

EFFECT OF THE INFESTATION BY *Bemisia tabaci* (Genn.) ON SOME CHEMICAL PROPERTIES OF TOMATO FRUITS AT FAYOUM DISTRICT.

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ABSTRACT

The response of the five tomato cultivars gahal, E446, Gordean, Entersia and E448 to *Bemisia tabaci* (Genn.) Infestation was tested under field conditions at Fayoum district, Fayoum Governorate. Tomato Cultivars showed different susceptibility to white fly, *B. tabaci*. Obtained results indicated that, E446 and E448 cultivars were the highest susceptible, while Jakal cultivar was the lowest.

The percentages of mature green and mature pink fruits had a little amounts of non-reducing sugars as compared to the Reducing sugars. The Ascorbic acid (Vitamine C) content was increased in the mature pink tomato fruits.

INTRODUCTION

Whitefly *Bemisia tabaci* (Gennadius) is Serious pest of tomato (*Lycopersicon esculentum* L.) in Egypt. It cause indirect damage by tomato yellow leaf curtivirus. It's infestation on tomato is a vector of tomato leaf curl virus (Kisha, 1984; Gabr 1991 and Iskander 1995).

Researches concerning the white fly injury and population was estimated by several Egyptian authors. Habibi (1975) stated that the variety Ace was found to be the least susceptible of 3 varieties to attack by the white fly, Shaheen (1977) recorded that the most serious pest is the white fly *B. tabaci* causing loss to tomato.

Shanab and Awadallah (1982) stated that the variety Ace was found to be the least susceptible of 3 varieties to attack by the white fly.

Gabr (1991) recorded that the variety pritcherd showing highest susceptibility by white fly and Abd Elwahab (1997) indicated that Jakal variety was lowest susceptible to white fly *B. tabaci*.

RIDA (1974) cleared that there is a relation between the increase of ascorbic and decrease of the reducing sugars content in the tomato fruits during dark pink fruits.

The present work aimed to evaluate the susceptibility of the five tomato cultivars Gahal. E446, Gordean, Entersia and E448 to the white fly *B. tabaci* Infestation under field conditions at Fayoum district. The correlation between susceptibility and some biochemical mature green and mature pink tomato fruits content on the other hand was studied.

MATERIALS AND METHODS

One feddan experimental area was devided into thirty plots 140 m² at Fayoum district. Where five tomato cultivars were cultivated during the two successive seasons 15 July 1998-1999.

The tested cultivars were Gahal, E446, Gordean, Entersia and E448, where each cultivar was randomly replicated in six plots.

Each experimented cultivar received the normal recommend fertilizers and agricultural practices. Infestation level was determined by weekly counts of white fly immature stages (eggs and nymphs) on 150 leaflets. (25 leaflets/reflicate) picked at random from the plots, similarly number of adults was also counted randomly on 150 leaf lets in early morning. Data were recorded and subjected to statistical analysis (Snedecor, 1961). Plants showing virus symptoms were worked with a coloured plastic label after one and two months from cultivation (Yassin, and Nour 1965). The previous mentioned experiment was repeated during the Nili season of the second season 1998-1999.

Samples of tomato fruits after and before mature (green and pinkie) was analysed for ascorbic acid determination according to David (1970). The technique used for determination of reducing sugars and non reducing sugars was that adopted by Shaffer and Hartman (1921) and modified by Said (1941). The obtained data were statistically analyzed using correlation coefficient.

RESULTS AND DISCUSSION

Relative susceptibility of tomato varieties to white fly infestation and virus infection:

The population density and dynamics of the different stages of white fly during July to November, 1998 and 1999. (Nili season) are presented in Table (1). It is explained that the cultivar E448 was highly susceptible to white fly infestation 47.42 and 46.84 individuals plant leaves, while in the cultivar Jakal was the least susceptible one in this respect (27.48 and 20.88 individuals/plant leaves during 1998 and 1999 seasons respectively. During the two successive seasons, the cultivar E448 presented the highest number of *B. tabaci* individual followed by E446, Gordian and Entresia. In general, the cultivar Jakal proved the least preferable host to white fly infestation due to the nature of its leaves which are hairiness and because the plant short leaves (Kisha, 1984; Gabr, 1991 and Abdel Wahab *et al.*, 1998).

