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Effect of Some Antitranspirants and Supplementery Irrigation on Growth, Yield and Fruit Quality of Sultani Fig (*Ficus Carica*) Grown in the Egyption Western Coastal Zone under Rainfed Conditions.

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Abstract: This study was carried out during two successive seasons (2006and2007)on the Egyptian Sulani fig tree (Ficus carica) grown under rainfall conditions of the western coastal zone Matrouh Governorate) to study the effect of supplemental irrigation, two antitranspirant types namely folicote and vapor-guard and two time for application on growth, yield and fruit quality of "Sultani" fig cultivar trees. The obtained results indicated that, supplemental irrigation increased vegetative growth, number of fruit/tree, yield (kg)/tree and fruit quality except TSS & sugars content that reduced as compared with other treatments or the control. On the other hand, both of antitranspirants agents increased growth parameters, yield and fruit quality in the first season, while folicote gave the highest values in both seasons. Moreover, it was found that there was non significant difference between both dates of spraying with antitranspirants in both seasons. Interaction between supplemental irrigation, antitranspirants and dates improved that all vegetative growth parameters, yield (kg)/tree and fruit physical properties were improved, while TSS% and sugar percentage were reduced in both studied seasons. Regardless the amount of supplemental irrigation, spraying with folicote antitranspirants, resulted in the highest values either in vegetative growth or fruit yield and fruit quality.

Key words: Fig, supplemented irrigation, antitranspirants, vegetative growth, tree yield, fruit quality.

INTRODUCTION

Fig trees grows successfully in Egypt from Mediterranean coast to Aswan, the total area reaches 70,000 (FAO 2007) feddans mainly concentrated from Alexandria to the west tell Marsa – Matrouh, depending mainly on the winter rainfed irrigation. The soils of most districts are typical sandy calcareous soils. The main Variety grown in this district is the local "Sultani" fig which is consumed fresh.

It is often observed that the low yield is closely correlated with low rainfall rates, decrease of vegetative growth and early defoliation of the leaves. Fig growers in the dry farming area in Egypt believe that irrigation of fig trees during summer affects the fruit quality.

The average yearly winter rainfall along the western coastal zone spicially Ras El-Hekma (Matrouh Governorate) is usually scant for fig growth and fruiting.

Measurements of the stomatal apertures of young clonal tea plants (Camellia sinensis) showed that stomata of plants irrigated during the dry seasons only were wider opened than those not irrigated during both wet and dry seasons. Similarly, xylem water potential values (ψx) were always higher (less negative) in irrigated than non-irrigated plants, during both wet and dry seasons. The results suggest that more drought-susceptible clones have a greater demand for water than those less susceptible to drought. [1]

Transpirational water loss may be reduced by covering the stomata with film forming antitranspiration inducing stomatal closure with metabolic antitranspirants. In this respect, using antitranspirants improved the water use effeciancy and reduced leaf transpiration rate by 87-93%. Morever, using antitranspiration may reduce water loss through transpiration; consquently the amount of used water and increased yield of cotton plants by 63 %.[2,3,4]

The experiment in southern Italy found that, drought conditions for fig are considered to axcept when the average monthly rainfall from November to April is below 61 mm. and in summer period when the rainfied is below 9mm.[5] In California using Calimerana fig Variety growing in sandy loam soil used sprinkler irrigation during the early spring to supplement winter rainfall and again in early July when moisture content of the top 3 feet had been reduced to the permanent wilting percentage.They found that, fruit samples taken from the irrigated plots were from 7to 22 percent heavier than those from the unirrigated plots. [6] Spraying magnisium carbonate (Mg CO3) at 5% as antitranspirant and irrigate banana plants at 60% of the avilable water depletion is the promising treatment to reduce the total amount of irrigated water

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through the growing season of Wiliams banana plants, both antitranspirants (magnesium carbonate) and kaolin (aluminum silicate)) improved yield (kg/tree) specially kaolin treatment at 4% once at early March which recorded the maximum number of fruits and yield per tree by about35.4 and27.5% for Washington navel orange and by 25.9 and 36.9% for Succary orange tree in the first and second seasons, respectively. [7,8].

Spraying both antitranspirants (Vapor-Gurd and Folicote) 3-7 week before harvesting increased stomata resistance of tagged apricote leaves 14 day after treatment by 54-62% compared with untreated leaves. Fruits from treated trees were larger and matured earlier than those of untreated trees. [9]

Genarally, growth parameters, yield per tree/kg and fruit quality of fig (ficus carica) were improved and gave the hight values by the application of supplemantray irrigation and both antitranspirants (Vapor-Guard – Folicote). [10-30]

Thus, the aim of the present investigation is to study the effect off summer irrigation and antitranspiration agents on the growth, yield and fruit quality of Sultani fig., grown under such dry farming area.

