EFFECT OF VENTILATION PERCENT AND LOCATION ON THE PRODUCTIVITY OF SOME CANTALOUPE CULTIVARS UNDER LOW TUNNEL CONDITIONS.

***Hasanein ,N. M. and ** Manal M. H. Gad El-Mola**

Journal

J. Biol. Chem. Environ. Sci., 2010, Vol. 5(3):717-729 www.acepsag.org

** Prot. Cult. Res. Dep. Hort. Res. Inst. Agric. Res. Center, Giza, Egypt.*

***Modified Climate Res. Dep., Center Lab. of Agric. Agric. Res. Center, Giza, Egypt.*

ABSTRACT

Two field experiments were carried out in a private farm at El-Sheikh Zwyied, North Sinai governorate during the two successive seasons of 2008/2009 and 2009/2010 to study the effect of ventilation percent and location [i.e. open the tunnels of 10% east (v_1), open the tunnels 10% west (v_2), open the tunnels 10% east west (v_3), open the tunnels 10% west east (v_4),open the tunnels 20% east (v_5), open the tunnels 20% west (v_6), and open the tunnels 20% east west (v_7)] using two cantaloupe cultivars (i.e. Imperial, C_1 AND Yathrib hybrid, C_2). The effects of the previously mentioned factors on growth, yield and and yield components were studied.

Results indicated that plant height, leaf area, number of leaves per plant, fresh weight and dry weight were significantly affected by the two cultivar treatments. The highest one was found for C_2 treatment. Also, the previously mentioned characters were significantly affected by ventilation percent and location. The maximum one was registered for V_5 treatment. The highest interaction was found for C_2 X V_5 in the two growing seasons.

Results indicated also that fruit length in the first season and TS in the second season were superior for C_2 treatment. While, fruit diameter, shape index, flesh thickness, TS in the first season and fruit length, fruit diameter, shape index, flesh thickness in the second season were increased for C_1 treatment.

Concerning ventilation percent and location, it was significantly affected fruit parameters. The highest one was found for V_5 in the two

seasons. The superiority of the interaction between cultivars, ventilation percent and location was found for C_1 X V_6. At the same time, C_2 was superior for V_5, in the two seasons. Yield and yield components were significantly affected by the two cultivars under study. The maximum result was obtained for C_2 in the two seasons. In the same direction, ventilation percent and location were significantly affected yield and yield components. The highest one was obtained for V_5 treatment. The superiority of interaction between the factors under study was registered for C_1 X V_6 in the two seasons.

It could be concluded that, under the use of Imperial cultivar (C_1), the optimum ventilation percent and location should be 20 % west. However, the optimum ventilation percent and location for Yathrib hybrid cultivar (C_2) is 20 % east at El-Sheikh Zwyied area.

Key words: ventilation percent, ventilation location, cultivars cantaloupe, growth, yield and low tunnels

INTRODUCTION

Ventilation has a great effect on growth and development of crops. It was reported that greenhouse ventilation which was caused by wind and temperature has a very direct effect on the greenhouse on ventilation conditions such as temperature, CO_2 concentration and humidity *Boulard and Draoui (1995)* also, found that several greenhouse parameters such as air temperature, relative humidity and CO_2 concentration may be controlled by ventilation, Also it was found that the greenhouse climate can be controlled by ventilation. *Seginer (1984)* suggested that greenhouse overheating may be reduced by ventilation but the plants may be subjected to water stress because ventilation often increases plant transpiration. *Sirait et al. (1994)* found that wider row spacing (10 cm) increased individual plant vegetative growth of lima bean compared to cioser row spacing (5cm). as well as *Ismail (2004)* showed that there were significant decreases in dry weight of different plant parts (branches and leaves as well as whole plant) with increasing of plant density to 18 plants/m^3 when plants are sown on one side or two sides of irrigation .*El-Dolify (2005)* reported that when the ventilation is efficient, this may increase the absorption of the most needed essential elements. *Luo et al. (2005)* revealed that natural ventilation is the most frequently used method for cooling the greenhouse atmosphere and maintaining more suitable

conditions for plant growth. *Coelho et al (2006)* mentioned that the greenhouse climate can be controlled by greenhouse ventilation and this affect environmental conditions such as humidity, temperature and CO_2 concentration which in turn affect development and production of crops.

