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Evaluation Effect of Different Maintenance Systems on some Ornamental Plants in the North-Western Coast of Egypt

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ABSTRACT

The present study was carried out in North-Western Coast of Egypt in summer resorts of Marina during the two seasons of 2012/2013 and 2013/2014 to study three maintenance systems (technical system, internal management system and specialized company system) on three ornamental plant species (*Ficus retusa*, *Hibiscus rosa sinensis*, and *Vinca rosea*) which were chosen in Marina resorts for evaluation, taking in consideration the effect of these maintenance systems throughout the four climatic seasons of the year on the tested plants. Evaluation of these factors included some plant growth and quality parameters such as plant height, crown diameter, stem diameter and plant performance. The results showed that among the three used maintenance systems, the specialized company system was the most effective followed by the internal management system, then the technical system which gave the lowest values in all investigated parameters. Moreover, the best results were measured in the summer season followed by spring.

INTRODUCTION

A resort is a popular place of entertainment and recreation at which public overnight accommodations are available and if there is no lodging facilities are available; properly it would not be considered as a resort **(**Wall, 2001**)**.Resorts vary widely in their character and size **(**Walton, 2000**)**. Resort is not only a place of sun, sand and sea water but also a place with green area. Concerning green area it will affect the resort evaluation either for owners or tourists not as a source of pleasure but also as an income source. In a questionnaire about the landscape design on some resorts in Turkey, 23% of tourists stated that it would have been better if more trees and fewer constructional elements were used (Oğuz *et al.*, 2010). In addition, green area share many positive effects; on adults spending time in neighborhood parks, contribute in better mental health, higher levels of physical activity, better overall well-being, and lower levels of stress (Bratman *et al.*, 2012; Mc Cormack *et al.*, 2010 and Roe *et al.*, 2013) and for young people provide numerous benefits for mental health, physical health, cognitive functioning, personal well-being, and socio-emotional development (Chawla, 2015 and Lee *et al.*, 2015) .Ornamental plants are also used to control erosion, restore disturbed landscapes, water consumption, reduce energy and improve the aesthetic quality of recreational areas, rural and urban landscapes, interiorscapes and commercial sites (Cassaniti *et al.*, 2009).Little information is available about the percent of green areas or maintaining it. Beach resort developments in Egypt face problems due to inability a part of stakeholders to make sound decisions about sustainable designs and a lack of comprehensive decision-making to assist them (Abdel-Latif *et al.*, 2012).On the other side, gardens need from 2 to 3 years of care to rise up plants till plants take the final form. Even after plant maturity, gardens beauty depends on care and maintenance of gardens and the ability of the garden owners to spend money for maintaining their gardens. Maintenance systems include the programs of irrigation, fertilization, pruning, pest management and weeding.

Few studies were done on green area in resorts of the North-Western Coast of Egypt. So, the aim of the present investigation was to evaluate three different maintenance systems and their components on the growth parameters of some ornamental plants during the four climatic seasons during 2012/2013 and 2013/2014 years.

MATERIALS AND METHODS

The present investigation was carried out at the North-Western Coast of Egypt in summer resorts of Marina during the two successful years of 2012/2013 and 2013/2014. The present work aimed to study the green maintenance systems in these resorts and their components. There were five maintenance systems. We suggest names for these systems as follows for ease of use namely:

A. Contractor and ordinary worker served green area (we suggested its name as contractor system).
B. Technical and ordinary workers served green area (we suggested its name as technical system).
C. Engineer, technician and farm workers served green area(we suggested its name as internal management system) .
D. Specialized company (Consultant or supervisor, engineer, technicians and agricultural worker) served green area using provisional program (we suggested its name as specialized company system) .
E. A government department supervises a maintenance company served green areas) we suggested its name as governmental management system.

The chosen maintenance systems are three (technical system- internal management system and specialized company system) these maintenance systems look like many types of maintenance systems of resorts and widely expaned along the coast as a sample for the study , to evaluate and choose the best of them.

