry weight of roots. in the first season, growing the seedling of the "Variegata" cultivar in the mixtures clay + sand + peatmoss gave the highest value of the dry weight of roots (0.85 gm), but in the second season, the heaviest dry weight was recorded with clay + sand (1.740 gm).several workers proved that using clay combined with vermiculite, sand or peatmoss increased the dry weight of roots, as Tillmann *et al.* (1994) on *Codiaeum variegatum* found that vermiculite was the most suitable medium for root growth, it gave the longest and heaviest roots Zaghloul *et al.* (1996) on *Philodendron domesticum* stated that peat alone or peat + sand (1:1) gave the greatest root fresh weights.

2-Effect on chemical constituents:

Pigments content

Data in Table (7) showed the effect of growing media on the contents of chlorophyll -a,-b and carotenoids in the leaves of the two cvs of *Ficus alii* . The results showed that in both seasons, clay + sand + vermiculite medium showed the highest content of chlorophyll–a (1.136 mg/gm F.W) in the leaves of "Green" cv., whereas the lowest content of chlorophyll -a (0.831 mg/gm F.W) in the leaves of "Geen" cultivar was recorded when plants were grown in clay + sand + perlite. The content of chlorophyll -a in the leaves of "Variegata" cultivar reached to the highest value (0.409 mg/gm F.W) when plants were grown in clay + sand + vermiculite in the first season, and clay + peat + vermiculite in the second one (0.408 mg/gm F.W) . The highest value of chlorophyll -b in the leaves of "Green" cultivar, was recorded with the mixture of clay + sand + perlite (0.788 mg/gm F.W) and with clay + sand in the second season. (0.525 mg/gm F.W) . On the other side,the content of chlorophyll -b in the leaves of the "Variegata" cultivar reached to the highest value (0.495 mg/gm F.W) when plants were grown in clay + sand + vermiculite in the first season, and clay + peat + vermiculite (0.524 mg/gm F.W) in the second one. In both seasons, the highest value of carotene in the leaves of "Green" cv., was recorded with the mixtures clay + sand + vermiculite (0.560 and 0.594 mg/gm F.W, respectively), whereas the highest content of carotene in the leaves of "Variegata" cv. was recorded with the mixture clay + sand + vermiculite (0.489 mg/gm F.W) in te first season, and the mixture of clay + sand + perlite (0.577 mg/gm F.W) in the second one . In this connection, El-Deeb (1999) on *Asplenium nidus* plants found that the mixture of peatmoss + sand + clay increased the content of leaf pigments, while Hassan (1996)on *Aspidistra elatior* plant reported that the plants grown in a mixture of peat + sand contained the highest value of chlorophyll a,b and carotenoids content. Saleh (2000) on *Ficus benjamina* "Starlight"indicated that peatmoss + sand + clay mixture decreased the content of carotenoids in the leaves .

N,P and K contents:

The responses of nitrogen content in the leaves, stem and roots of the two cvs of *Ficus alii* plants to the different growing media are presented in Tables (8 and 9). The results show that in the both seasons, clay + sand + perlite medium showed the highest content of nitrogen in the leaves and stems of the "Green" cultivar. whereas the highest content of carbohydrates in the roots was recorded when plants were grown in clay + peat + perlite. The content of carbohydrates in the leaves, stem as well as roots of "Variegata" cultivar reached to the highest values when plants were grown in clay + sand + peatmoss and clay + sand + perlite in the first season, and clay + sand + perlite in the second one Similar findings were

reported by Mansour (1985) on *Aspidistra lurida*plant found that the plants grown in peat + sand mixture contained higher N in leaves. Goma (2000) on *Ornithogalum thyrsoides* plants, they stated that using a mixture of sand + composted leaves medium increased the content of nitrogen. On the other hand, on tuberose plant, Mohamed (1994) reported that growing the plants in a mixture of loam + sand + vermiculite (1:1:1v/v/v) resulted in more considerable increase in N content

Table (7): Effect of growing media on the content of chlorophyll a,b and carotene (mg/gm F.W.) in the leaves of *Ficus alii* cvs "Green" and "Variegata", during seasons of 2003/2004 and 2004/ 2005