Data in Table (2) indicated that the cultivar Jakal proved to be the least susceptible cultivar to infection by leaf curl virus (10 and 9.5%). This was pronounced within the 1st and 2nd months from cultivation. While the cultivar E448 showed the highest percent of virus infection (65.5 and 63%) during 1998 and 1999 seasons respectively.

Statistical analysis exhibited significant differences among the five tested varieties. The obtained data agree with those reported (Gabr 1991 and Abdel Wahab *et al.* 1998). The cultivar Jakal was the least susceptible to virus infection.

Table (3) showed that the *B. tabaci* infestation induced on decrease in the Ascorbic acid in the investigated cultivars, especially Gakal which seemed to 6 significant followed by Enter similar data were given by Currence (1940); Reynard *et al.* (1942) and Scot and Kaamer (1949); who showed that green tomato fruits have less ascorbic acid content than pink ones.

Table 2: The leaf curl virus symptoms infection of tomato cultivars at Nili seasons of 1998 and 1999.

Tomato Cultivars	% virus infection following					
	Month 1998		Mean	Month 1999		Mean
	1 st	2 nd		1 st	2 nd	
1- Gakal	7	13	10	6	11	9.5
2- Gordean	25	21	23	26	20	23
3- E446	50	76	63	41	82	61.5
4- Entersia	29	53	41	27	50	38.5
5- E448	61	70	65.5	60	66	63

"F" Value between tomato cultivars = 0.30

Craft and Heinse (1954) and RIAD (1974) found that the ascorbic acid concentration in red-ripe tomatoes was 80% higher than in yellow fruits. Concerning non-reducing sugars content, pinkie fruits tomato of Gakal contained a significantly higher levels, than the green fruits tomato. The Reducing sugars in the two varieties of (Gakal and Entersia) tomato fruits examined during the green and pinkie mature fruits the range (2.17, 2.33 – 3.2.41, 2.47) Xamaguchi *et al.* (1960); Stevens (1972) and RIDA (1974), also found that the reducing sugars content of the mature fruits of some tomato varieties was 3.00%.

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**تأثير الإصابة بالذبابة البيضاء (*Bemisia tabaci* (Genn.) على بعض
المركبات الكيميائية لثمار الطماطم
شناهazy الديب
معهد بحوث وقاية النباتات - مركز البحوث الزراعية - الدقى - مصر 0**

- أجريت هذه الدراسة خلال موسمي 1998 - 1999م (العروق النيلى) فى منطقة الفيوم وذلك بهدف:
- 1- اختبار حساسية خمس أصناف من الطماطم جاكال - E446 وجورديان وانتريسيا و E448 لحشرة الذبابة البيضاء (*Bemisia tabaci* (Genn.) تحت ظروف الإصابة الحقلية 0
 - 2- دراسة بعض التغيرات الكيميائية فى الثمار الخضراء (قبل النضج) والثمار الحمراء (بعض النضج) وارتباطها بالإصابة الحشرية وقد أظهرت الدراسة النتائج التالية:-
أ) وجد اختلافات معنوية بين الأصناف المختبرة والإصابة بحشرة الذبابة البيضاء ومن النتائج المتحصل عليها تبين أن صنف E448 أعلى إصابة بالذبابة البيضاء وعلى العكس فى صنف جاكال 0
ب) أظهرت قياس المواد السكرية المختزلة والغير مختزلة أعلى فى الثمار الناضجة فى الصنف المقاوم للذبابة البيضاء جاكال، وأيضا حمض الأسكوربيك كان أقل كميات من الثمار الخضراء الغير ناضجة عكسها فى الثمار الناضجة فى الصنف المقاوم جاكال 0

Table (1): Population density of *B. tabaci* on five tomato cultivars during the Nili season of the successive years (1998 and 1999) at Fayoum Governorate.

