

EFFECT OF BIOINSECTICIDE, INSECTICIDE, INSECT GROWTH REGULATOR AND NATURAL OIL ON THE WHITE FLY *Bemisia tabaci* (Genn.) AND ASCORBIC ACID (VITAMIN C) CONTENTS IN TOMATO PLANTS

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ABSTRACT

Beauveria bassiana (Biofly); Profenofos (Selecron 72% E.C) and Insect growth regulator (Admiral) as well as Natural oil were used against whitefly. *Bemisia tabaci* (Genn.) on tomato leaves in Fayoum district, Fayoum Governorate. Results indicated that Profenofos (Selecron 72% E.C) and Natural oil exhibited the highest reduction in population (after 2 day initial) during two seasons. While, Insect growth regulator; (Admiral) and (*Beauveria bassiana*) (Biofly) exhibited the highest reduction as residual effect (after 5-7 days) during 1998 and 1999 seasons.

The highest reduction in the incidence of Ascorbic acid was obtained with Profenofos (Selecron 72%) while Ascorbic acid increased in case of by (*Beauveria bassiana*) (Biofly) treatment.

INTRODUCTION

Tomato (*Lycopersicon esculentum* L.) is an important vegetable crop in Egypt. Whitefly, *Bemisia tabaci* (Genn.) Hemiptera, Aleyrodidea, considered to be the major pest attacking this crop. This insect cause severe damage to tomato plants by sucking up the leaf. sap and by transmitting tomato yellow leaf. Curl virus (TYLCV) which causes severe damage in Egyptian tomato production.

Virus incidence may reach 80% in unprotected fields (Shaheen *et al.*, 1973). Reductions in virus spread are usually achieved by vector control using insecticides (Cohen and Nitzani, 1966; Gameel, 1974; Shaheen, 1977 and Mazyad *et al.*, 1979 & 1986).

Little information is available about the effect of Bioinsecticide, Insect growth regulator and Natural oil on *B. tabaci* and also its effect on ascorbic acid contents of tomatoes.

George *et al.* (1988) shows that ascorbic acid contents in tomato fruits was reduced after thiodicarb application.

The effect of dimethoate in reducing the ascorbic acid content of egg plant was also reported by Berger (1980). The present paper is an attempt to determine the effect of Bioinsecticide. Insecticide, Insect growth regulator and Natural oil on *B. tabaci* and on ascorbic acid contents in tomatoes fruits. Insect growth regulator (Admiral), showed low initial mortality and a high residual mortality during 1998 and 1999 seasons.

It is of interest to report that this compound affect the ascorbic acid contents of tomato fruits.

MATERIALS AND METHODS

Field experiment was carried out during 1998 – 1999 seasons at Fayoum district, Fayoum Governorat, in an area of ½ feddan cultivated with tomato (Castle Roach variety). Treatments were replicated four times, the used substances were sprayed at the recommended rates per feddan as follows:

Tested Materials:

1st- Chemical Insecticide:-

Profenofos (0-4-bromo-2-chlorophyl)-ethyl - S – propylphosphoro thioat (selecron) 72% E.C at 750 cc/feddan.

2nd- Biological Insecticide:-

Biofly: (*Beauveria bassiana*) (Bals) (3×10^7 conidia/lm) at 1.2 L/feddan.

3rd- IGR:-

Admiral (Pyriproxyfen) J H M 10% at 300 cc/feddan.

4th- Natur'l oil at (1.0 lit):-

A mixture of fatty acid triglycerides and vegetable oil 93% + insert materials 5% (Stoller Enterprises, U.S.A.).

The remaining four replicates were left as untreated check. Application of different treatment was carried out after transplanting at consecutive 7 days intervals. Adults were counted weekly before sunrise on ten tomato leaves per plot at one day, 3, 5 and 7 days after application. The corrected mortality percent for each material was calculated according to Henderson and Tilton (1955). Incidence of TYLCV was determined by counting the number of plants, which showed the disease symptoms. The percentage of infected plants was calculated.