MATERIALS AND METHODS

This study was carried out during the two successive seasons (2000 and 2007) to declare the effect of supplemental irrigation, antitranspirants spray (folicote and vapor-guard) and time of spraying on growth, yield and fruit quality of Sultani fig trees (Ficus carica) grown at the western coastal zone of Egypt (Matrouh Governorate) Egypt, under rainfed conditions, on 120 mostly mature "Sultani" fig tree more than 15 years old. Five irrigationtreatments were devoted where trees were irrigated in the first of may or june or July or August by 80-90 litr/ tree as supplementary irrigation whereas the fifth treatmente represented the control where the trees rainfed only. The water used for irrigation and soil samples were analyzed and the data are presented in Table (1).

Vapor-Guard and Folicote emulsion, (polyterpene compound as film forming agents) were sprayed once in two dates at 6% as recommended for Vapor-Guard and Whitewash. [15,16].

Antiranspirants were applied using a hand pressure sprayer.Seven week and three weeks befor harvesting, plant were curfully sprayed with a fine mist of antitranspirat till run-off with care being taken to cover all plant parts. Vapor-gurd and Folicote are considered as friend using either for environment or human use. [17]

The previous cited treatments were arranged in a split plot design with three replicates for each treatment and 2 trees devoted for each replicate. The data obtained every season were as following:

- The average number of new shoots / tree
- The Average length of new shoot

At the end of the growing season, the average length of ten shoots distributed around the tree was measured.

- The average leaf area $(cm)^2$: twenty leaves per tree were picked per tree; [18]

$$\text{Leaf area } (cm)^2 = \frac{(\text{diameter})^2 \times 3.14}{4}$$

- Total chlorophyll content (in fresh leaves) was measured in field using Minolta chlorophyll meter SP AD-502.
- Yield (kg/tree) total yield per tree was recorded in kilogram at harvest time.
- Fruit number per shoot was counted and recorded.
- Fruit weight, length and diameter were determined and recorded.
- Total sugars content in fresh weight of fruits were determined according to. [19]
- TSS % was determined using a hand refractometer.
- Total acidity was estimated in fruit as percentage of tartaric acid according to. [20]
- The stastical analysis: Data were subjected to analysis of variance according to the Duncan's multiple range tests. [21]

Table 1: Analysis of water and soil samples:

						Water analysis:	
Ec (M.mohs)	pH	K^+(meq/L)	Ca^{++}(meq/L)	Mg^{++}(meq/L)	Na^+(meq/L)	Cl^-(meq/L)	B^- (ppm)
1.20	7.65	0.77	4.30	6.17	1.33	8.87	1.38
Soil analysis:							
Ec (M.mohs)	pH	Na^+(meq-L)	K^+(meq/L)	Ca^{++}(meq/L	Mg^{++}(meq/L)	Cl^-(meq/L)	$CaCo_3$
1.33	7.45	3.26	0.90	6.75	3.25	6.25	57

RESULTS AND DISCUSSION

Vegetative Growth: Data in Table (2) showed that supplemental irrigation for four times increased all studied parameters significantly as compared with the control, the average number of new shoots per tree was 63.44 and 67.50 shoots in the two succesive seasons 2006and 2007, respectively. Shoot length increased to 18.61 and 18.94 in 2006 and 2007,, number of leaves per tree reached 67.89 and 71.17 leaves in the two

respective seasons of study. The average leaf area increased to about 485.6 and 461.3 as compared with control during the two seasons of study. Total chlorophyll increased to 45.03 in 2006 and to 45.97 in the second seasons.

Beside, antitranspirant increased vegetative growth parameters significantly as compared with control. Number of new shoot per tree was 55.60 and 57.87 shoots in the two succesive seasons 2006and 2007, respectively, shoot length increased to 16.00 and 16.01 in 2006 and 2007,, number of leaves per tree reached 60.53 and 60.60 leaves in the two respective seasons of study. The average leaf area increased to about 398.4 and 424.1 as compared with control during the two seasons of study. Total chlorophyll increased to 42.62 in 2006 and to 43.59 in the second seasons.

Also, data showed that date of application (Vapor-Guard – Folicote) increased all studied parameters significantly as compared with control, number of new shoot per tree reached 54.64 and 55.20 respectively in two studied seasons. Shoot length increased to 15.50 and 15.61 in 2006 and 2007,, number of leaves per tree increased to 54.18 and 56.95 leaves in 2006 and 2007, seasons of study and the average leaf area increased to about 383.2 and 393.8 as compared with Control during the two seasons of study. Total chlorophyll was 39.83 in 2006 and to 41.96 in the second seasons 2007. Results presented in Table (3) showed that, the date of spraying with both antitranspiration (vapor-Guard and Folicote) were not significantly affected by other treatments In both studied seasons.

All supplemental irrigation treatments improved all parameter of vegetative growth, especially when added in first July and first August where they gave the highest values in all parameters compared with other treatments and with the control in both studied seasons.