		No. of <i>B. tabaci</i>																			
Date	Year	Gakal				E446				Gordian				Entresia				E448			
		Egg	Nymph	Adult	Total	Egg	Nymph	Adult	Total	Egg	Nymph	Adult	Total	Egg	Nymph	Adult	Total	Egg	Nymph	Adult	Total
July	1998	231	141	482	854	291	212	813	1315	370	189	622	1181	206	160	461	827	376	227	835	1438
	1999	251	128	347	726	185	422	640	1247	361	172	609	1142	260	143	451	854	174	165	889	1228
Aug.	1998	252	118	572	442	316	228	899	1443	409	253	841	1503	399	203	588	1190	412	357	902	1671
	1999	145	117	441	703	221	531	721	1473	414	251	858	1523	276	194	470	940	202	321	1105	1628
Sep.	1998	203	188	511	902	355	239	887	1481	411	261	853	1525	398	205	582	1191	435	369	887	1691
	1999	219	119	363	701	223	549	714	1486	429	232	861	1522	272	196	542	1010	201	313	1102	1616
Oct.	1998	244	115	394	753	269	225	792	1286	352	179	521	1052	289	146	511	946	311	208	791	1310
	1999	150	103	269	522	145	335	574	1054	354	173	433	960	163	113	491	767	151	201	1007	1359
Nov.	1998	156	173	342	671	281	205	741	1227	308	66	278	652	123	61	470	654	218	74	711	1003
	1999	146	122	212	480	141	258	542	941	301	98	256	655	152	116	392	660	147	142	906	1195
Total	1998	1086	735	2301	4122	1512	1109	4132	6753	1850	948	3115	5913	1415	781	2612	4808	1752	1235	4126	7113
	1999	811	589	1732	3132	915	2095	3191	6201	1859	926	3017	5802	1123	762	2346	4231	875	1142	5009	7026
Ave.		9481	662	2016.5	3627	12135	1602	3661.5	6477	1854.5	937	3066	5857.5	1269	771.5	2479	45195	1313.5	1188.5	4567.5	7069.5

F. 1998 = 119.59

F. 1999 = 141.65

L.S.D. 153.36

L.S.D. 144.40

Table (3): Biochemical status of the five tested tomato cultivars in relation to the tested *B. tabaci* and correlation coefficient

Constituent type	Constituent fruit in each of the cultivars									
	Gakal		E446		Gord.		Ent.		E448	
	Green	Pink								
Non-reducing sugars	0.8	0.9	0.45	0.72	0.54	0.66	0.45	0.56	0.51	0.71
Reducing sugars	2.17	2.33	2.11	2.23	1.88	2.37	2.41	2.47	2.18	2.21
Ascorbic acid	0.20	4.45	0.09	1.50	0.20	3.50	0.20	4.30	0.19	2.40
<i>B. tabaci</i> (Genn.) Average No. of individual	24.18		43.18		39.00		30.10		47.10	
Non-reducing sugars	0.95	0.95	0.97	0.95	0.68	0.98	0.62	0.69	0.65	0.94
	3.166	3.166	3.96	3.16	0.925	5.65	0.787	0.947	0.853	2.71
Reducing sugars	0.844	0.541	0.95	0.362	0.285	0.150	0.717	0.99	0.99	0.94
	1.55	0.640	3.16	0.388	0.297	0.151	1.024	9.00	9.00	2.713
Ascorbic acid	0.66	0.796	0.579	0.846	0.798	0.492	0.61	0.866	0.752	0.863
	0.881	1.30	0.707	1.570	1.311	0.564	0.768	1.732	1.133	1.692