Growing media	*Ficus alii* cv. "Green"			
	First season 2003/2004			
	Chl-a	Chl-b	Chl.a+b	Carotene
Clay+Sand	1.036	0.532	1.568	0.284
Clay+Sand+Vermic.	1.118	0.538	1.656	0.426
Clay+Sand+Peatmoss	0.708	0.885	1.593	0.256
Clay+Sand+Perlite	1.136	0.599	1.735	0.560
Clay+Peatmoss+Vermic	0.841	0.788	1.629	0.524
Clay+Peatmoss+Perlite	0.831	0.646	1.477	0.236
	Second season 2004/2005			
Clay+Sand	0.843	0.525	1.368	0.268
Clay+Sand+Vermic.	0.889	0.352	1.241	0.365
Clay+Sand+Peatmoss	0.603	0.412	1.015	0.324
Clay+Sand+Perlite	0.964	0.161	1.125	0.594
Clay+Peatmoss+Vermic	0.817	0.267	1.084	0.435
Clay+Peatmoss+Perlite	0.837	0.196	1.033	0.379
	Ficus alii cv. "Variegata"			
	First season 2003/2004			
Clay+Sand	0.343	0.309	0.652	0.369
Clay+Sand+Vermic.	0.356	0.362	0.718	0.423
Clay+Sand+Peatmoss	0.297	0.229	0.526	0.403
Clay+Sand+Perlite	0.409	0.495	0.904	0.443
Clay+Peatmoss+Vermic	0.391	0.326	0.717	0.489
Clay+Peatmoss+Perlite	0.366	0.250	0.616	0.312
	Second season 2004/2005			
Clay+Sand	0.348	0.344	0.692	0.209
Clay+Sand+Vermic.	0.295	0.297	0.592	0.289
Clay+Sand+Peatmoss	0.104	0.451	0.555	0.577
Clay+Sand+Perlite	0.393	0.400	0.793	0.421
Clay+Peatmoss+Vermic	0.408	0.524	0.932	0.385
Clay+Peatmoss+Perlite	0.227	0.391	0.618	0.357

Concerning the effect of media on P-content, in both seasons, as shown in Table (8), growing the plants in a mixture of clay + sand + perlite increased P content in the leaves to the highest value, whereas, the mixture of clay + peat +

vermiculite increased the P content in the stems of the "Green" cv. On the other side, the highest phosphorus content the different plant parts of the "Variegata" variety was ecorded in plants grown in clay + sand + perlite. In this regard, Goma (2000) on *Ornithogalum thyrsoides* plant stated that composted plus sand significantly increased the P% in foliage .

Table (8): Effect of different growing media on the contents of phosphorus and total carbohydrates in the different parts of "Green" and *"Variegata"* cvs of *Ficus* alii plants during seasons of 2003/2004 and 2004/ 2005

Growing media	N% D.W. in the different parts of *F.alii* cv."Green"					
	First Season, 2003/2004			Second Season, 2004/2005		
	Leaves	Stem	Roots	Leaves	Stem	Roots
Clay + sand	1.53	1.02	1.15	1.29	1.02	0.99
Clay + sand + peatmoss	1.57	1.38	1.84	1.63	1.15	0.82
Clay + sand + perlite	2.00	1.53	1.88	1.96	1.37	0.94
Clay + sand + vermiculite	1.46	1.08	1.40	0.98	0.70	0.69
Clay + peat + vermiculite	1.94	1.98	1.64	1.48	1.39	1.10
Clay + peat + perlite	1.76	1.38	1.97	1.36	0.94	1.34
N%D.W. in the different parts of *F.alii* cv."Variegata "						
Clay + sand	1.27	0.80	0.95	1.12	0.94	0.99
Clay + sand + peatmoss	1.59	1.37	0.98	1.53	0.94	1.23
Clay + sand + perlite	1.46	1.23	0.98	1.95	1.50	1.33
Clay + sand + vermiculite	1.25	0.97	0.90	1.39	1.26	1.10
Clay + peat + vermiculite	1.36	0.99	0.82	0.98	0.97	0.90
Clay + peat + perlite	1.35	0.96	0.91	1.58	1.21	0.88
P %D.W. in the different parts of *F.alii* cv."Green"						
	First season 2003/2004			Second season 2004/2005		
Clay + sand	0.414	0.290	0.211	0.287	0.274	0.223
Clay + sand + peatmoss	0.426	0.405	0.270	0.447	0.175	0.164
Clay + sand + perlite	0.571	0.333	0.452	0.523	0.225	0.207
Clay + sand + vermiculite	0.354	0.316	0.274	0.219	0.175	0.110
Clay + peat + vermiculite	0.557	0.583	0.139	0.333	0.490	0.261
Clay + peat + perlite	0.536	0.405	0.321	0.481	0.249	0.346
P %D.W. in the different parts of *F.alii* cv."Variegata"						
Clay + sand	0.538	0.156	0.363	0.312	0.291	0.223
Clay + sand + peatmoss	0.502	0.181	0.190	0.278	0.219	0.230
Clay + sand + perlite	0.563	0.350	0.304	0.511	0.568	0.498
Clay + sand + vermiculite	0.401	0.215	0.232	0.428	0.452	0.388
Clay + peat + vermiculite	0.321	0.223	0.207	0.249	0.342	0.274
Clay + peat + perlite	0.485	0.223	0.236	0.478	0.426	0.143