Ventilation can influence greenhouse climate strongly such as temperature, humidity and CO_2 concentration particularly in Mediterranean countries *Hasni et al (2006)*. Sase (2006) found that the uniformity of greenhouse environment can be affected strongly by the air movement caused by ventilation in greenhouse, which in turn affect uniformity of plant growth and quality. *Ewa and Skupien (2007)* revealed that there were a significant and gradual decrease in number of branches and leaves with increasing plant density. On the contrary plant height was increased with increasing plant density. As well as, significantly longer leaves and higher weight per plant were obtained at 20x4 cm sowing rate and influence of flat covers usage (non- woven polypropylene and perforated polyethylene film) on quantity and quality of garlic yield cultivated for bundle – harvest was carried out.

Covering with non-woven polypropylene and perforated film was found to increase the yield of spring garlic cv. Jarus by 24.5% in comparison to open- field cultivation (control) . Nevertheless the film type covered plant were higher, produced more and longer leaves which resulted in higher weight per plant. *Magdoubi et al (2007)* analyze the natural ventilation performances in large-scale of Canary type tomato green house equipped with insect screens on the vent openings. The results confirm the strong dependence of greenhouse ventilation rate on wind speed and ventilation opening location. In addition , results showed a significant reduction of the ventilation rate compared with other greenhouse type : the insect screen reduced the greenhouse ventilation rate by 46% and the tomato rows that were oriented perpendicular to the prevailing air movement through the greenhouse reduced the ventilation rate by 50%.

MATERIALS AND METHODS

This experiment was carried out in a private farm at El Sheikh Zwyied , North Sinai Governorate during two seasons of 2008/2009 and 2009/2010 under transplanting polyethylene low tunnels

conditions to study the effect of ventilation percent and location on cantaloupe growth , yield and fruit quality. Cantaloupe hybrid yathrib and Imperial seeds were sown on December 15th 2008 and on December 20 th 2009 in a nursery .Seedling transplanting took place on January 5th 2009 and on January 11th 2010 using clear polyethylene low tunnels. Block polyethylene mulch and drip irrigation system were implemented before planting cantaloupe.

Treatments:-

The experiment included 16 treatments, as follows:-

A- Main plot.

1- C_1: Imperial cultivar.
2- C_2 : Yathrib hybrid.

B- Sub main plot.

1- V_1: open the tunnels 10% east. (Is open 10% (3 m) of the length of the tunnel 30 m length)
2- V_2 :Open the tunnels 10% west. (Is open 10% (3 m) of the length of the tunnel 30 m length)
3- V_3 :Open the tunnels 10% east west. (Is open 10% (3 m) of the length of the tunnel 30 m length)
4- V_4 :Open the tunnels 10% west east. (Is open 10% (3m) of the length of the tunnel 30m length)
5- V_5 :Open the tunnels 20% east.(Is open 20% (6m) of the length of the tunnel 30 m length)
6- V_6 :Open the tunnels 20% west.(Is open 20% (6m) of the length of the tunnel 30m length)
7- V_7 :Open the tunnels 20% east west. (Is open 20% (6 m) of the length of the tunnel 30 meters length)
8- V8 : Open the tunnels 20% west. east (Is open 20% (6 m) of the length of the tunnel 30 meters length)
9- V9:Control

The experimental design was split plot with four replicates having cultivars distributed randomly in the main plots and open tunnels (location) and ventilation percentages were randomly distributed in the sub plots. Each experimental plot consisted of one

bed 30 meters long and one meter in width and it contained 30 plants .Design of Low tunnels

1- Open 10% (3 m) of the length of the tunnel 30 meters length and 75 cm aperture and the distance between the slot and the other 7 meters

2- Open 20% (6 m) of the length of the tunnel 30 meters length and 1.5 m aperture and the distance between the slot and the other 7 meters.Physical and chemical analysis of the soil are presented in Table (1).

Table (1) The Physical and chemical properties of the experimental soil

2008/2009														
Partical size distribution			Texture	PH	EC	C/N	$CaCO_3$	OM	mg/kg soil					
Sand	Silt	Clay			ds/m	%	%	%	N	P	K	Fe	Zn	Mn
97.3	1.8	0.9	Sandy	7.6	4.3	1:17	3.41	23	8.4	13.1	87.1	2.05	1.31	1.11
2009/2010														
96.8	2.5	0.7	Sandy	7.8	4.7	1:16	3.52	19	8.1	13.7	82.6	2.37	1.20	1.24

Drip irrigation and other cultural practices ,such as basic fertilization and pesticides were applied as recommended by Ministry of Agriculture , chemical analysis were carried out at Soil and Water Research Institute ,ARC.