Regarding to the interaction between supplemental irrigation, antitranspirants treatments and date of spraying, it is obvious that all plant growth measurements significantly responded to the interaction between treatments and increased compared with control .Generally, it could be concluded that the highest values of number of shoot/tree was 71.78, 72.00 respectevly in both studied seasons, while shoot length increased to 20.00 and 20.33 in 2006 and 2007, The no .of leaves /tree reached 72.67 and 75.67 in both studied seasons, leaf area was 492.7 and 494.0, and total chlorophyll was 48.13 and 48.17 compared with control in 2006 and 2007. Vegetative growth parameters were improved by three and four addition supplemental irrigation in 1st July and 1st Augut especially four additions with spraying folicote antitranspirants in both times especially in the second season compared with control and other treatments. The date of spraying with both antitranspirats was not significantly affected by other treatments in both studied seasons.

From the previous results in Table (2, 3) it is clear that the increase of all vegetative growth parameters of fig trees could be due to the effect of supplemental irrigation treatment on increasing the absorption of some nutrient elements, which improved photosynthetic capacity operation in leaf. On the other hand, using antitranspirants improved the water use efficiency under arid conditions by reducing leaf transpiration rate.
These results are in agreement with those of *Abd EL-Kader et al*[7] recorded that spraying antitranspirants increased growth parameters. Malaka [10]stated that in a study on nemaguard peach plants, paraffin oil as antitranspirant reduced salinity seriousness on growth rate, *El-Abd* [22]on citrus, *Ranney et al* [23] on cherry trees recorded that pruning and antitranspirant were successful in delaying plant water stress, and relative growth rate, *Naiema* [24] on Anna apple and Sultani fig tree, and *Ahmed et al* [25] found that, average length of new shoot increased by 44% in the irrigated trees more than the control,.

Yield (kg/tree): Table (4) showed that the supplemental irrigation for four times increased Yield per tree (kg) of fig significantly to reach (9.05, 8.96) compared with the control (4.95, 5.14) in both studied seasons.

In the other hand, antitranspirants increased yield weight (kg) / tree significantly compared with control in the two studied seasons. Both studied antitranspirants (vapor- Guard – Folicote) gave the same values in the first and second seasons. Results recorded in Table (5) indicate that, the date of spraying the two chemical antitranspirants was not significantly affected by other treatments in the first or second season. In this respect, additional supplemental irrigation recorded high values of yield weight (kg) per tree compared with antitranspirant treatments or control (8.39, 8.69, 9.05, and 8.96) in both studied seasons.

In the other hand, antitranspiration treatment affected yield significantly in both studied seasons. In this respect, spraying by Folicote resulted in the highest values of yield/tree compared with the Vapor-Guard in both studied seasons. Results in table (5) reveoled that the interaction between

Supplemental irrigation, antitranspirants and date of spraying significantly increased yield (kg) / tree. The highest values of yield per tree (kg) were about 9.42 and 9.65 respectively in both studied seasons. Irrigation with 1st July and 1st Augest three and four additions of supplemental irrigation and spray with Folicote antitranspirant regarding both times of spraying in both studied seasons gave the highest values in yield (kg) / tree compared with other treatments and control.

The obtained results are in agreement with those obtained by Abd El-kader *et al*., [7] who found on Wiliams banana that foliar sprays of magnisium carbonate as antitranspirants increased growth parameters and improved yield weight and fruit characteristics, Saleh and Soad [8] on orange tree recorded that, both antitranspirants (magnesium carbonate and kaolin(aluminum silicate)) improved yield (kg/tree) specially kaolin treatment at 4% once at early March which recorded the maximum number of fruits and yield per tree by about35.4 and27.5% for Washington navel orange and by 25.9 and 36.9% for Succary orange tree in the first and second seasons, respectively, Fox and Rockström [26] reported that, during an on-farm study carried out in semi-arid Burkina Faso, supplemental irrigation during dryspells increased sorghum harvests by 41%. Ben-Porath and Greenblat [9] found that, both antitranspirants (Vapor-Gurd and Folicote) specially Folicote application 3 weeks before harvest, which increased yields of trees irrigated at the 100 and 75% levels by 12 and 18%, respectively,compared with unsprayed trees, Abd El-nasser [14] and Shabban *et al* [27] found that spraying Vapor-Guard at3% of Jaffa and Balady orange increasing yield.

Fruit Quality:

Physical Properties: Data in Table (4) showed that fig fruit quality was affected by supplemental Irrigation treatments. All physical properties (fruit weight, length, diameter and volume) were Significantly increased and gave the highest values compared with the control. Fruit weight increased to 47.85 and 47.33g in both studied seasons, fruit length was about 3.64 and 3.67cm, fruit diameter reached to 4.75 and 4.74cm in two studied seasons and fruit volume increased about the double as compared with control and reaching 43.76 and 44.20cm in both studied seasons.