The components of each maintenance system were shown in Table (1), and the data were recorded throughout the four climatic seasons (autumn, winter, spring and summer) of 2012/2013 and 2013/2014 years. These three maintenance systems differ from each other in the responsible for maintenance, method of irrigation and fertilization. The investigated plant species were, *Ficus retusa* (tree), *Hibiscus rosa sinensis* (shrub) and *Vinca rosea* (Perennial).

Table 1. The components of the three chosen maintenance systems

System Treatments	Technical system	Internal management system	Specialized company system
Irrigation -method -quantity	-manual by workers using the hose -10L/m^2/day	-sprinkle -12L/m^2/day	-sprinkle and dripping -16L/m^2/day
Fertilization	Nitrogen (urea)48.8 unit/fed in May – June – July- August)	-N+P+K+ Traceelements(20+20+20 + Trace elements)(2kg/fed) in July and August. -Nitrogen (Nitrate) (16.75 unit/fed) in May– June- July- August. -Phosphorus (super) (8.25 unit/fed) in March	-Potassium (potassium nitrate) (24unit/fed) in March -Phosphorus (super). (8.25 unit/fed) in November. -Nitrogen (sulphate). (10.5 unit/fed) in November and January. -Nitrogen (urea). (23.25 unit/fed) in March, May, July and September.
pruning -trees& shrubs	-Every 3 months December, 20th -March,20th June, 20th and September, 20th	-Every 3 months December, 20th -March, 20th June, 20th and September, 20th	-Every 3 months December, 20th -March, 20th June, 20th and September, 20th
Weeding	Every 3 months	Every 3 months	Every 1.5 months
Pest management	According to needs	Only once and(according to needs)	For insects and fungi (April-July- August –September)
Maintenance of irrigation system	Replacing the hose	Every 3 months maintaining irrigation system	Every month maintaining all parts of irrigation system
Responsible for maintenance	Technician + Operator	Internal management	Specialized company

The following measurements were taken in the four climatic seasons at December 15th, March15th, June15th and September15th:

1. **Increase in plant height (cm) :** was measured before and after pruning the plants.
2. **Increase in crown diameter (cm) :** was measured as an average of two perpendicular dimensions for each plant before and after pruning the plant and the measure between that mean increases in crown diameter, except for *Hibiscus rosa sinensis* (hedge plant).Crown diameter was measured in cm as an average of two widths for each plant before and after pruning the plant and the measurements between that mean increases in crown diameter.
3. **Increase in stem diameter (cm) :** was measured exactly above the surface of the soil before and after pruning the plant and the measurements between that mean increases of stem diameter.
4. **Plant performance :** was estimated through five grades according to the morphological state of plant (leaves) as follows:

*** 9 = Good-healthy - No abscission- Pure color.**
*** 7 = Slightly wilting - Slightly abscission -Ordinary color.**
*** 5 = More slightly -Partial abscission -Change in color.**
*** 3 = Wilting -More abscission -More change in color.**
*** 1 = Wilting - Abscission -Abnormal color.**

Statistical analysis:

A split plot design was used in that experiment. Since, the maintenance systems (technician system, internal management system and specialized company system) were the main plot and the climatic seasons (autumn, winter, spring and summer) were the sub-plot. In addition, in each maintenance system four gardens were selected and five plants in each were randomly selected and the means of them were considered a replicate to form 4 replicates in each maintenance system. Mean comparison was achieved by LSD at 5% method according to Snedecor and Cochran (1974).

RESULTS

Effect of the chosen maintenance systems on growth parameters of investigated plant species:

1- Increase in plant height (cm)

Data presented in Table (2) show that the increase in plant height of *Ficus retusa, Hibiscus rosa sinensis* and *Vinca rosa* heights was influenced by the three maintenance systems and four seasons during the two years of the experiment. Moreover, the highest increase in plant height values was in summer followed by spring then winter and autumn with the least values. Also, there were non-significant differences in plant height values of all tested plants during the two years in winter and autumn seasons.