Measurements:-

1- Plant height (cm) from the cotyledon level to the main stem apex.

2- Leaf area (cm^2) was measured of the 5^{th} true leaf by using laser leaf area meter.

3- Number of leaves was counted at intervals of 2 weeks and the total number of leaves per plant was recorded.

4- Plant fresh weight (gm).

5- Plant dry weight (gm) plant sample was dried at $70C^o$.

-Yield and its components:-

1- Early yield (kg/plant) for the first two picking.

2- Total yield (kg/ plant).

3- Total yield (ton/feddan)

4- Average fruit weight (gm)\

5- Fruit length (cm) ,fruit diameter (cm) and shape index (L/D)

6- Flesh thickness (cm).

-Chemical composition:-

- Total sugar content (TS) was measured by refract meter (model 1300)

Plant and soil sample dried and analyzed according to the standard of Chapman and Pratt (1961) ,Jackson (1973) and Pagl (1982).Also, total sugar content was determined according to Ogiwera et al (1998).

Statistical analysis:-

All obtained data were subjected to Statistical analysis for variance by using split plot design method as mentioned by Gomez and Gomez (1984) for calculating the least significant differences between treatments.

RESULTS AND DISCUSSION

1- Vegetative growth:-

Plant height, leaf area, number of leaves, fresh weight and dry weight of plants as affected by ventilation percent and location on some cantaloupe cultivars in 2008/09 and 2009/10 are presented in table (2).

Results indicated that all previous vegetative growth was affected by cultivar treatments. The highest one was obtained for C_2 cultivar in the two seasons. Concerning ventilation percent and location, they were significantly affected vegetative growth. The maximum result was obtained for V_5 treatment in the two seasons.

Results of interaction between cultivars, ventilation percent and location are shown in table (3). Results showed that the two cultivars under study were superior for V_5 treatment in the two seasons. However, the minimum one was found between C_1 X V_6 and C_2 X V_6. This may be due to the suitable conditions of ventilation could encourage plants to more absorption of elements. These results are in agreement with those obtained by Seginer (1984), Sirait et al . (1994) and Boulard and Draoui (1995).

From the previous results, it can be concluded that Yathrib hybrid (C_2) is the best cultivar under the conditions of El-Sheikh Zwyied area. The optimum ventilation percent and location is 20 % east (V_5). And the interaction between C_2 with C_1 could give the highest result of vegetative growth parameters.

Table (2) Effect of ventilation percent and location on vegetative growth of cantaloupe plants under low tunnels conditions.

Constituents		2008/ 09					2009/10				
Main	Sub Main	Plant height (cm)	Leaf area (cm^2)	No .of Leaves / plant	fresh weight /plant (g)	Dry weight /plant (g)	plant height (cm)	leaf area (cm^2)	No .of Leaves / plant	fresh weight /plant (g)	Dry weight/ plant (g)
A	Imperial	151.5	151.6	64.6	659.1	140.7	160.1	157.4	61.9	674.1	153.2
	Yathrib	153.9	153.4	65.9	667.8	143.3	162.1	158.4	62.1	680.1	154.7
L.S.D.at 0.05		1.1	0.45	N.S	0.23	1.04	0.63	0.17	N.S	2.19	0.31
B	V_1	142.4	146.4	58.0	626.0	128.4	150.5	150.2	52.0	637.4	142.8
	V_2	136.4	139.2	53.0	599.5	120.1	143.4	146.3	47.5	616.4	130.7
	V_3	162.0	160.3	75.0	707.0	154.8	171.7	166.1	69.5	715.8	168.8
	V_4	156.9	155.4	68.0	678.4	145.6	165.0	158.7	64.5	695.9	158.9
	V_5	177.3	171.9	85.0	747.6	174.7	184.1	176.2	80.5	761.7	182.5
	V_6	130.0	130.9	46.0	565.3	111.8	136.9	138.9	41.5	581.3	121.4
	V_7	148.5	149.5	61.0	654.7	137.8	158.5	155.3	59.0	667.7	151.5
	V_8	169.0	166.7	79.0	729.1	162.9	178.7	171.8	75.0	740.9	175.1
	V_9	153.4	157.4	72.0	692.7	148.3	161.5	155.2	61.0	682.6	153.4
L.S.D.at 0.05		3.26	4.17	2.06	11.39	6.54	1.37	5.61	2.38	18.39	7.03

1- Opened 10% (3 m) of the length of the tunnel 30 m length
2- Opened 20% (6 m) of the length of the tunnel 30 m length

Table (3) Effect of cultivars, ventilation percent and location interaction on vegetative growth of cantaloupe plants under low tunnels conditions.