All the aforementioned data were statistically analysed according to Snedecor (1961).

Determination of ascorbic acid in tomato fruits after different materials application:

Samples of treated and untreated tomato fruits were taken for ascorbic acid determination after and before mature tomato fruits.

Representative samples were extracted with 0.4% oxalic acid solution at the ratio of 1:6 w/v in warring blender for minutes (David Pearson, 1970). After filtration through a Buchner funnel, an aliquot (one ml) of the filtrate at each sampling time was used for ascorbic acid determination.

RESULTS AND DISCUSSION

Effect of the applied substances on the whitefly *Bemisia tabaci* (Genn.):-

The effectiveness of four substances against whitefly *B. tabaci* infestation on tomato was evaluated under field conditions. The analysis of variance as well as the data and means for which the least significant

difference was made for both seasons are presented in Table (1). The data clearly indicated that there were significant differences between substances. The highest reduction in whitefly population was noticed with Profenofos (Selecron 70% Ec) and natur'ls oil during 1998 and 1999 seasons. Abd Elwhab *et al.* (1997). Showed that Profenofos (Selecron 72% E.C) gave the best results against whitefly *B. tabaci*. Insect growth regulators (Admiral) and Beauveria bassiana Biofly) gave the least initial (after 2 days) corrected mortality percentage during the two seasons which ranged between (75.6 and 74.2%) and (76.2 and 73.1%) respectively.

Statistical analysis after 2 days (initial) using Chi square parameters showed significant difference between these substances (table 1). It appear that these substances could be grouped into two categories according to their efficacy in controlling *B. tabaci*, adults during the two seasons.

Table (1): Efficiency of different materials on the population dynamics of the whitefly *B. tabaci* infesting tomato plants at Fayoum during two seasons 1998 and 1999.

Materials	Rate/ Feddan	1998		1999	
		C.M.P.		C.M.P.	
		Initial (2 days)	Residues (3-7 day)	Initial (2 days)	Residues (3-7 day)
Bioinsecticide:					
Biofly	1.2 L	74.2 ^b	84.9 ^a	73.1 ^b	85.1 ^a
Insect growth Regulator					
Admiral	0.300 L	75.6 ^b	89.5 ^a	76.2 ^b	89.9 ^a
Natural oil:					
Natur'l oil	1.2 L	86.0 ^a	68.0 ^b	83.6 ^a	70.3 ^b
Insecticide:					
Profenofos (Selecron 72% Ec)	0.750 L	94.9 ^a	75.9 ^b	95.2 ^a	72.8 ^b

C.M.P. = Corrected mortality percentage.

C.M.P. followed by the same letter in the column means not significantly different (P 0.05) by Chi square test.

Also Table (1) showed that the IGRs and Biofly gave the highest (residual effect) (after 5-7 days) with mortality percent (89.5 and 89.9%) and (84.9 and 85.1%) during the first and the second seasons respectively.

The effect of tested materials (residual effect after 5-7 days) was statistically analysed using Chi square parameters. It is clear that these substances could be grouped into two categories according to their efficacy in checking the population of *B. tabaci*, adults during the two seasons. In 1998 and 1999 seasons, the first category included insect growth regulator's (Pyriproxyfe) Admiral and (Beauveria bassiana) (Biofly). The second category occupied the next position as to its effectiveness and included Profenofos (Selecron 70% E.C) and natur'ls oil. Hamid and Korkor (1998) found that Admiral was for superior over several tested by them-bioinsecticides in controlling *Bemisia tabaci* on cotton plants. Mahgoub (1998) reported positive results for vegetable oils in controlling *B. tabaci*.

Data in Table (2) showed that the highest reduction in the incidence of TYL cv infection was with Profenofos (Selecron 70% Ec); Beauveria bassiana (Biofly) and Natur'ls oil during 1998 and 1999 seasons respectively.

Table (2): The leaf curl virus symptoms infection of tomato treated by same Chemicals at 1998 and 1999 seasons.