2- Increase in crown diameter (cm)

Data presented in Table (3) show that the increase in crown diameter of *Ficus retusa, Hibiscus rosa sinensis* and *Vinca rosa* was influenced by the three maintenance systems and the climatic four seasons during the two years of experiment. Moreover, the highest increases in plant crown diameter values were in summer followed by spring then winter and autumn with the least values. Also, there were non-significant differences in crown diameter values of all tested plants during the two experimental years in winter and autumn seasons.

Table 2. Effect of maintenance systems, climatic seasons and their interaction on the increase in plant height (cm) of *Ficu sretusa* ,*Hibiscus rosa sinensis* and *Vinca rosa* in resorts of Marina during 2012/2013 and 2013/2014 seasons.

Seasons (B) / Maintenance (A)	*Ficus retusa*										*Hibiscus rosa sinensis*										*Vinca rosa*									
	2012/2013					2013/2014					2012/2013					2013/2014					2012/2013					2013/2014				
	Aut	Win	Spr	Sum	Mean of A	Aut	Win	Spr	Sum	Mean of A	Aut	Win	Spr	Sum	Mean of A	Aut	Win	Spr	Sum	Mean of A	Aut	Win	Spr	Sum	Mean of A	Aut	Win	Spr	Sum	Mean of A
Technician system	4.55	7.40	19.18	30.05	15.29	5.05	7.93	20.20	32.1	16.3	2.82	4.42	13.00	17.07	9.33	3.27	4.95	14.05	19.17	10.36	25.3	26.2	28.7	31.9	28.0	26.58	27.25	29.80	31.00	28.11
Internal management system	5.95	8.99	24.08	35.07	18.35	6.65	9.95	25.7	37.05	19.59	3.80	5.47	14.57	20.26	11.09	4.30	6.47	16.67	23.00	12.11	24.9	25.9	28.9	35.0	28.1	25.98	27.05	30.03	34.13	29.29
Specialized company system	11.60	17.07	42.35	69.25	35.56	13.04	18.45	44.03	69.60	36.28	8.08	14.13	38.30	51.18	28.07	10.05	15.45	40.88	56.58	30.63	25.78	27.70	33.05	38.88	31.35	27.02	29.15	34.75	41.92	33.21
Mean of (B)	7.37	11.15	28.56	42.78		8.25	12.11	29.98	46.45		5.16	8.01	21.96	29.50		5.93	8.96	23.67	32.92		25.33	26.60	30.22	34.93		26.46	27.82	31.54	36.35	
L.S.D at 5%	A	B	AB			A	B	AB			A	B	AB			A	B	AB			A	B	AB			A	B	AB		
	3.44	1.85	4.09			3.60	2.03	4.36			6.96	2.70	7.51			7.65	2.98	8.26			3.39	0.68	3.43			2.99	1.33	3.33		

Table 3. Effect of maintenance systems, climatic seasons and their interaction on the increase in crown diameter (cm) of *Ficus retusa*, *Hibiscus* and *Vinca rosa* in resorts of Marina during 2012/2013 and 2013/2014 seasons.