Constituents		2008/09					2009/10				
Main	Sub Main	Plant height (cm)	Leaf area (cm^2)	No .of Leaves / plant	fresh weight /plant (g)	Dry weight /plant (g)	plant height (cm)	leaf area (cm^2)	No .of Leaves / plant	fresh weight /plant (g)	Dry weight/ plant (g)
Imperial	V_1	143.2	147.8	58.0	633.1	130.2	151.7	151.2	53.0	642.1	145.2
	V_2	135.4	136.8	51.0	591.1	117.8	141.6	145.9	46.0	609.9	131.2
	V_3	160.6	159.2	72.0	702.4	153.2	170.0	164.8	68.0	711.6	166.6
	V_4	158.4	156.1	70.0	684.9	147.1	166.2	160.2	65.0	705.3	160.8
	V_5	175.2	170.4	83.0	741.1	172.1	182.6	174.1	79.0	756.1	180.6
	V_6	127.9	128.5	45.0	556.3	109.3	134.6	136.5	40.0	571.4	118.4
	V_7	145.3	148.9	60.0	643.2	135.3	156.4	155.6	57.0	664.0	149.6
	V_8	166.4	165.1	78.0	720.7	160.7	177.3	170.7	74.0	732.7	173.1
	V_9	155.6	126.2	70.0	685.3	145.9	157.5	152.2	59.0	676.3	150.4
Yathrib	V_1	141.6	144.3	57.0	619.8	126.6	149.3	149.1	51.0	632.7	140.3
	V_2	137.4	141.6	54.0	607.8	122.4	145.1	146.7	49.0	622.9	130.2
	V_3	163.4	161.3	75.0	711.5	156.3	173.4	167.3	71.0	720.0	170.9
	V_4	155.3	154.6	66.0	671.8	144.0	163.8	157.1	64.0	686.4	156.9
	V_5	179.4	173.4	86.0	754.0	177.2	185.6	178.2	82.0	767.2	184.4
	V_6	131.2	133.2	47.0	574.2	114.2	139.2	141.3	43.0	591.2	124.3
	V_7	151.6	150.1	62.0	666.1	140.2	160.5	154.9	61.0	671.3	153.4
	V_8	171.6	168.2	80.0	737.5	165.1	180.1	172.8	76.0	749.1	177.1
	V_9	150.4	156.6	74.0	700.1	150.7	165.5	158.2	69.0	690.3	157.4
L.S.D.at 0.05		2.14	3.48	1.04	12.93	4.57	3.07	2.16	0.87	8.25	3.27

1- Opened 10% (3 m) of the length of the tunnel 30 m length
2- Opened 20% (6 m) of the length of the tunnel 30 m length

2-Fruit characteristics :-

Fruit length, fruit diameter, shape index, flesh thickness and TS as affected by ventilation percent and location on some cantaloupe cultivars in 2008/09 and 2009/10 are presented in table (4). Results indicated that all previous vegetative growth was affected by cultivar treatments. The highest one was obtained for C_2 cultivar in the two seasons. Concerning ventilation percent and location, they were significantly affected fruit characteristics. The maximum result was obtained for V_5 treatment in the two seasons.

Results of interaction between cultivars, ventilation percent and location are shown in table (5). Results showed that the two cultivars under study were superior for V_5 treatment in the two seasons, expect flesh thickness However, the minimum one was found between C_1 X V_4 or C_2 X V_4. This may be due to the suitable conditions of ventilation could encourage plants to more absorption of elements. These results are in agreement with those obtained by El – Afifi et al. (1995), (Kittas et al, 2002).Peil and Galvez (2002). Ismail (2004) and El-Dolify (2005).

From the previous results, it can be concluded that Yathrib hybrid (C_2) is the best cultivar under the conditions of El-Sheikh Zwyied area. The optimum ventilation percent and location is 20 % east (V_5). And the interaction between C_2 with V_5 could give the highest result of vegetative growth parameters.

Table (4) Effect of ventilation percent and location on fruit characteristics of cantaloupe plants under low tunnels conditions.

