

SUSCEPTIBILITY OF CERTAIN TOMATO VARIETIES TO INFESTATION WITH SOME INSECT PESTS

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Abstract

Susceptibility of 4 tomato varieties namely Pacesetter 502, Rossel VFN, Ace and Alex. 61F₁ to infestation with adults of *Myzus persicae*, *Empoasca decipiens*, *Bemisia tabaci* and larvae of *Autographa* spp. was investigated in summer and nili plantations of 1991. The results indicated that certain tomato varieties were susceptible to infestation with some insects while others were somewhat resistant. As for *M. persicae*, Alex. 61F₁ was the most resistant and Pacesetter 502 was the highest susceptible followed by Ace in summer plantation. Aphid infestation in summer plantation was more abundant than in nili plantation. *B. tabaci* infestation in summer was low in Alex. 61F₁ followed by Ace and was high in Rossel VFN with no significant differences in nili plantation. Concerning *E. decipiens* infestation in summer it was low with no significant differences between summer and nili plantations. Infestation with *Autographa* spp. was low in summer and nili plantations. Data concerning the yield of the different varieties indicated that Alex. 61F₁ had the highest fruits per plant and fruit's weight. Nili plantation gave the highest yield. The results showed that type of variety and time of growing season play a role in susceptibility rate and the quantity of yield.

INTRODUCTION

The tomato plants, *Lycopersicon esculentum* L., are attacked by various insect pests, among which are the green peach aphid *Myzus persicae* Sulzer, the potato leaf hopper *Empoasca decipiens* Paoli, the cotton white fly *Bemisia tabaci* Genn. and

the semi-looper worms *Autographa* spp. Integrated Pest Management programs require the adoption of resistant plant varieties to pests. The main objective of the present work is to evaluate the susceptibility of certain tomato varieties to some pests in order to select good tomato cultivars characterized by good yield and resistance to pests.

MATERIALS AND METHODS

The Tomato seed varieties, Pacesetter 502, Rossel VFN, Ace and Alex. 61F₁ were cultivated in pots (60cm x 60cm) at the Farm of Agricultural Research Station, Alexandria, Sabahia district. The seeds were cultivated on March 2 and June 4 for summer and nili plantations, respectively. Each variety consisted of 27 pots (27 plants) Normal agricultural practices were followed and no insecticidal treatments were applied during the experimental period. Each variety was separated by a 5m alleyway of ground. The number of adults of *M. Persicae* , *E. decipiens*, *B. tabaci* and larvae of *Autographa* spp. were counted weekly starting from May 13th to July 22nd and from August 19th to October 28th for summer and nili plantations, respectively. The red ripe tomato fruits of each variety were collected and weighed. Minimum, maximum temperatures and relative humidity were recorded during the experimental period.

RESULTS AND DISCUSSION

Results in Table 1 indicate that certain tomato cultivars were susceptible to some insects while others showed some resistance . With regard to *M. persicae* significant differences between tomato varieties in summer plantation were observed, but no significant differences were noticed in nili plantation. During summer plantation, Alex. 61F₁ cv. was the most resistant to aphid infestation with an average number of 2.15 adults /plant followed by Rossel VFN. Pacesetter 502 cv., however, was the highest susceptible with an average number of 20.11 adults /plant followed

Table 1. Susceptibility of different tomato varieties to insect infestations during summer and nili plantations (1991)

Varieties	Insect	Average no. of insects/plant		General average
		Summer (05/13-07/22)	nili (08/19-10/28)	
Pacesetter 502	<i>M. persicae</i>	20.11 a	1.18 a	10.65
Rossel VFN		4.22 bc	1.03 a	2.63
Ace		13.20 ab	1.54 b	7.37
Alex. 61F ₁		2.51 c	1.01 a	1.76
X		10.01	1.19	10.60
Pacesetter 502	<i>E. decipiens</i>	1.53 a	0.01 a	0.77
Rossel VFN		0.73 a	0.00 a	0.37
Ace		0.38 a	0.00 a	0.19
Alex. 61F ₁		1.83 a	0.01 a	0.92
X		1.50	0.005	0.75
Pacesetter 502	<i>B. tabaci</i>	3.76 ab	3.58 a	3.67
Rossel VFN		4.44 a	4.45 a	4.45
Ace		3.22 ac	2.67 a	2.95
Alex. 61F ₁		2.48 bc	5.25 a	3.87
X		3.48	3.99	3.74
Pacesetter 502	<i>Autographa spp</i>	0.09 a	0.07 a	0.08
Rossel VFN		0.09a	0.06 a	0.075
Ace		0.09 a	0.18 b	0.155
Alex. 61F ₁		0.09a	0.10 a	0.095
X		0.08	0.10 a	0.090

Means followed by the same letter are not significantly different at 5% ,
based on L. S. D. test.