In general antitranspirants spraying significantly increased all physical properties, where fruit weight increased to 45.31 and 46.06g, fruit length was 3.59 and 3.63cm, fruit diameter reaching 4.68 and 4.71cm and fruit volume increased to 42.45 and 42.99cm on both studied seasons. Generally, date of spraying antitranspirants was not significantly affected by treatments in the first or second seasons.In this respect, supplemental irrigation recorded high values of all physical

Proprieties of fig fruits, also, the three and four addition of supplemental irrigation recorded the highest values of physical proprieties of fig fruits compared with other treatments and control in both seasons.

Regarding the interaction between supplementary irrigation, antitranspiration and date of spraying it is obvious in Table (5) that the physical properties significantly increased. The highest values of physical properties in fruit weight were (50.29 and 49.57), fruit length increased to 3.74 and 3.77cm, fruit diameter reaching to 4.80 and 4.79cm and fruit volume were 46.51 and 47.81cm in both studied seasons, as compared with the control and other treatments.

Table 2: The average no. of new shoots/tree, shoot length, no.of leaves /tree, leaf area and total chlorophyll content as effect by Supplemental irrigation, antitranspirants, and date of spraying of sultani fig tree during 2006 and 2007, seasons.

Factors	treatment	NO.of new shoot/tree		Shoot length(cm)2		No. of leaves/ tree		Leaf area(cm)2		Total chlorophyll	
		2006	2007	2006	2007	2006	2007	2006	2007	2006	2007
Irrigation dates	Control rainfed	32.72 d	37.11 c	9.03 e	8.91c	33.72 e	37.11 d	231.1d	252.9 d	33.06 d	34.51 d
	First May	48.39 c	47.83 d	13.84 d	14.85 b	46.22 d	47.17 c	349.3 c	380.6 c	39.03c	40.14c
	First June	61.11 b	60.67ab	17.25 c	17.28ab	60.78 c	63.17 b	422.8 b	436.1 b	41.48bc	43.99 b
	First July	61.22 b	66.61 a	18.00 b	17.94 b	64.76 b	67.72 b	450.0a	452.6 b	42.48ab	44.90 b
	First August	63.44 a	67.50 a	18.61 a	18.94 a	67.89 a	71.17 a	458.6 a	461.3 a	45.03 a	45.97 a
Antitranspirant agent	Control	50.93 c	54.03 b	14.10 b	14.20 b	47.67 c	51.80b	350.9 b	356.7 c	38.41 c	39.74 c
	Vapor-guard	53.60 b	55.93 b	15.94 a	16.54 a	55.83 b	59.40 a	397.7 a	409.3 b	39.62 b	42.38 b
	Folicote	55.60 a	57.87a	16.00 a	16.01a	60.53 a	60.60 a	398.4 a	424.1 a	42.62 a	43.59a
Spraying	1stMay	52.11 a	56.69 a	15.19 a	15.56 a	55.18 a	59.58 a	381.5a	399.7 a	40.61 a	41.85 a
date	1stJune	54.64 a	55.20 a	15.50 a	15.61a	54.18 a	56.95 a	383.2 a	393.8 a	39.83 a	41.96a

Means followed by the same letter one not significantly different at the 5% level.

Table 3: The average no. of new shoots/tree, shoot length,no.of leaves /tree, leaf area and total chlorophyll content as effected by interaction between supplemental irrigation, antitranspirants agent , and date of spray of Sultani fig tree during 2006 and 2007, seasons.