Treatment	Season	% virus infection			
		First	Second	Total	Mean
1- Selecron	1998	1	-	1	0.5
	1999	-	1	1	0.5
2- Natu'ls oil	1998	1	2	3	1.5
	1999	1	3	4	2.0
3- Biofly	1998	1	-	1	0.5
	1999	-	-	-	0.0
4- Admiral	1998	1	-	1	0.5
	1999	-	-	-	0.0
5- Controll.	1998	8	12	20	10
	1999	10	14	14	12

Hegab *et al.* (1992) and Mahgoub (1998) who found that vegetable oils was effective in reducing both whitefly and TYL cv in tomato plants.

In the present study Table (3) showed that Ascorbic acid (Vitamin C) content in tomato fruits variety Castel Roach ranged from (2.12 – 12.1 mg/100 g) fresh weight during the stages of ripening (green fruits and pink fruits), without treated by same substances.

Table (3): Ascorbic acid in tomato fruits treated with some substan.

Treatment	Ascorbic acid of stages of ripening	
	Green fruits	Pink fruits
1- Selecron	1.5	11.8
2- Natu'ls oil	2.2	12.3
3- Biofly	2.8	12.9
4- Admiral	2.6	12.8
5- Controll.	2.12	12.1

Mg/100 g freshweight.

The highest reduction in the incidence of Ascorbic acid was with Profenofos (Selecron 72% E.C) (1.5 – 11.8) while Ascorbic acid increased with treated by *Beauveria bassiana* (Biofly) (2.8 – 12.9 mg/g) followed by Pyriproxyfe (Admiral) and Natur'ls oil (2.6 – 12.8 and 2.2 – 12.3 mg/100 g) fresh weight for the green furls and pink fruits respectively. The effect of dimethoate in reducing the ascorbic acid content of egg plants was also reported by Berger *et al.* (1980). These pollutants include several chlorinated hydrocarbon insecticides and several organophosphate insecticides (Calabrese, 1985).

Thus, as a conclusion, it can be said that using Biofly; Admiral and Natur'ls oil treatments may used safety for reducing the population of *B. tabaci* on tomato and Ascorbic acid level was increased with all treatments.

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**تأثير المبيد الحيوى والمبيد الكيمايى ومانع التغذيةى والزيت على الذبابة البيضاء
وعلى حمض الأسكوربيك فى نبات الطماطم 0
شناهazy الديب
معهد وقاية النباتات - مركز البحوث الزراعية - الدقى**

أجريت هذه الدراسة خلال موسمى 1998، 1999 (العروة النيلى) بمحافظة الفيوم - مركز الفيوم وذلك بهدف:

- 1- تقييم بعض من المواد مثل مبيد حشرى (السيليكرون 72% E.C)، مانع التغذيةى (أدميرال) ومبيد حيوى (البيوفلاى) وزيت (ناتورليز) على الحشرة الكاملة للذبابة البيضاء 0
- 2- تم تقدير مدى تأثيرها على نقل فيروس تجعد أوراق الطماطم الأصفر 0
- 3- كما تم تقدير حمض الأسكوربيك (فيتامين C) فى الثمار قبل النضج وبعد النضج فى المعاملات السابقة 0

وقد أوضحت النتائج:-

- 1- أن المبيد الحشرى السيليكرون 72% Ec، والناتورلز أعطى أعلى نسبة انخفاض معنوى فى القتل المبدئى (initial) وقسمت النتائج إلى مجموعتين أ، ب 0
- 2- والأدميرال المانع للتغذية والمبيد الحيوى والبيوفلاى أعطى أعلى نسبة انخفاض معنوى فى (Residual effect) وقسمت النتائج إلى مجموعتين أ، ب 0
- 3- أثرت المعاملات الأربعة على حمض الأسكوربيك (فيتامين C) على الثمار قبل وبعد النضج بالمقارنة بالكنترول، كانت أكثرها انخفاضا فى المعاملة بالمبيد الحشرى السيليكرون وأكثرها زيادة فى المعاملة بالمبيد الحيوى والمانع للتغذية ثم الزيت 0