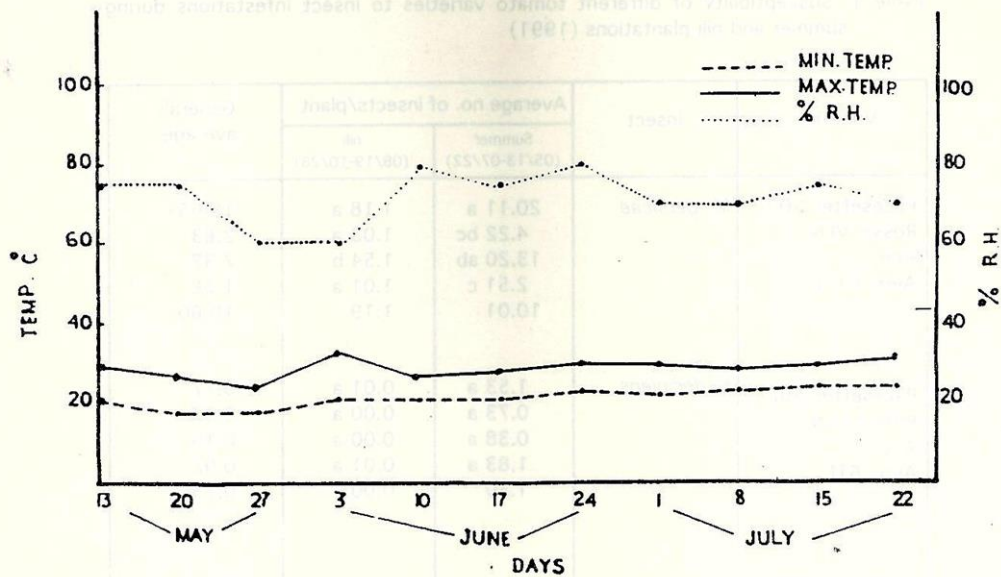


Fig. 1. WEEKLY MIN. AND MAX. TEMPERATURES AND RELATIVE HUMIDITIES DURING SUMMER PLANTATION OF TOMATO VARIETIES (1991)

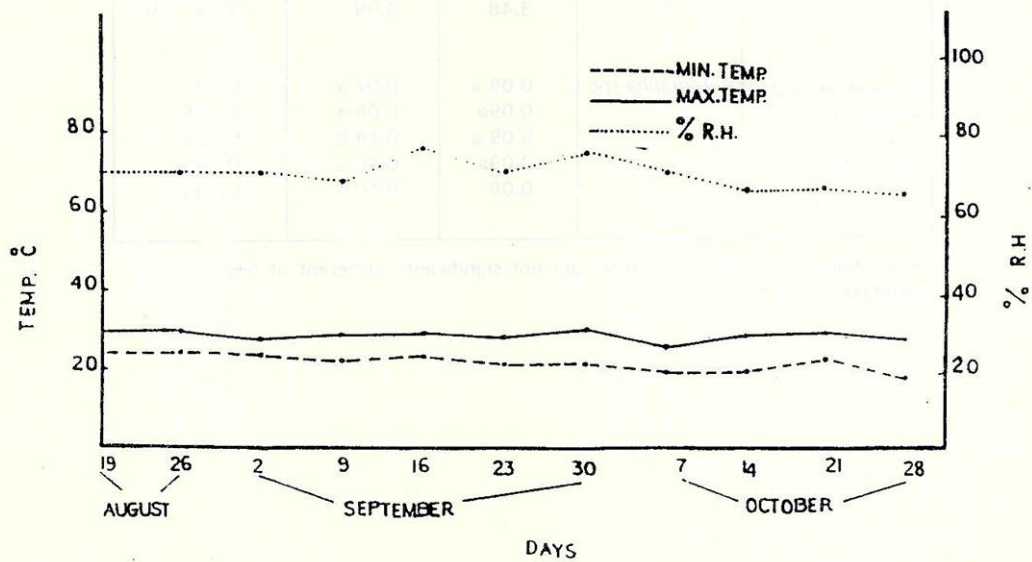


Fig. 2. WEEKLY MIN. AND MAX. TEMPERATURES AND RELATIVE HUMIDITIES DURING NILI PLANTATION OF TOMATO VARIETIES (1991)

by Ace cv. Aphid infestation in summer plantation was more than in nili plantation.

The average number *E. decipiens* on the different tomato varieties did not show any significant difference in summer and nili plantations. Although infestation by the potato leaf hopper was low in either season, it was higher in summer plantation than in the nili one.

During summer plantation, Alex. 61F₁ cv. showed the least infestation with *B. tabaci*. Rossel VFN, Pacesetter 502 and Ace cvs. showed high infestation levels with average numbers of 4.44, 3.76 and 3.22 adults /plant, resp. In nili plantation, tomato varieties did not show any significant difference in infestation with white fly. The average numbers of larvae of *Autographa* spp. were too low on the different tomato cultivars in summer and nili plantations.