Treatments			NO.of new shoots/tree		Shoot length(cm)2		No.of leaves/ tree		Leaf area (cm)2		Total chlorophyll	
irrigation	antitranspirant	date	2006	2007	2006	2007	2006	2007	2006	2007	2006	2007
Control rainfed	control	1stMay	50.93ghi	55.67efg	8.13 l	8.37 i	28.00kl	27.33 n	216.3 k	229.3lm	31.33 l	32.43lm
		1stJune	53.60fgh	29.00 k	8.23 l	8.10 i	26.00 l	30.00mn	216.3 k	225.3 m	32.17kl	31.43 m
	Vapor-guard	1stMay	55.60efg	31.00jk	8.90kl	8.70 i	32.33jk	45.00jk	220.3 k	239.3klm	33.93i-l	37.70ij
		1stJune	64.66 l	33.33ijk	8.57kl	8.87 i	37.00ij	45.00jk	221.3 k	270.7jkl	33.40jkl	35.77jk
	Folicote	1stMay	48.39 i	35.00ijk	9.67jkl	9.50hi	40.67hi	39.00kl	243.0jk	277.7jk	33.20jkl	35.33k
		1stJune	61.11bcd	38.67ijk	10.70ijk	9.93ghi	38.33hi	36.3lm	269.0 j	275.3jk	34.33i-l	34.40kl
First May	control	1stMay	61.22bcd	39.33ijk	12.23hi	11.00gh	40.67hi	45.67jk	276.3 j	303.3 j	36.30hij	37.90ij
		1stJune	63.44abc	61.00bcd	11.60hij	11.57 g	38.67hi	44.67jk	270.0 j	306.3 j	35.77hij	38.13ij
	Vapor-guard	1stMay	47.83 l	43.00hi	13.77gh	18.13bcd	43.00 h	45.33jk	388.7ghi	307.3ghi	37.53f-i	39.33ghi
		1stJune	55.73efg	53.00gh	15.13fg	17.73bcd	44.00 h	37.00 l	387.0hi	391.7 i	36.90g-j	38.53hi
	Folicote	1stMay	54.50fg	56.67d-g	13.67gh	15.00f	55.33ef	56.33ghi	374.0 i	441.7b-h	44.37bc	43.30def
		1stJune	47.62 l	54.00fg	16.67def	15.67ef	55.67ef	54.00hi	399.7f-i	433.3b-i	43.33bcd	43.63cde
First June	control	1stMay	53.17 k	59.00b-g	16.17ef	15.67ef	52.00fg	61.00efg	419.7def	420.0f-i	41.27c-f	41.80ef
		1stJune	54.50 k	58.00c-g	16.33def	16.67def	49.67 g	50.67ij	396.3f-i	395.0hi	38.23e-h	41.50efg
	Vapor-guard	1stMay	61.33 j	61.67a-g	18.00a-e	18.33bcd	64.33bcd	66.33b-e	409.0e-i	435.3b-i	41.97cde	44.43cd
		1stJune	69.33hi	64.33a-g	17.33c-f	18.00bcd	64.00bcd	68.67bcd	442.0cde	454.0a-g	40.33d-g	43.30def
	Folicote	1stMay	64.50fg	65.00a-g	18.00a-e	18.00bcd	67.33abc	66.33b-e	435.3def	471.7a-e	44.90abc	47.77 a
		1stJune	57.33def	56.00efg	17.67b-e	17.00cde	67.33abc	66.00cde	434.3def	440.3b-h	42.20cd	45.13bcd
First July	control	1stMay	65.67ab	66.00a-f	17.33c-f	16.67def	58.67de	58.67fgh	428.3d-g	429.7c-i	41.27c-f	40.87fgh
		1stJune	60.33cde	63.00a-g	16.67def	17.00cde	56.00ef	67.00b-e	416.7e-h	407.3ghi	41.20c-f	43.33def
	Vapor-guard	1stMay	69.67cde	68.67a-d	19.33abc	19.00abc	66.67abc	69.33a-d	446.0cde	462.7a-f	42.90bcd	45.17bcd
		1stJune	63.33abc	68.33ab	18.00a-e	18.67a-d	67.33abc	73.33abc	491.0 a	466.7a-f	40.40d-g	47.83 a
	Folicote	1stMay	60.67cd	67.33a-e	18.00a-e	18.00bcd	71.00 a	68.33b-e	489.0ab	479.0ab	44.93abc	44.03cde
		1stJune	60.67cd	64.33a-g	18.67a-d	18.33bcd	69.00abc	69.67a-d	429.0d-g	470.3a-e	44.20bcd	48.17 a
First August	control	1stMay	67.17 a	65.67a-f	16.67def	18.00bcd	64.00bcd	65.33def	433.0def	426.7d-i	42.53cd	45.10bcd
		1stJune	62.50abc	63.67a-g	17.67b-e	19.00abc	63.00cd	67.67b-e	436.0def	423.7e-i	44.07bcd	44.87bcd
	Vapor-guard	1stMay	65.10 l	64.33a-g	20.33 a	18.67a-d	72.67 a	73.33abc	492.7 a	494.0 a	44.60abc	44.50cd
		1stJune	64.64fg	69.67abc	20.00ab	19.33ab	67.00abc	70.67a-d	478.7abc	471.7a-e	44.23bcd	47.23 ab
	Folicote	1stMay	68.88 l	72.00 a	17.67b-e	20.33 a	71.00 a	76.33 a	450.7b-e	477.3abc	48.13 a	48.07 a
		1stJune	71 .78 k	69.67abc	19.33abc	18.33bcd	69.67ab	73.67ab	460.3a-d	474.7a-d	46.63ab	46.07abc

Means followed by the same letterone not significantly different at the 5% level.

Table 4: The average yield/tree, fruit weight, fruit length, fruit diameter and fruit volume as affected by supplemental irrigation, Antitranspirants agent and date oe spray of Sultani fig tree during 2006 and 2007, seasons.

Factors	treatment	Yield(kg)/tree		Fruit weight (g)		Fruit length(cm)2		Fruit diameter (cm)2		Fruit volume(cm)3	
		2006	2007	2006	2007	2006	2007	2006	2007	2006	2007
Irtrigation dates	Control	4.95 c	5.14 c	41.57 d	42.17 c	3.31 b	3.33 b	4.34 c	4.37 b	40.15 c	38.54 d
	First May	6.87 b	6.98 b	44.67bc	45.44ab	3.58 a	3.69 a	4.65 b	4.62 c	42.72ab	41.87 c
	First June	7.95 a	8.04 ab	43.38 c	45.04 b	3.63 a	3.65 a	4.64 b	4.67 b	41.73bc	42.90 b
	First July	8.39 a	8.69 ab	45.64 b	45.67ab	3.67 a	3.71 a	4.67 b	4.70 b	41.99abc	42.63 b
	August	9.05 a	8.96 a	47.85 a	47.33 a	3.64 a	3.67 a	4.75 a	4.739 a	43.76 a	44.20 a