Constituents		2008/09					2009/10				
Main	Sub Main	Fruit length (cm)	Fruit diameter (cm)	shape index	Flesh thickness (cm)	TS mg/100 g f.w.	Fruit length (cm)	Fruit diameter (cm)	shape index	flesh thickness (cm)	TS mg/100 g f.w.
A	Imperial	7.16	12.46	0.654	3.49	64.53	7.91	12.14	0.651	3.25	60.02
	Yathrib	7.99	12.31	0.648	3.34	62.69	7.76	11.98	0.646	3.08	64.33
L.S.D.at 0.05		0.08	0.05	0.004	0.02	0.11	0.09	0.03	0.003	0.07	0.14
B	V_1	7.9	12.3	0.645	3.4	63.6	7.7	11.9	0.644	3.1	65.50
	V_2	7.3	11.5	0.635	2.8	56.4	6.9	11.2	0.618	2.5	57.45
	V_3	8.9	13.3	0.668	3.8	71.1	8.8	12.9	0.679	3.6	73.20
	V_4	6.9	11.1	0.625	2.5	53.8	6.4	10.7	0.601	2.2	55.65
	V_5	9.2	13.7	0.674	4.1	61.0	9.1	13.4	0.676	4.1	78.70
	V_6	8.6	13.3	0.667	4.1	76.8	8.5	12.6	0.675	3.9	62.30
	V_7	7.6	11.9	0.640	3.1	58.8	7.3	11.6	0.630	2.8	60.15
	V_8	8.3	12.6	0.655	3.6	66.8	8.2	12.3	0.666	3.3	68.15
	V_9	8.1	12.4	0.655	3.5	65.2	8.1	12.1	0.666	3.2	66.6
L.S.D.at 0.05		0.42	0.72	N.S	0.11	0.26	0.32	0.54	N.S	0.09	0.06

1- Opened 10% (3 m) of the length of the tunnel 30 m length
2- Opened 20% (6 m) of the length of the tunnel 30 m length

Table (5) Effect of cultivars, ventilation percent and location interaction on fruit characteristics of cantaloupe plants under low tunnels conditions.

Constituents		2008/09					2009/10				
Main	Sub Main	Fruit length (cm)	Fruit diameter (cm)	Shape index	Flesh thickness (cm)	TS mg/100 g f.w.	fruit length (cm)	Fruit diameter (cm)	Shape index	flesh thickness (cm)	TS mg/100 g f.w.
imperial	V_1	8.0	12.3	0.65	3.4	64.4	7.7	12.0	0.642	3.1	66.4
	V_2	7.4	11.6	0.638	2.9	57.1	7.0	11.3	0.620	2.6	58.1
	V_3	8.9	13.3	0.669	3.9	72.9	8.8	13.0	0.677	3.7	74.3
	V_4	6.8	11.2	0.625	2.6	54.4	6.5	10.8	0.602	2.3	56.4
	V_5	8.7	13.0	0.669	4.0	61.3	8.6	12.7	0.677	3.9	62.3
	V_6	9.3	13.8	0.674	4.3	78.4	9.1	13.5	0.675	4.1	80.4
	V_7	7.7	11.8	0.653	3.2	59.6	7.4	11.5	0.644	2.9	60.6
	V_8	8.3	12.7	0.654	3.6	68.1	8.2	12.3	0.667	3.4	69.1
	V_9	8.0	12.3	0.660	3.3	66.2	7.9	13.9	0.666	3.0	64.6
Yathrib	V_1	7.8	12.2	0.639	3.3	62.8	7.6	11.8	0.645	3.0	64.6
	V_2	7.2	11.4	0.632	2.7	55.7	6.8	11.0	0.616	2.4	56.8
	V_3	8.8	13.2	0.667	3.7	70.5	8.7	12.8	0.680	3.5	72.1
	V_4	7.0	10.9	0.624	2.4	53.2	6.3	10.5	0.600	2.0	54.9
	V_5	9.1	13.5	0.674	4.2	60.7	9.0	13.3	0.677	4.0	77.0
	V_6	8.5	12.8	0.664	3.9	75.2	8.4	12.5	0.672	3.8	62.3
	V_7	7.5	12.0	0.627	3.0	58.0	7.2	11.7	0.615	2.7	59.7
	V_8	8.2	12.5	0.656	3.5	65.4	8.1	12.2	0.664	3.2	67.2
	V_9	8.2	12.5	0.650	3.5	64.2	8.1	12.3	0.666	3.4	68.6
L.S.D.at 0.05		0.13	0.32	0.046	N.S	0.26	0.15	0.22	0.036	N.S	0.23