Seasons (B) / Maintenance(A)	*Ficus retusa*										*Hibiscus rosa sinensis*										*Vinca rosa*									
	2012/2013					2013/2014					2012/2013					2013/2014					2012/2013					2013/2014				
	Aut	Win	Spr	Sum	Mean of A	Aut	Win	Spr	Sum	Mean of A	Aut	Win	Spr	Sum	Mean of A	Aut	Win	Spr	Sum	Mean of A	Aut	Win	Spr	Sum	Mean of A	Aut	Win	Spr	Sum	Mean of A
Technician system	3.38	5.38	11.78	20.32	10.21	3.45	5.70	12.50	21.20	10.71	2.60	4.13	10.18	15.12	8.01	2.62	7.47	10.72	16.20	8.51	24.25	25.07	27.55	30.65	26.88	25.30	26.15	28.62	31.72	27.95
Internal management system	3.98	6.25	15.40	23.40	12.26	4.20	6.58	15.98	24.02	12.89	2.80	4.25	11.40	15.95	8.59	3.00	4.58	12.00	17.25	9.22	26.45	29.52	32.22	36.00	31.37	29.80	30.88	33.48	37.18	32.33
Specialized company system	9.05	13.65	32.25	45.20	25.08	9.26	14.12	33.13	47.84	25.59	6.35	10.45	25.37	35.36	18.49	7.32	9.97	24.15	34.50	18.99	28.78	30.65	35.80	42.45	34.41	30.05	32.08	37.50	45.95	35.89
Mean of (B)	5.47	8.49	19.80	29.64		5.64	8.80	20.21	31.22		3.96	6.27	14.98	21.54		4.32	6.34	15.64	22.65		27.16	28.42	31.89	36.36		28.31	29.65	33.20	37.62	
L.S.D at 5%	A		B	AB		A		B	AB		A		B	AB		A		B	AB		A		B	AB		A		B	AB	
	3.47		1.59	3.91		3.61		1.83	4.20		2.54		0.89	2.69		2.20		0.81	2.35		5.28		0.40	5.28		5.32		0.38	5.32	

3- Increase in stem diameter (cm)

Data presented in Table (4) show the increase in *Ficus retusa, Hibiscus rosa sinensis* and *Vinca rosa* stem diameter as influenced by the three maintenance systems and four seasons during the two years experiments. Moreover, the highest increase in plants stem diameter value was in summer followed by spring then winter and autumn with the least values. Also, there were non-significant differences in plant stem diameter values of all tested plants in the two years in winter and autumn seasons.

Table 4. Effect of maintenance systems, climatic seasons and their interaction on increase in stem diameter (cm) of *Ficus retusa, Hibiscus rosa sinensis* and *Vinca rosa* in resorts of Marina during 2012/2013 and 2013/2014 seasons.

Seasons (B) / Maintenance(A)	*Ficus retusa*										*Hibiscus rosa sinensis*										*Vinca rosa*									
	2012/2013					2013/2014					2012/2013					2013/2014					2012/2013					2013/2014				
	Aut	Win	Spr	Sum	Mean of A	Aut	Win	Spr	Sum	Mean of A	Aut	Win	Spr	Sum	Mean of A	Aut	Win	Spr	Sum	Mean of A	Aut	Win	Spr	Sum	Mean of A	Aut	Win	Spr	Sum	Mean of A
Technician system	0.11	0.16	0.32	0.50	0.27	0.11	0.16	0.35	0.56	0.29	0.07	0.11	0.22	0.37	0.19	0.07	0.11	0.25	0.43	0.21	0.43	0.47	0.55	0.66	0.52	0.45	0.49	0.57	0.66	0.54
Internal management system	0.13	0.18	0.39	0.59	0.32	0.13	0.18	0.44	0.67	0.35	0.07	0.11	0.25	0.36	0.20	0.07	0.11	0.26	0.44	0.22	0.50	0.54	0.65	0.77	0.62	0.52	0.56	0.67	0.79	0.64
Specialized company system	0.26	0.36	0.76	1.18	0.64	0.27	0.39	0.85	1.28	0.70	0.17	0.25	0.48	0.74	0.41	0.20	0.30	0.55	0.86	0.48	0.50	0.59	0.77	1.00	0.71	0.52	0.64	0.82	1.07	0.76
Mean of (B)	0.16	0.23	0.49	0.75		0.17	0.24	0.54	0.83		0.10	0.16	0.31	0.49		0.11	0.17	0.35	0.57		0.48	0.53	0.66	0.81		0.50	0.56	0.69	0.84	
LSD at 5%	A		B	AB		A		B	AB		A		B	AB		A		B	AB		A		B	AB		A		B	AB	
	0.04		0.03	0.05		0.066		0.037	0.080		0.081		0.033	0.088		0.080		0.037	0.090		0.130		0.013	0.130		0.133		0.017	0.133	