The effect of media on K-content, revealed that in both seasons Table (9), growing the plants in a mixture of Clay + sand + peatmoss increased K content in the leaves of the "Green" cv. The highest K- value in the leaves of

"Variegata", recorded with the mixture of clay + sand + vermiculite, whereas, growing the plants on clay + peat + vermiculite mixture increased the K- content in the stems . El-Sallami (1996) on *Ficus benjamina*, found that the mixture of peat + clay or vermiculite increased the leaf contents of N, P, K, Mg. Saleh (2000) on *Ficus benjamina* "Starlight" indicated that peatmoss + sand + clay mixture increased the contents of N, P and K.

Table (9): Effect of different growing media on the contents of potassium and total carbohydrates % D.W in the different parts of "Green" and "Vareigated" cvs of *Ficus alii*, during seasons of 2003/2004 and 2004/ 2005

Growing media	K% D.W. in the different parts of *F.alii* cv. "Green":					
	First Season, 2003/2004			Second Season, 2004/2005		
	Leaves	Stem	Roots	Leaves	Stem	Roots
Clay + sand	0.368	0.320	0.208	0.572	0.488	0.636
Clay + sand + peatmoss	0.428	0.356	0.256	0.640	0.524	0.360
Clay + sand + perlite	0.400	0.316	0.220	0.520	0.572	0.348
Clay + sand + vermiculite	0.392	0.472	0.220	0.632	0.324	0.492
Clay + peat + vermiculite	0.400	0.320	0.356	0.308	0.508	0.388
Clay + peat + perlite	0.392	0.328	0.408	0.588	0.596	0.380
K %D.W. in the different parts of F.alii cv. "Variegata"						
Clay + sand	0.288	0.236	0.256	0.476	0.356	0.378
Clay + sand + peatmoss	0.452	0.232	0.220	0.456	0.388	0.324
Clay + sand + perlite	0.308	0.268	0.212	0.488	0.360	0.380
Clay + sand + vermiculite	0.460	0.288	0.272	0.376	0.456	0.388
Clay + peat + vermiculite	0.232	0.292	0.220	0.576	0.368	0.392
Clay + peat + perlite	0.396	0.288	0.236	0.492	0.424	0.332
Total carbohydrates %D.W. in the different parts of *F.alii* cv. "Green"						
	First season 2003/2004			Second season 2004/2005		
Clay + sand	21.79	28.70	22.65	24.72	31.85	21.69
Clay + sand + peatmoss	24.57	27.64	18.19	23.75	18.88	24.30
Clay + sand + perlite	21.40	20.43	16.53	18.66	21.20	22.48
Clay + sand + vermiculite	23.07	21.40	27.36	20.24	19.30	30.52
Clay + peat + vermiculite	20.46	24.86	28.51	19.59	22.32	28.63
Clay + peat + perlite	25.42	20.92	19.36	28.43	30.46	26.86
Total carbohydrates %D.W. in the different parts of *F.alii* cv. "Variegata"						
Clay + sand	21.08	22.46	23.45	18.15	29.08	26.15
Clay + sand + peatmoss	29.88	28.59	26.65	19.41	27.48	27.54
Clay + sand + perlite	24.66	18.48	20.98	25.51	22.93	22.89
Clay + sand + vermiculite	23.40	26.43	29.44	20.49	29.49	29.69
Clay + peat + vermiculite	28.68	24.25	29.44	30.59	28.43	32.24
Clay + peat + perlite	25.21	29.47	25.72	21.77	25.16	29.18