1-Is open 10% (3 m) of the length of the tunnel 30 m length
2-Is open 20% (6 m) of the length of the tunnel 30 m length

3- Yield and its components:-

Early yield, total yield Kg/plant, average fruit weight and total yield ton/fed., as affected by ventilation percent and location on some cantaloupe cultivars in 2008/09 and 2009/10 are presented in table (6). Results indicated that all previous vegetative growth was affected by cultivar treatments. The highest one was obtained for C_2 cultivar in the two seasons. Concerning ventilation percent and location, they were significantly affectedfruit characteristics. The maximum result was obtained for V_4 treatment in the two seasons.

Results of interaction between cultivars, ventilation percent and location are shown in table (5). Results showed that the two cultivars under study were superior for V_4 treatment in the two seasons, expect flesh thickness However, the minimum one was found between C_1 X V_2 or C_2 X V_2. This may be due to the suitable conditions of ventilation could encourage plants to more absorption of elements. These results are in agreement with those obtained by Luo et al. (2005), Coelho et al (2006) and Magdoubi et al (2007).

From the previous results, it can be concluded that Yathrib hybrid (C_2) is the best cultivar under the conditions of El-Sheikh Zwyied area. The optimum ventilation percent and location is 20 %

west (V_6). And the interaction between C_2 with V_6 could give the highest result of vegetative growth parameters.

Table (6) Effect of ventilation percent and location on yield and its components of cantaloupe plants under low tunnels conditions.

Constituents		2008/09				2009/10			
Main	Sub Main	Early yield kg/ plant	total yield kg/ plant	average fruit weight (g)	Total yield ton/ fed.	Early yield kg/ plant	total yield kg/ plant	Average fruit weight (g)	Total yield ton/ fed.
A	Imperial	3.28	6.37	683.8	12.74	3.12	6.33	709.1	12.65
	Yathrib	3.29	6.39	696.5	12.78	3.14	6.34	721.4	12.69
L.S.D.at 0.05		N.S	N.S	2.6	0.02	N.S	N.S	4.2	0.01
B	V_1	3.21	6.35	683.0	12.70	3.04	6.28	699.0	12.58
	V_2	3.09	6.15	624.0	12.29	2.77	6.12	648.5	12.24
	V_3	3.57	6.63	757.0	13.25	3.48	6.62	785.5	13.22
	V_4	2.88	6.03	592.5	12.06	2.69	5.94	622.5	11.88
	V_5	3.80	6.74	777.5	13.47	3.68	6.68	810.5	13.36
	V_6	3.38	6.55	729.5	13.10	3.38	6.50	747.0	13.00
	V_7	3.14	6.24	647.5	12.47	2.97	6.21	679.0	12.41
	V_8	3.25	6.42	710.0	12.76	3.13	6.34	726.0	12.68
	V_9	3.23	6.37	700.0	12.73	3.08	6.30	712.0	12.62
L.S.D.at 0.05		0.13	0.24	17.36	0.17	0.08	0.06	22.69	0.27

1- Opened 10% (3 m) of the length of the tunnel 30 m length
2- Opened 20% (6 m) of the length of the tunnel 30 m length

Table (7) Effect of cultivars, ventilation percent and location interaction on yield and its components of cantaloupe plants under low tunnels conditions.

Constituents		2008/09				2009/10			
Main	Sub Main	Early yield kg/plant	total yield kg/plant	average fruit weight (g)	Total yield ton/ fed.	Early yield kg/plant	Total yield kg/plant	average fruit weight (g)	Total yield ton/ fed.
Imperial	V_1	3.17	6.32	692.0	12.63	3.0	6.25	706.0	12.50
	V_2	3.07	6.10	615.0	12.21	2.71	6.11	641.0	12.21
	V_3	3.62	6.65	763.0	13.30	3.54	6.63	797.0	13.25
	V_4	2.82	6.00	600.0	12.00	2.64	5.91	630.0	11.81
	V_5	3.42	6.58	732.0	13.15	3.37	6.55	753.0	13.10
	V_6	3.82	6.77	785.0	13.53	3.71	6.71	814.0	13.41
	V_7	3.11	6.21	652.0	12.42	2.92	6.15	685.0	12.31
	V_8	3.22	6.36	715.0	12.71	3.10	6.31	730.0	12.62
	V_9	3.20	6.34	685.0	12.69	3.05	6.26	705.0	12.57
Yathrib	V_1	3.24	6.38	674.0	12.76	3.07	6.30	692.0	12.65
	V_2	3.11	6.19	633.0	12.37	2.82	6.13	656.0	12.26
	V_3	3.51	6.60	751.0	13.20	3.41	6.60	782.0	13.19
	V_4	2.94	6.05	585.0	12.11	2.73	5.97	615.0	12.9
	V_5	3.77	6.71	770.0	13.41	3.64	6.65	807.0	11.94
	V_6	3.33	6.52	727.0	13.04	3.25	6.45	741.0	13.31
	V_7	3.16	6.27	643.0	12.54	3.01	6.26	673.0	12.51
	V_8	3.28	6.40	705.0	12.80	3.16	6.37	722.0	12.73
	V_9	3.26	6.40	715.0	12.77	3.11	6.34	719.0	12.67
L.S.D.at 0.05		0.13	0.05	10.57	0.47	0.28	0.03	7.16	0.31