4- Plant performance

Data presented in Table (5) show that improvements in *Ficus retusa, Hibiscus rosa sinensis* and *Vinca rose* performance as influenced by the three maintenance systems and four seasons during the two years experiments. Moreover, the best performance in plant values was in summer followed by spring. However, autumn and winter showed lower values for each plant in all the tested maintenance systems in the two years.

Table 5. Effect of maintenance systems, climatic seasons and their interaction on plant performance of *Ficus retusa, Hibiscus rosa sinensis* and *Vinca rose* in resorts of Marina during 2012/2013 and 2013/2014 seasons.

Seasons (B) / Maintenance(A)	*Ficus retusa*										*Hibiscus rosa sinensis*										*Vinca rosa*									
	2012/2013					2013/2014					2012/2013					2013/2014					2012/2013					2013/2014				
	Aut	Win	Spr	Sum	Mean of A	Aut	Win	Spr	Sum	Mean of A	Aut	Win	Spr	Sum	Mean of A	Aut	Win	Spr	Sum	Mean of A	Aut	Win	Spr	Sum	Mean of A	Aut	Win	Spr	Sum	Mean of A
Technician system	6.13	5.25	7.13	7.63	6.53	5.88	4.88	7.13	7.63	6.38	5.75	4.88	6.88	7.38	6.22	5.75	4.40	6.65	7.38	6.06	5.13	4.50	6.88	7.65	6.03	5.25	4.38	6.50	7.63	5.94
Internal management system	6.50	6.00	7.50	8.25	7.06	6.38	5.50	7.50	8.38	6.94	6.25	5.38	7.38	8.00	6.75	6.25	5.25	7.38	8.25	6.78	5.88	5.00	7.25	8.00	6.53	5.75	4.88	6.88	8.13	6.41
Specialized company system	7.00	8.25	8.25	8.88	7.59	7.00	6.13	8.25	8.88	7.56	7.00	6.38	8.13	8.75	7.56	6.8	6.0	8.1	8.8	7.4	6.75	6.25	8.13	8.75	7.47	6.76	5.88	8.13	8.75	7.38
Mean of (B)	6.54	5.83	7.63	8.25		6.42	5.50	7.63	8.29		6.33	5.54	7.46	8.04		6.2	5.2	7.4	8.1		5.92	5.25	7.42	8.13		5.92	5.04	7.17	8.17	
LSD at 5%	A		B	AB		A		B	AB		A		B	AB		A		B	AB		A		B	AB		A		B	AB	
	0.30		0.23	0.43		0.24		0.25	0.39		0.37		0.14	0.39		0.35		0.22	0.45		0.24		0.25	0.42		0.35		0.19	0.42	

Also, there was significant increase in plants performance values in specialized company system followed by internal management system then technician system of all tested plants in the two years in winter and autumn seasons.

DISCUSSION

Gardens need from 2 to 3 years of care to raise up plants till they take the final form. Even after plant maturity, gardens beauty depends on care and maintenance of them and the ability of the garden owners to spend money for maintaining their gardens. Landscape affects the resort evaluation especially the green area of the resorts by tourist and resorts owners. Oğuz*et al*. (2010) made questionnaires about the landscape design with 100 tourists accommodated at selected resorts in the Belek region in Turkey. Only 23 % of tourist criticized the landscape design of the tested resorts and stated that it would have been better if more trees and fewer constructional elements were used. Ibrahim (2009) stated that in Malaysia landscape industry is still new with few professional and experts who manage the landscape work and maintenance. Also, Ab Sani and Othman, (2012) found the soft scape materials quality based on physical quality of turfs, shrubs and trees including health, fertilizers, soil, sizes and proper handling of these materials, whereas soft scape work quality refer to achieving quality in work sequence, installation technique and maintenance after planting.