Total carbohydrates content (%DW):

Data in Table (9) showed the effect of growing media on the contents of carbohydrates In the different parts of *Ficus allii* plants. The results show that in both seasons, growing the "Green" cv., of *Ficus alii* in clay + peat + perlite, clay

+ sand as well as clay + sand + peatmoss markedly increased the content of carbohydrates in the leaves of "Green" cultivar, whereas the lowest content of carbohydrates -a in the leaves of "Geen" cultivar was recorded when plants were grown in clay + sand + perlite. The content of carbohydrates -a in the leaves of "Variegata" cultivar reached to the highest value when plants were grown in clay + sand + vermiculite in the first season, and clay + peat + vermiculite in the second one. The highest value of carbohydrates in the leaves of "Green" cultivar, was recorded with the mixture of clay + sand + perlite and with clay + sand in the second season. On the other side, the content of carbohydrates in the leaves of "Variegata" cultivar reached to the highest value when plants were grown in clay + sand + vermiculite in the first season, and clay + peat + vermiculite in the second one. In both seasons,the highest value of carbohydrates in the roots of "Green" and "Variegated" cvs., was recorded with the mixture containing vermiculite. In this connection, El-Deeb (1999) on *Asplenium nidus* plants found the mixture of peatmoss + sand markedly increased the content of carbohydrates in the leaves. El-Sallami (1996) on *Ficus benjamina*, found that media composed of peat + clay or vermiculite produced high leaf contents of carbohydrates. Saleh (2000) on *Ficus benjamina* "Starlight", indicated that peatmoss + sand + clay mixture resulted in the highest total content of carbohydrates .

REFERENCES

Abo-Hassan, AA; Zeawail, EF; and Souidan, AA (1994): Effect of different planting substrates and dates on rooting potential of *Ficus infectoria* cuttings.Annals of-Agricultural-Science,-Moshtohor. 1994, 32: 2, 973-986.

El-Deeb, E.A (1999): Effect of mineral nutrition, planting media and light on some foliage plants. M.Sc.Thesis, Fac.Agric., Cairo Univ.

El-Sallami, .H. (1996): Response *of Ficus benjamina* L. to different potting media and doses of nutrient solution. Assiut J. Agric. Sci., 27: 3, 61-76.

Fahmy, R. (1970): Qantitve methods for organic compainds Determent Mination in plant tisues .Dar-El-Taawen plus .

Garcia, C.; Alcantar, G; Cabrera, R.; Gavi, R. and Volke, H.(2001): Substrate evaluation for container production of *Epipremnum aureum* and *Spathiphyllum wallisii* Terra. 2001, 19: 3, 249-258.

Goma, S.A.(2000): Physiological studies on polianthes and ornithogolum thyrsoides bulbs. Ph.D Thesis,Fac. Agric. Kafr El-Sheikh,Tanta Univ.

Hall, DA; Smith, C.A. and Serra, G.; Tognoni, F. and Leoni, S. (1994): An evaluation of perlite-based substrates for ornamental pot plant production. Acta-Hort No. 361, 486-490.

Hassan, A.M. (1996): Effect of chemical fertilization, growing media and gibberellic acid on growth of Aspidistra elatior . M.Sc.Thesis, Fac.Agric., Cairo Univ.

Herbert, D. Philipps, J. and Strange, R. (1971): Determination of total carbohydrates. Methods in Microbiologgy, 58:259-344.

Ishtiaq, M. and Fozia-Khattak; Abdur-Rab (1995): Effect of different media on different rubber plant spp. Cutting. Sarhad-J. Agriculture.11: 4, 463-466.

Karakir, N; Misirli, A; Seferoglu, G and Kara, S. (1994): Research on the rooting of fig cuttings. I. Effect of different media. Ege-Universitesi-Ziraat-Fakultesi- Dergisi. 1994, 31: 2-3, 79-84.

Kock, F. and Mc Meekin, T.L. (1924): Methods of chemical analysis determination of total nitrogen in plant.J Amer.chem.Soc., 46:2066.