1- Opened 10% (3 m) of the length of the tunnel 30 m length
2- Opened 20% (6 m) of the length of the tunnel 30 m length

reduced the greenhouse ventilation rate by 46% and the tomato rows that were oriented perpendicular to the prevailing air movement through the greenhouse reduced the ventilation rate by 50%. The results were agreement with those ofHasni et al (2006) . Sase (2006) and Ewa and Skupien (2007).

REFERENCES

Bonlard, T. and B. Draoui. 1995. Natural ventilation of a greenhouse with continues roof vents: Measurements and data analysis. Journal of Agricultural Engineering Research. 61: 27 – 36.

Chapman ,H. D. and F. Pratt (1961) Method of analysis for soil .Plant and water Calif. Univ. USA.

Coelho, M., F. Baptista, V. Fitas da Cruz and J. L. Garcia. 2006. Comparison of four natural ventilation systems in a Mediterranean greenhouse. Acta Hort. 719: 157 – 164.

El – Afifi, S. T.; Hamail, A. F.; Abou El-Salehein, E. H. and Abaza, M. E. 1995. Effcet of NPK fertilizers and plant spacing on growth and yield of bean (*Phaseolus vulgaris* L.). J. Agric. Sci. Mansoura Univ., 20 (2): 819 – 830.

El-Dolify, M. R. M. 2005. Productivity of cucumber crops affected by the greenhouse design types. M.Sc. Thesis, Fac. Agri. Ain Shams University.

Ewa, R. and Skupien, K. 2007. Influence of flat covers and sowing density on yield and chemical composition of garlic cultivated for bundle – harvest. Vegetable Crops Research Bulletin. 66: 17 -24.

Gomez, K. A. and A. A. Gomez (1984) Statistical procedures for agricultural Research Joho Wiley and Sons Inc. New York 680 pp.

Hasni, A., B. Draoui, F. Bounaama, M. Tamali and T. Boulard. 2006. Evolutionary algorithms in the optimization of natural ventilation parameters in a greenhouse with continuous roof vents. Acta Hort. 719: 49 – 55.

Ismail, T. B. A. 2004. Effect of drip irrigation rates, organic fertilization and plant density on yield and quality of snap bean. Ph.D. Thesis, Faculty of Agriculture, Suez Canal University. Cairo, Egypt.

Jackson ,M. (1973) Soil chemical analysis prentice hall of India private Limited New Delhi 18pp.

Kittas, C., T. Boulard, T. Bartzanas, N. Katsoulas and M. Mermier. 2002. Influence of an insect screen on greenhouse ventilation. American Society of Agricultural Engineering. 45 (4): 1083 – 1090.

Luo, W.; Stanghellini, C.; Dai, J.; Wang, X.; De Zwart H. F. and Bu, C. 2005. Simulation of greenhouse management in the subtropics, Part II: Scenario study for the summer season, Biosystems Engineering 90(4): 433 – 441.

Magdoubi, H.; Boulard, T.; Hanafi, A.; Bekkaoui, A.; Fatnassi, H.; Demrati, H.; Nya, M. and Bouirden, L. 2007. Natural ventilation performance of a large greenhouse equipped with insect screens. Translocation of the ASABE 50 (2): 621 – 650.

Ogiwara, L. ;G. H. Habutsu; N. Hakada and I. Khimura (1998) Soluble sugar content in fruit of nine wild and forty one cultivated strawberries .J. of the Japanese Soc. for Hort. Sci. 67(3) :406-412.