There were five types of maintenance systems and only three types were chosen:-

1- First type (technical system) includes technician and worker and when few number of resort owners received their units and they want to increase the plants in private or public gardens in partnership with the administration. They need a technician supervising the workers to improve the work and the administration will provide them with some funds to provide agricultural technician to supervise the work.
2- Second type (internal management system) includes internal agricultural management and occurs when most of resort owners receiving their units. Their presence in resorts and needs to grow more plants in private gardens so new formats of garden as well as interest with maintenance will increase. In some resorts, agricultural management has existed since the establishment of the resorts.
3- Third type (specialized company system) exists in some resorts which use specialized agricultural companies that carry out the operations of agriculture and maintenance well since construction or after, because of the economic situation of resort owners where availability of money helps in management to do so.

Ibrahim (2009) stated that problems raised from poor maintenance of soft scape include lack of acceptable standards that leads the judgment on the soft-scape quality depending on landscape architect experience, lack of experience to produce, interpret and applying soft scape specification to the ground which eventually leads to discrepancies and error during construction and low standards of maintenance (Reeves, 2000 and Osman, 2005). In Catalonia, home owner maintain their gardens in high percent about 80.3% of all cases (Cubino *et al*., 2014). In Georgia (U.S.), nearly the similar values were obtained where three of every four owners perfrome landscape maintenance (Varlamoff *et al*., 2001), and in Aljarafe (Spain), where 83% of the owners performed up keep (Fernández-Cañero *et al*., 2011). In Sir Lanka, although more than 35% of the 20 million people of Sri Lanka involved in vegetation, they face problems in home garden production including, inadequate access of water, lack of knowledge, information, and advisory services, shortage of family or hired labor and in abundant research and development on home gardens (Galhena *et al*., 2013). Family labors including children, elders, and women are involved in home gardening and have particular importance in their management (Sthapit *et al*., 2004, Torquebiau, 1992) but, depending on the soci-economical status and affordability, home owners may hire wage laborers to cultivate and maintain the home garden that in turn affect the composition and intensity of home garden activities (Maroyi, 2009).

In the current investigation three plant species, which represent plant groups that exist in gardens, were selected. They were *Ficus retusa*, *Hibiscus rosa sinensis* and *Vinca rosea.* The effect of the chosen three maintenance systems and different climatic seasons in the two experimental years on some growth parameters like increase in plant height, increase in crown diameter, increase in stem diameter and plant performance were studied. Generally all plant parameters were best in summer and spring seasons in specialized company system followed by internal management system then technical system in the two years. The results showed that the specialized company system was the best as it based on a specialized company with consultants, experienced and specialized technicians. This maintenance system and its components are appropriate in terms of types, quantities and appropriate dates because of accumulated experience and following recommendations. This may include several factors affecting the landscaping potentials of the evaluated plants such as plant species, and season of the years. Allam (2008) found that most of the studied plants showed better growth in summer and spring and this may be due to the good weather which helps to grow best, irrigation and fertilization also, all the maintenance practices are done very well. Similar results were obtained by Shehata (1997) who concluded that most plants like, *Ficus retusa*, *Hibiscus rosa sinensis, Myoporum pictum* and *Vinca rosea* under investigation had better growth in spring and summer. This may due to wind which blows strongly in the North- Western Coast of Egypt during winter and early spring (20-25km/hr), while the wind speed decreases in summer (15km/hr) (UNDP/FAO report in 1970). Forty five annuals grown on the beach of Florida were evaluated during the four seasons, they found more than 50% of plants were survived in all seasons (Tjia and Rose, 1987).