Table 4: Continue

Antitranspirant agent	Control	7.05 b	7.02 a	42.62 b	42.56 b	3.49 b	3.56 b	4.50 b	4.53 c	41.21 a	40.65 b
	Vapor-guard	7.67 a	7.96 a	45.94 a	46.79 a	3.61 a	3.64 a	4.65 a	4.62 b	42.55 a	42.44 a
	Folicote	7.50 a	7.71 a	45.31 a	46.06 a	3.59 a	3.63 ab	4.68 a	4.71 a	42.45 a	42.99 a
Sprayingdate	1st May	7.41 a	7.54 a	44.74 a	45.42 a	3.55 a	3.59 a	4.62 a	4.63 a	42.04 a	41.66 a
	1st June	7.39 a	7.59 a	44.50 a	44.85 a	3.58 a	3.62 a	4.60 a	4.61 a	42.09 a	42.39 a

Means followed by the same letterone not significantly different at the 5% level.

Table 5: The average yield/tree, fruit weight, fruit length, fruit diameter and fruit volume as affected by interaction between Supplemental Irrigation, antitranspirants agent and date of spray of Sultani fig tree during 2006 and 2007, seasons.

Treatments			Yield(kg)/tree		Fruit weight (g)		Fruit length(cm)2		Fruit diameter (cm)2		Fruit volume(cm)3	
irrigation	antitranspirant	date	2006	2007	2006	2007	2006	2007	2006	2007	2006	2007
Control rainfed	control	1stMay	4.32f	4.36f	40.37i	38.21l	3.14f	3.12h	3.96k	4.15j	41.35a-e	39.17ijk
		1stJune	4.84f	4.65f	40.90hi	40.35kl	3.15f	3.18gh	4.12j	4.05k	40.39b-e	39.54h-k
	Vapor-guard	1stMay	4.50ef	5.15ef	41.93f-i	42.57ijk	3.48bcd	3.35fg	4.55gh	4.30i	42.05a-e	37.10jk
		1stJune	5.08ef	5.16ef	41.10ghi	44.86c-i	3.38de	3.45def	4.25i	4.44h	37.63e	39.25ijk
	Folicote	1stMay	5.20e	5.77e	44.41d-g	44.40f-j	3.25ef	3.39efg	4.57fgh	4.68b-f	38.46de	39.73h-k
		1stJune	5.19ef	5.74e	40.73hi	42.67ijk	3.47bcd	3.48b-f	4.59e-h	4.62d-g	41.02a-e	36.43k
First May	control	1stMay	5.95cd	5.91cd	42.26f-i	41.71jk	3.45b-e	3.56a-f	4.59d-h	4.53g	40.22b-e	39.90g-k
		1stJune	5.98d	6.93d	40.77hi	42.69ijk	3.42cde	3.59a-f	4.51h	4.59fg	42.13a-e	40.24f-k
	Vapor-guard	1stMay	7.79abc	7.26a-d	43.97e-h	47.18a-e	3.62abc	3.77 a	4.73a-d	4.65b-f	45.50ab	40.00g-k
		1stJune	6.90d	6.99cd	48.63ab	47.02a-f	3.74 a	3.72abc	4.69a-g	4.59efg	44.44abc	43.20b-i
	Folicote	1stMay	7.15a-d	7.50abc	45.93b-e	49.31 a	3.60a-d	3.73ab	4.73a-d	4.73abc	42.00a-e	43.30b-I
		1stJune	6.94bcd	7.30a-d	46.48b-e	44.75d-i	3.63abc	3.75 a	4.64c-h	4.66b-f	42.00a-e	44.59a-e
First June	control	1stMay	7.37ab	7.67a-d	44.00e-h	44.08g-j	3.58a-d	3.66a-d	4.60d-h	4.64c-f	42.34a-e	41.20c-j
	1stJune		7.44a-d	7.39a-e	42.22f-i	42.36ijk	3.64abc	3.69a-d	4.62d-g	42.36a-e	41.06c-j	
	Vapor-guard	1stMay	8.78abc	8.54cd	44.34d-g	48.03ab	3.56a-d	3.64a-e	4.68a-g	4.67b-f	43.45a-d	43.16b-I
		1stJune	8.01abc	8.62abc	43.96e-h	45.91b-g	3.58a-d	3.76 a	4.65b-g	4.65b-f	40.23b-e	46.96ab
	Folicote	1stMay	8.08abc	7.77a-d	43.60e-i	47.27a-d	3.74 a	3.47c-f	4.67a-g	4.71a-d	42.90a-e	40.56d-k
		1stJune	8.00abc	8.28abc	42.15f-i	42.63ijk	3.67ab	3.68a-d	4.59d-h	4.71a-d	39.07cde	44.42a-f
First July	control	1stMay	8.09cd	8.28abc	44.04e-h	44.46d-i	3.57a-d	3.67a-d	4.59d-h	4.67b-f	38.39de	40.38ek
		1stJune	8.47abc	7.99abc	44.50def	43.09hij	3.63abc	3.72abc	4.60d-h	4.66b-f	41.70a-e	41.22c-j
	Vapor-guard	1stMay	8.49ab	8.88ab	48.07abc	47.64ab	3.72 a	3.65a-d	4.68a-g	4.69a-f	41.83a-e	44.16a-g
		1stJune	8.36abc	9.48 a	47.47a-d	47.55abc	3.75 a	3.77 a	4.72a-e	4.71a-d	43.99a-d	41.83c-I
	Folicote	1stMay	8.66abc	8.72abc	45.06c-f	45.57b-h	3.66ab	3.70a-d	4.75abc	4.74abc	42.73a-e	44.86a-d
		1stJune	8.28abc	8.78abc	44.69d-f	45.53b-h	3.68ab	3.72abc	4.70a-f	4.72a-d	43.33a-d	43.30b-I
First August	control	1stMay	8.59cd	8.64abc	43.20e-i	44.00g-j	3.68ab	3.74ab	4.68a-g	4.71a-d	40.45b-e	41.56c-I
		1stJune	9.42a-d	8.36a-d	43.97e-h	44.46e-j	3.63abc	3.64a-e	4.71a-f	4.70a-e	42.80a-e	42.24c-i
	Vapor-guard	1stMay	9.42 a	9.95 a	49.68 a	47.53abc	3.65ab	3.74 a	4.76abc	4.75ab	42.48a-e	45.03abc
		1stJune	9.37abc	9.56 a	50.23 a	49.57 a	3.65ab	3.56a-f	4.79ab	4.73abc	43.88a-d	43.73a-h
	Folicote	1stMay	8.83abc	8.65abc	50.29 a	49.20 a	3.70a-d	3.71abc	4.74abc	4.79 a	46.51 a	44.85a-d
		1stJune	8.65abc	8.63abc	49.76 a	49.28 a	3.63abc	3.63a-e	4.80 a	4.75ab	46.44 a	47.81 a