Mansour, H.A. (1985): Effect ofsome cultural practices on the production of Aspidistra lourida and two Chamaedorea spp. M.Sc. Thesis, Fac. Agric., Cairo Univ.

Matysiak, B and Nowak, J.(1998): Acclimatization and the growth of *Ficus benjamina* microcuttings as affected by carbon dioxide concentration.Jour. Hort. Sci.and Biotechnology. 73: 2, 185-188.

Mohamed, M.I. (1994). Effect of chemical fertilization and different growing media on growth, flowering and chemical composition of tuberose (*Polianthes tuberose* L.) Plant. M.Sc. Thesis, Fac. of Agric., Cairo Univ., Egypt.

Mukhtar, A, Sher, R.; Muhammad, I. and Mohammad, I. (1996): Studies on aerial and subterranean plant parts of Ficus elastica as affected by different soil media.

Papafotiou, M; Asimakopo, V; Kovaeou,I; Phsyhalou, M; Kargas, G. (2001): Cotton gin trash compost as growing medium ingredient for the production of pot ornamentals. Gartenbauwissenschaft. 66: 5, 229-232.

Piper, C .(1947): Soil and Plant Analysis . The University of Adelaida: 252-275.

Ryu, B.;Lee, J., Ryu, B. and Lee, J.S.(1996): Effect of media compositions made by several organic materials on the growth of *Ficus benjamina*.Jour.Korean-Soc.Hort.Sci. 37: 2, 292-298;

Saleh, S.I.I. (2000): Effect of different planting media on the growth and chemical composition of *Ficus benjamina*"Starlight"plants grown under two locations"outdoor and plastichouse"conditions

Singh, D.R and Nair, S.A. (2003): Standardization of rooting media for cuttings of certain house plants. Jour. Ornamental-Hort. New-Series. 6: 1, 78-79.

Singh, P; Sidhu, G.S; Misra, R.L. and Sanyal, M.(2002): Effect of potting media on the growth of pot plants.Proceed.National Symp.Indian-floriculture new-millenium,Bangalore,25-27-February, 355-356

Son, K.I; Paek, K., Park, W. and Kim, T.(2000):Plant growth and wilting of indoor plants, and water content and rehydration of media irrigated by wick as affected by medium composition. Jour. Korean Soc. Hort. Sci. 41: 4, 429-434;

Soyergin, S; Genc, C and Ertan, N.(1994): Determination of the potting mixture and fertilization of *Dieffenbachia Camilla* and *Codiaeum Norma*. Bahce, 23: 1-2, 33-42.

Stamps, RH and Evans, M.R.(1999):Growth of *Dracaena marginata* and *Spathiphyllum* 'Petite' in sphagnum peat- and coconut coir dust-based growing media

Steel, R.G. and Torrie, S.H. (1980):Principles and Procedures of Statistics .Second edition, McGrow-Hall Inc.

Tillmann, MAA; Cavarani, C. Piana, Z. and Minami, K.(1994): Comparison of several substrates for rotting of croton (*Codiaeum variegatum* L.) cuttings. Scientia-Agricola. 51: 1, 17-20.

Treder, J; Matysiak, B; Nowak, JS; Nowak,J and Papadopoulos, A.P.(1999): The effects of potting media and concentration of nutrient solution on growth and nutrient content of three Ficus species cultivated on ebb-and-flow benches.Acta-Horticulturae. No. 481, 433-439.

Trough, E. and Mayer, A. (1939): Improvement in deiness colorimetric method for phosphorus and arsenic Ind. Eng. Chem. Anal. F.J.1: 136-139

Zaghloul, M; Atta-Alla, H; Waly, AK. and Khattab, S.H.(1996): Micropropagation of some ornamental plants. 2. In vitro culture, establishment and effect of potting mixture and NPK fertilization on ex vitro of *Philodendron domesticum* L Annals Agric .Sci. Moshtohor. 34: 2, 711-725. .

Ziaullah; N,A; Syed, A.; Noorul, A.; Arshad, M; Ali, N; Asghar, S and Amin, N (1999): Genotypic variation in two *Cordyline* species and their performance in different growth media. Sarhad. J. Agric. 15: 3, 177-179.