Table 2, shows the mean number of fruits / plant and the mean weight per fruit of the different varieties in summer and nili plantations. No significant differences were noticed between the number of fruits per plant during summer, while there were significant differences in nili plantation. Alex. 61F₁ gave the highest fruits/plant followed by Ace, and Pacesetter 502. Rossel VFN did not produce suitable fruits. Nili plantation gave the highest weight / fruit with significant differences. Alex. 61F₁ variety produced the highest fruits. In summer Alex. 61F₁ also gave the highest weight/ fruit followed by Ace, Pacesetter 502 then Rossel VFN.

Table 2. Mean number of tomatoes /plant and mean weight / fruit of tomato varieties planted in summer and nili seasons.

Varieties	mean No. fruits /plant			mean weight/ fruit gm		
	Summer	nili	X'	Summer	nili	X'
Pacestter 502	8.84 a	4.50 a	6.67	37.70 a	106.38 a	72.04
Rossel VFN	8.38 a	3.00 a	6.19	32.93 a	43.75 b	38.34
Ace	8.51 a	7.25 b	7.88	43.93 a	48.75 b	46.37
Alex. 61F ₁	10.50 a	24.11 c	17.31	65.55 b	188.100 c	126.78
X'	9.31	9.72	9.51	45.04	45.04	70.88

Means followed by the same letter are not significantly different at 5% based on L.S. D. test.

From the foregoing results, *M. persicae* was abundant during summer plantation, while *B. tabaci* was common during both plantations. It seems that the insect population in summer and nili plantations is influenced by temperature, moisture, cultivar and the growing season.

These results agree with those of Abd El-Fattah *et al.*, (1984/85) who stated that the highest peak of *B. tabaci* was attained during September to November, while the lowest occurred in February on certain common weeds growing normally in tomato fields. Therefore, removal of weeds could minimize the population of *B. tabaci*.

Fertilizer treatments and naturally occurring products in plants have effects on their tolerance to insects. In 1988, Nossier indicted that phenolic and mineral contents in tomato leaves affected tomato tolerance to *A. gossypii* and *B. tabaci*. Kelada and Doss (1991) showed that concentration of phosphorus, potassium and calcium in leaves of summer squash were affected by foliar fertilizer treatment with (K_2SO_4). Treatment with K_2SO_4 reduced the population of *B. tabaci*, *A. gossypii* and *Thrips tabaci*. On the other hand, leaves treated with gibberlic acid increased the concentrations of nitrogen thus leading to high infestation with these insects. In 1967, Sturckow and Low isolated tomatine and solanine from Solanaceae. These chemicals were deterrent against the Colorado potato beetles. Williams *et al.*, 1980 reported that *A. gossypii*, and larvae of *Manduca sexta* and *H. zea* died when were confined on filter papers treated with a nonalkaloid insecticide (2- tridecanone), isolated from the wild tomato *Lycopersicon hirsutum* f. *glabratum*.

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حساسية بعض أصناف الطماطم للإصابة ببعض الحشرات

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أجريت التجربة في محطة البحوث الزراعية بالاسكندرية بهدف دراسة مدى حساسية أصناف الطماطم: Alex. 61F₁, Rossel VFN, Pacesetter 502 للإصابة بحشرات من الخوخ الأخضر، نطاط أوراق البطاطس، الذبابة البيضاء، الديدان نصف القياسه وذلك خلال العروه الصيفيه والنيليه من عام ١٩٩١. ولقد أظهرت النتائج قابلية لبعض الأصناف للإصابة ، بينما أظهر البعض الآخر مقاومه لتلك الآفات الحشرية ولقد كان الصنف Alex. 61F₁ أقوى الأصناف مقاومه لحشره المن ، بينما كان الصنف Pacesetter 502 ويلييه الصنف Ace أشد الأصناف قابلية للإصابة بتلك الحشره في العروه الصيفيه وكانت درجة إصابة تلك الأصناف بحشره المن في العروه الصيفيه أكبر منه في العروه النيليه.

وبالنسبة للإصابة بحشرة الذبابة البيضاء في العروه الصيفيه كانت أقل الأصناف أصابة Alex. 61F₁ يليها Ace بينما أظهر الصنف Rossel VFN أعلى درجات الإصابة لم تظهر اي فروق معنويه بالنسبه لقابلية تلك الأصناف للإصابة بهذه الحشرة في العروه النيليه.

ولقد لوحظ انخفاض الإصابة بحشره نطاط أوراق البطاطس في العروتين الصيفيه والنيليه وخاصة في العروه الأخيره . مع عدم وجود فروق معنويه للإصابة بين تلك الأصناف في العروتين كما يلاحظ انخفاض الإصابة بديدان النصف القياسه بالنسبه للأصناف المختلفه في العروتين . ولقد أظهرت النتائج أن الصنف Alex. 61F₁ كان أعلى الأصناف في عدد الثمار ووزنها وكانت إنتاجيه العروه النيليه أعلى من العروه الصيفيه وذلك لانخفاض الإصابة في العروه النيليه.