Means followed by the same letterone not significantly different at the 5% level.

Chemical Properties: It is obvious from Table (6) that data of TSS percentage was reduced by all treatments compared with control.

Acidity percentage was not significantly affected by treatments in both studied seasons.

Total sugar percentage, decreased significantly by treatments compared with the control in both studied seasons.

The previous results are in agreement with those obtained by Gaballah *et al* [28] who found that on sesame cultivars,the highest significant increase inRWC % was recorded for Shandaweel 3 cv. grown under 2.3 dSm-1 salinity level and sprayed with Kaolin or paraffin wax, Abou Leila *et al* [29] on sesame cultivars recorded that, using Kaolin antitranspirant under 2.3 dSm-1 salinity level led to an increase in saturated fatty acids while the peaks corresponding to arachidic and stearic disappeared when salinity levels increased and in addition to antitranspirant application., El-Zeiny *et al* [30] showed that application of kaolin and $CaCo_3$ antitranspirants were more effective in increasing protein percentage under higher salinity levels than low levels for both sesame cultivars Saleh and Soad [8] recorded that, Washington navel and Succary orange tree with antitranspirants sprays, improved all fruit quality, Abd El-kader *et al* [7] on Wiliams banana plant found that,foliar sprays of magnisium carbonate ($MgCo_{3)}$ as antitranspirant increased fruit characteristics and Ben-Porath and Greenblat[9] on apricot plants.

Conclusion: Vegetative growth parameters were improved by all supplemental irrigation treatments especially in 1st July and 1st Augut additions with spraying folicote antitranspirants in both times compared with control.

Antitranspirants with supplemental irrigation increased yield weight (kg) / tree significantly compared with control in the two studied seasons. Antitranspirants (vapor- Guard – Folicote) gave highest values in Vegetative growth parameters, yield weight (kg) / tree and fruit quality compared with control. All parameters were improved by three and four addition supplemental irrigation in 1st July and 1st Augut especially four additions with spraying folicote antitranspirants in both times compared with control and other treatments

Increase of all Vegetative growth parameters of fig trees could be due to the effect of supplemental irrigation treatment on increasing the absorption of some nutrient elements, which improved photosynthetic capacity operation in leaf. On the other hand, using antitranspirants improved the water use efficiency under arid conditions by reducing leaf transpiration rate.

Date of spraying antitranspirants was not significantly affected by treatments in the first or second seasons.

Table 6: The average total soloble % solids (TSS), acidity % and total sugars content as affected by Supplemental irrigation, antitranspirants agent and date of spray of Sultani fig tree During 2006 and 2007, seasons.