Wazir, M.G.; Amin, N.U.; Ishtiaq, M; and Khan, I.A.(2003): Effects of different soil media on the growth of *Dracaena deremensis* var. Janet Craige cuttings.Sarhad-Journal-of-Agriculture., 19: 1, 31-34.

تأثير بيئة النموعلى النموالتركيب الكيماوى لنباتات الفيكس إلياى

محمد عبد الخالق الخطيب، عفت إسماعيل المعداوى، أسماء بدر الدين العطار
قسم الزينه ــ كلية الزراعة جامعة القاهره

أجريت هذه الدراسة بالصوب الزجاجية بقسم بساتين الزينة- كلية الزراعة- جامعة القاهرة خلال موسمى ٢٠٠٣/٢٠٠٤، ٢٠٠٤/٢٠٠٥ بهدف دراسة تاثير اوساط الزراعة على النمو والتركيب الكيماوي لصنفين من الفيكس الياي "الاخضر"و"المبرقش". واوضحت النتائج ان مخلوط الطين والبيتموس والبيرليت ومخلوط الطين والرمل والبيتموس وكذلك مخلوط الطين والرمل والفرميكيوليت اعطت اكبر زيادة في طول النباتات. للصنفين . بينما مخلوط الطين والبيتموس والبيرليت كان الاكثر تاثيرا في زيادة سمك الساق للصنف الاخضر ومخلوط الطين والرمل والبيرليت للصنف المبرقش- ووجد ان الصنف الاخضر كان اكثر تكوينا للاوراق والافرع من المبرقش. وان استخدام مخلوط الطين والبيتموس والبيرليت وكذلك الطين والبيتموس والفرميكيوليت ادت الي زيادة تكوين الاوراق على الصنف الاخضر والمبرقش علي التوالى.

- ووجد ان زراعة الصنف الاخضر في مخلوط الطين والرمل والبيرليت والصنف المبرقش في مخلوط الطين والبيتموس والفرميكيوليت ادي الي زيادة مساحة الاوراق. للصنفين وكان مخلوط الطين والبيتموس والبيرليت وكذلك الطين والبيتموس والفرميكيوليت الاكثر تاثيرا في زيادة الاوزان الطازجة للاوراق للصنفين. وادي استخدام مخلوط الطين والبيتموس والفرميكيوليت الي زيادة الاوزان الجافة لاوراق الصنف الاخضر بينما مخلوط الطين والبيتموس والبيرليت اعطي اكبر زيادة في الاوزان الجافة لاوراق الصنف المبرقش.

- واوضحت النتائج ان افرع الصنف الاخضر كانت اكثر وزنا وطولا من المبرقش وان مخلوط الطين والبيتموس والفرميكيوليت ادي الي زيادة عدد وطول الافرع للصنف الاخضر. في حين ان مخلوط الطين والرمل والبيتموس ومخلوط الطين والبيتموس والفرميكيوليت كان لها اكبر الاثر في زيادة عدد وطول الافرع للصنف المبرقش ·وادي استخدام مخلوط الطين الرمل والبيرليت زيادة الوزن الطازج للجذور للصنف الاخضر - بينما مخلوط الطين والرمل والبيتموس ادي الي زيادة الوزن الطازج للجذور للصنف المبرقش·
- واوضحت النتائج ايضا مخلوط الطين والرمل والفرميكيوليت ادي الي زيادة محتوي الكلوروفيل في اوراق الصنفين. وان مخلوط الطين والبيتموس والبيرليت كان اكثر تاثيرا في زيادة تراكم الكربوهيدرات في اوراق الصنف الاخضر ومخلوط الطين والرمل والفرميكيوليت ادي الي ريادة تراكم الكربوهيدرات في اوراق الصنف المبرقش · ووجد ان واضافة الفيرميكيوليت الي اوساط الزراعة ادي الي زيادة تراكم الكربوهيدرات في جذور الصنفين ·وان مخلوط الطين والرمل والبيرليت اعطي اكبر محتوي نتروجيني باوراق وسيقان الصنفين· وكانت هناك زيادة في محتوي البوتاسيوم باوراق الصنف الاخضر عند نموه في وسط من الطين والرمل والبيتموس كما زاد محتوي البوتاسيوم باوراق الصنف المبرقش عند نموه في وسط من الطين والرمل والفيرميكيوليت.