Pagl, A. L. (1982) Method of soil analysis .Part 2 chemical micro biological properties SSSAP Inc. Madison Wisconsin ,USA.

Peil,R. M. and Galvez, J. L. 2002. Fruit growth and biomass allocation to the fruits in cucumber effect of plant density and arrangement. Acta Horticulture; 588: 75 -80.

Sase, S. 2006. Air movement and climate uniformity in ventilated greenhouses. Acta Hort. 719: 313 – 323.

Seginer, I. 1984. Transpirational cooling of a greenhouse crop with partial ground cover. Agricultural and Forest Meteorology. 71: 265 – 281.

Sirait,Y.; Pill, W. G. and Kee, W. E. J. 1994. Lima bean (*Phaseolus lunatus*, L.) response to irrigation regime and plant population density. Hort. Sci., 29 (2): 71 – 73.

تأثير نسب فتحات التهوية ومكانها على إنتاجيه بعض أصناف الكنتالوب تحت ظروف الأنفاق البلاستيكية

*** نظير محمد حسنين - **منال محمد حسنى جاد المولى**

*معهد بحوث البساتين – أقسام بحوث الخضر – قسم بحوث الزراعات المحمية
** المعمل المركزي للمناخ الزراعى - قسم بحوث تعديل المناخ

أجريت هذه الدراسة فى عامي 2008/2009و 2009/2010 فى منطقة الشيخ زويد بمحافظة شمال سيناء لدراسة تأثير نسب فتحات التهوية وموضعها على نمو وإنتاجيه صنفين من الكنتالوب [(C_1) امبريال و (C_2) هجين يثرب] تحت ظروف الأنفاق البلاستيكية. من هذه الدراسة تم استخدام أنفاق بطول 30 متر وفتحات تهوية 10و20 % (3و6 متر من طول النفق 30 متر) ويضم النفق 4 فتحات تهوية طول كل فتحة 75 سم و150 سم وكذلك اتجاه النفق (اتجاه واحد إما شرقا وإما غربا واتجاهين (شرق غرب او غرب شرق بالتبادل) وكانت المعاملات كالآتى

1- V_1: فتح فتحات التهوية بنسبة 10 % فى اتجاه الشرق.
2- V_2: فتح فتحات التهوية بنسبة 10 % فى اتجاه الغرب
3- V_3: فتح فتحات التهوية بنسبة 10 % فى اتجاهين شرق غرب
4- V_4: فتح فتحات التهوية بنسبة 10 % فى اتجاهين غرب شرق
5- V_5: فتح فتحات التهوية بنسبة 20 % فى اتجاه الشرق
6- V_6: فتح فتحات التهوية بنسبة 20 % فى اتجاه الغرب
7- V_7: فتح فتحات التهوية بنسبة 20 % فى اتجاهين شرق غرب.
8- V_8:فتح فتحات التهوية بنسبة 20 % فى اتجاهين غرب شرق.
9- V_9: الكنترول

وكانت أهم النتائج المتحصل عليها

1- أدى فتح فتحات التهوية بنسبة 20 % فى اتجاه الشرق الى الحصول على أعلى نمو خضرى (طول نبات بالسم – والوزن الطازج والوزن الجاف لكل من الاوراق والسيقان وعدد الاوراق ومساحة الورقة) للهجين يثرب بالمقارنة بالهجين امبريال بينما أدى فتح فتحات التهوية بنسبة 20 % غرب إلى الحصول على على أقل نمو خضرى للصنفين تحت الدراسة.
2- فتح فتحات التهوية بنسبة 10 % فى اتجاه الشرق يؤدى الى زيادة الصفات الطبيعية لثمار الهجين يثرب مثل (طول وقطر ثمرة وسمك اللحم) وكذلك الصفات الكيميائية مثل السكريات الكلية بالمقارنة بالصنف امبريال والكنترول والمعاملات الأخرى.بينما كانت اقل المعاملات فى الصفات الكيميائية والطبيعية هي فتح فتحات التهوية بنسبة 10 % فى اتجاه الغرب.
3- يؤدى فتحات التهوية بنسبة 20 % فى اتجاه الشرق الى زيادة المحصول الكلى ومكوناته (المحصول المبكر بالكجم – المحصول الكلى بالكجم – ومتوسط وزن الثمرة بالجم – المحصول الكلى بالطن لكل فدان) بالمقارنة بالمعاملات الأخرى موضع الدراسة والكنترول.