Factors	treatment	TSS (%)		Acidity (%)		Total sugars (%)	
		2006	2007	2006	2007	2006	2007
Irrigation dates	Control rainfed	17.83 a	18.39 a	0.27 a	0.27 a	12.77 a	13.04 a
	First May	16.72 b	16.83 b	0.23 b	0.24 b	11.26 b	11.53cd
	First June	15.78 c	16.22 b	0.19 c	0.20 c	11.43 b	11.41d
	First July	15.72 c	16.11 b	0.18 c	0.20 c	11.54 b	11.82bc
	First August	15.94bc	16.17 b	0.17 c	0.20 c	11.68 b	12.05 b
Antitranspirant agent	Control	16.10 b	16.93 a	0.22 a	0.22 a	11.50 b	11.55 c
	Vapor-guard	16.53ab	16.73 a	0.21ab	0.22 a	12.05 a	12.39 a
	Folicote	16.57 a	16.57 a	0.20 b	0.22 a	11.66 b	11.97 b
Spraying date	1stMay	16.62 a	16.84 a	0.21 a	0.22 a	11.64 a	11.78 b
	1stJune	16.18 b	16.64 a	0.20 a	0.22 a	11.83 a	12.16 a

Means followed by the same letterone not significantly different at the 5% level.

Table 7: The average total soloble % solids (TSS), acidity % and total sugars content as affected by interaction between Supplemental irrigation, antitranspirants agent and date of spray of Sultani fig tree During 2006 and 2007, seasons.

Treatments			TSS (%)		Acidity (%)		Sugars (%)	
irrigation	antitranspirant	date	2006	2007	2006	2007	2006	2007
Control rainfed	control	1stMay	18.00ab	21.00a	0.25abc	0.21c	12.53a-f	12.87abc
		1stJune	17.33abc	19.00b	0.27ab	0.23bc	13.10abc	13.80 a
	Vapor-guard	1stMay	18.33 a	18.33c	0.25a-d	0.27ab	13.27ab	13.33ab
		1stJune	17.33abc	17.33f	0.27ab	0.30a	12.57a-e	13.77 a
	Folicote	1stMay	18.00ab	16.67h	0.30 a	0.30a	11.83c-i	11.63c-f
		1stJune	18.00ab	18.00d	0.29 a	0.30a	13.33 a	12.87abc
First May	control	1stMay	17.33abc	17.67e	0.30 a	030a	10.83hi	10.07h
		1stJune	17.00a-d	16.33i	0.28 a	0.27ab	12.20a-h	12.10b-e
	Vapor-guard	1stMay	16.67b-e	17.33f	0.25 abc	0.27ab	11.37d-i	11.87c-f
		1stJune	17.00a-d	16.33i	0.20cde	0.20c	10.70 i	11.77c-f
	Folicote	1stMay	17.00a-d	17.00g	0.19de	0.20c	11.20e-i	11.37d-g
		1stJune	15.33def	16.33i	0.17 e	0.20c	11.23e-i	12.00cde
First June	control	1stMay	15.67def	16.33i	0.22b-e	0.20c	10.90hi	10.34gh
		1stJune	15.00ef	16.00j	0.18 e	0.20c	11.50d-i	11.23eh
	Vapor-guard	1stMay	16.33c-f	16.33i	0.18 e	0.20c	11.73d-i	12.17b-e
		1stJune	15.33def	16.33i	0.20cde	0.20c	11.70d-i	11.90cde
	Folicote	1stMay	16.67b-e	16.33i	0.18 e	0.20c	11.73d-i	11.57c-g
		1stJune	15.67def	16.00j	0.19de	0.20c	11.03ghi	11.27d-h
First July	control	1stMay	14.67f	14.67k	0.19de	0.20c	10.83hi	10.57fgh
		1stJune	15.00ef	15.33l	0.18 e	0.20c	11.07ghi	11.20e-h
	Vapor-guard	1stMay	15.67def	15.33l	0.18 e	0.20c	12.10a-h	12.27b-e
		1stJune	16.00c-f	17.00g	0.18 de	0.20c	12.40a-g	12.33b-e
	Folicote	1stMay	16.67b-e	16.33i	0.18 e	0.20c	11.67d-i	12.27b-e
		1stJune	16.33c-f	17.00g	0.18 e	0.20c	11.17f-i	12.27b-e
First August	control	1stMay	15.67def	16.00j	0.18 e	0.20c	10.70 i	11.57c-g
		1stJune	15.33def	16.00j	0.17 e	0.20c	11.37d-i	11.80c-f
	Vapor-guard	1stMay	16.33c-f	16.00j	0.17 e	0.20c	11.97b-i	12.60a-d
		1stJune	16.33c-f	17.00g	0.18 e	0.20c	12.67a-d	11.87c-f
	Folicote	1stMay	16.33c-f	16.33i	0.17 e	0.20c	11.97b-i	12.27a-e
		1stJune	15.67def	15.67k	0.16 e	0.20c	11.43d-i	12.20b-e

Means followed by the same letterone not significantly different at the 5% level.

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