REFERENCES

Abdel-Latif, T.; Ramadan, S. T. and Galal, A. M. (2012).Egyptian coastal regions development through economic diversity for its coastal cities. HBRC Journal, 8: 252–262.

Ab Sani, J. and Othman, N. (2012).Quality standard and specification for soft-scape construction in Malaysia. Procedia - Social and Behavioral Sciences, 35: 260 – 266.

Allam, B. (2008). Environmental and landscape studies on some ornamental plants used in North Coast villages of Egypt. Master Thesis. Faculty of Agric. Mansoura University.

Bratman, G. N.; Hamilton, J. P. and Daily, G. C. (2012). The impacts of nature experience on human cognitive function and mental health. Annals of the New York Academy of Sciences, 1249(1): 118–136.

Cassaniti, C.; Leonardi, C. and Flowers, T.J. (2009). The effect of sodium chloride on ornamental shrubs. Scientia Horticulturae, 122: 586-593.

Chawla, L. (2015). Benefits of nature contact for children. Journal of Planning Literature, 30(4): 433–452.

Cubino, J. P.; Subiro´s, J. V. and Lozano, C. B. (2014). Maintenance, modifications, and water use in private gardens of Alt Emporda, Spain, 24(3): 374-383.

Fernández-Cañero, R.; Ordova´s, J. and Herrera Machuca.M.A. (2011). Domestic gardens as water-wise landscapes: A case of study in Southwestern Europe. Hort Technology, 21:616–623.

Galhena, D. H.; Freed, R. and Maredia, K. M. (2013). Home gardens: a promising approach to enhance household food security and wellbeing. Agriculture and Food Security, 2:8-13.

Ibrahim, R. (2009). Evaluating the quality standard of soft-scape in Malaysia. Master Thesis, University Putra Malaysia, Kuala Lumpur.

Lee, A. C. K.; Jordan, H. C. and Horsley J. (2015). Value of urban green spaces in promoting healthy living and wellbeing: prospects for planning. Risk ManagHealthc Policy, 8: 131–137.

Maroyi, A. (2009). Traditional home gardens and rural livelihoods in Nhema, Zimbabwe: A sustainable agroforestry system. Int. J Sustain Dev. World Ecol., 16 (1): 1-8.

McCormack, G.R.; Rock, M.;Tooley, A.M. and Hignell, D. (2010). Characteristics of urban parks associated.with park use and physical activity: a review of qualitative research, Health & Place, 16(4): 712–26.

Oğuz, D.; Diriöz, E. D. and Belkayalı, N. (2010). Tourists' perception of landscape design: The case of resorts in the Belek Specially Protected Area. African Journal of Agricultural Research., 5(10):1028-1035.

Osman, M. T. (2005). Urban Landscape Management In Malaysia. (Unpublished PhD Thesis, University of Newcastle Upon Tyne, United Kingdom).

Reeves, N. (2000).The condition of public urban parks and green space in Britain. The Chartered Inst. of Water and Environmental Management, 14(3): 157-163

Roe, J.; Ward Thompson, C.; Aspinall, P.; Brewer, M.; Duff, E.; Miller, D.; Mitchell, R. and Clow, A. (2013). Green space and stress: evidence from cortisol measures in deprived urban communities. International Journal of Environmental Research and Public Health, 10(9): 4086–4103.

Shehata, A.M.H. (1997). Landscaping studies on the green areas of some recreation resorts in the North – Western coast of Egypt. M. Sc. Floriculture, Ornamental Horticulture and Landscape Design Department, Faculty of Agric. Alex Univ.

Snedecor, G. and Cochran, W. (1974): Statistical Methods. Six Edition, lowa State University Press, Ames, lowa, USA.

Sthapit, B.R.; Rana, R.B.; Hue, N.N. and Rijal ,D.R.(2004). The Diversity of Taro and Sponge Gourds in Traditional Home Gardens in Nepal and Vietnam. Home Gardens and Agrobiodiversity.Edited by: Eyzaguirre PB, Linares OF. 234-254. Washington DC, USA: Smithsonian Books,

Tjia, B. and Rose, S.A. (1987). Salt tolerant bedding plants. Proceedings of the Florida State Horticultural Society. Department of Ornamental Horticulture, University of Florida, Gainesville, USA, 100: 181-182.

Torquebiau, E. (1992). Are tropical agroforestry gardens sustainable?. Agric Ecosyst Environ., 41: 189-207.

UNDP/FAO (1970).Physical conditions and water resources-climate.Pre-Investment survey of the North Western Coastal Region. Project ESE: SF/UAR49. Technical Report No. 1: 29-57.

Varlamoff, S.; Florkowski, W.J.; Jordan, J.L.; Latimer, J. and Braman, K. (2001). Georgia homeowner survey of landscape management practices. Hortechnology, 11(2):326-331.

Wall, G. (2001). Resort morphology: western concept and Chinese applicatio*n*. In Urban Tourism: Theory and Practice. Bao, J., Pan, X. and Wall, G. (ed.) (2001) Scientific Publications, Beijing, :205-211.

Walton, J.K. (2000). The British Seaside. UK: Manchester University Press.

تقييم تاثير انظمة الصيانة المختلفة على بعض نباتات الزينة بالساحل الشمالى الغربى فى مصر

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تم إجراء هذا البحث خلال موسمين متتالين هما ٢٠١٢-٢٠١٣ و ٢٠١٣- ٢٠١٤ فى الساحل الشمالى الغربى فى بعض المنتجعات الصيفية فى مصر بهدف دراسة أنظمة صيانة الحدائق فى هذه المنتجعات.تم أختيار ثلاث أنظمة للصيانة (نظام الشركة المتخصصة ,نظام الأدارة الداخلية و النظام الفنى) وتطبيقها على ثلاث أنواع نباتية ممثلة لثلاثة مجموعات نباتية هى الونكا كنبات عشبى ، الهيبسكس كشجيرة والفيكس كشجره. تم دراسة تأثير هذه الأنظمة الثلاث خلال فصول السنة الأربع على النباتات المختارة فى موسمين متتالين على الصفات النباتية الأتية:طول النبات و قطر الساق وقطر التاج و حالة النبات.وقد أظهرت النتائج الأتى: نظام الشركة المتخصصة كان أكثر كفاءة يليه نظام الأدارة الداخلية وأقلهم النظام الفنى فى الصفات المختبرة , وجدت فروق معنوية بين فصول السنة الأربعة ،فقد أعطى الصيف أعلى النتائج تبعه الربيع وبفروق قليلة ،أما الخريف والشتاء فقد أعطيا أقل النتائج وقد يرجع ذلك الى زيادة الأهتمام بالنباتات فى فصل الصيف كنتيجة لوجود الملاك وأيضا نمو النباتات أفضل فى الصيف نتيجةالاهتمام بالرى و التسميد والتحكم فى الأفات.بصفة عامة فإن كفاءة نمو النباتات وقيمتها التنسيقية تتأثر بأكثر من عامل واحد مثل القائم بالصيانة و برنامج الصيانة(ري - تسميد – ازالة الحشائش – مكافحة افات .....) ولكن يشترك العديد من العوامل فى التأثير على النمو و الكفاءة التنسيقية للنباتات والذى يمكن ان نضم ذلك كلة فى نظام الصيانة فيكون هو المؤثر .نوصى بالاهتمام بنظام الصيانة خصوصا صيفا حيث تواجد الملاك والعمل على حل جميع المشاكل التى تواجة صيانة المساحات الخضراء.نوصى باستخدام نظام الشركة المتخصصة لانة أكثر كفاءة فى خدمة و صيانة المساحات الخضراء.