BIOACTIVITY OF PENICILLIUM SPORES SUSPENSION AND PLANT EXTRACTS AGAINST *Liriomyza sativae* (BLACHARD) AND THEIR ASSOCIATED PARASITOIDS

Mohamed M.Abdella[1]; Ibrahim, H. H. Ali[1];
Ahmed H. El. Henidi[2] and Sayed M. Mostafa[2]
1- Plant Protection Dept., Fac. of Agric., Fayoum Univ., Egypt.
2- Plant Protection Institute, A. R. C., Giza, Egypt.

ABSTRACT:

The toxicity of two plant extracts *Allium sativum* L. and *Euphorbia helioscopia* L. in addition to virulence of *Pencillium funiculosum* and their latent effect were investigated on the tomato leaf miner, *Liriomyza sativae* and two of associated parasitoids, ectoparasitoid, *Neochrysocharis formosa* (Westood) and endoparasitoid, *Neochrysocharis punctiventris* (Crawford). Regarding toxic effect, *A. sativum* extract was the most toxic at LC_{50} values against *L. sativae* while penicillium spores suspension was the least active and *E. helioscopia* extract lies in between. Also, the adult stage was more sensitive for all used plant materials than pupae followed by larvae. Concerning latent effect, *E. helioscopia* extract was more effective on the different stages of *L. sativae* whereas *P. funiculosum* was more effective on the ecto and endo parasitoids.

Key words: Plant extracts, *Liriomyza sotivae,* Parasitoids, Toxicity, Latent effect.

INTRODUCTION

Tomato leaf miner, *L.sativae* is one of the most serious pests infesting tomato in Egypt. Larval stage penetrates leaves, wandering between epidermis to feed on the internal tissues causing tunnels in infested tomato leaves with *L. sativae* and also facilitates infection with several pathogenic and saprophytic fungi in addition to, infested plants showed reduction in their growth and fruiting quantity and quality (Zehnder and Trumble 1984).

Use of naturally alternatives instead of insecticides would lead to clean environment free of toxicants and pollution.

Toxicity of plant extracts and their latent activity against leaf miners in crops was reported by other research workers (El-Nahal and Assem, 1970; Trumble, 1986; Carolina and Johnson, 1992; Immaraju, 1998; Gahbiche, 2001and Azam *et al* 2003).

The present work aimed to study the toxic and latent effects of two plant extracts and penicillium spores suspension on the *L. sativae* and associated parasitoids.

MATERIALS AND METHODS

1- Biological tests:

A- The tomato leaf miner (*L. sativae*)

Pupae were collected from the tomato plants by fine camel brush hair and transferred to petridish under chimney glass until adults emergence as described by Parrella (1987).

Twenty couples of newly emerged adults were introduced under chimney glass which was used as oviposition cage. Uninfested seedlings of

tomato (obtained from the shade house) was introduced in bottle filled with water. The seedlings were changed daily and transferred to other chimney glasses until death of the adults.

B. The parasitoids

The two larval parasitoids (ecto and endo) were collected from the host larvae and identified by the Biological control Department, Agriculture Research Center.

Stock culture for each parasitoid was prepared as follows: newly emerged couples were introduced to the chimney glass cages (couple for each cage) containing infested seedling with larvae in the late instar of *L.sativae.* The infested seedlings were changed daily (to avoid superparasitism) and transferred to other cages until death of the parasitoid adults.

2- Isolation of the pathogenic fungi:

Dead and moribund larvae and pupae were obtained from the field collected samples and sterilized externally by passing through the following solutions, sodium hypochloride 2%, distilled water and ethanol 70% for one minute. These larvae and pupae were introduced into sterilized petridishes containing potato dextrose agar (PDA) and incubated for one week at 25 C^{o}. Such petridishes were examined daily and the appeared fungi colonies were purified, then their pathogenicity were evaluated using Koh's postulates and identified as *Penicillium funiculosum* by Department of plant pathology, Agriculture Research Center Giza, Egypt.

3- Bioassay tests:

A- Virulence of *P. funiculosum:*

Infested leaves of tomato were taken from the stock culture and the larvae were counted (50 larvae for each concentration). Such leaves were sprayed with different concentrations (spores /ml) of the fungal spores suspension in water). Also, fifty pupae were introduced in half petridish and sprayed with the fungal spores suspension and then transferred to other clean petridishes. Fifty newly emerged adults were treated with the fungal spores suspension as a bait in glass bottle.

Mortality percentages were taken after one week of treatment. The water spore suspension contained the following additives per litre (1 ml tween 80, 5% glycerine and 5% molasses). For control, only the additives and water were used.

B- Toxicity of plant extracts:

250 g of *A. sativum* and *E. helioscopia* with 100ml distilled water were blended in a blender and filtered through anhydrous sodium sulphate and completed to one litre with distilled water and used as standard, subsequent dilutions were prepared to get lower concentrations. All tested stages (larvae, pupae and adults) were treated with different concentrations (ppm). The methods of treatment were as abovementioned with the fungal spore suspension. Mortality percentages were taken after 24h of treatment. Four replicates were used for each concentration. Both extracts and fungal spore suspension were corrected for mortality according to Abbott's formula (1925) before probit analysis. Toxicity lines (Ld- p lines were drawn on probit logarithmic paper according to the methods developed by Finney (1952) to determine the LC_{50} values.

4- The latent effect:

Under laboratory conditions of 30 ± 2C^{o} and 68 ± 2% R.H. adults of the tomato leaf miner and associated parasitoids were treated with LC_{50} of different plant materials to determine their latent effects on some biological aspects e.g., ovipositional periods, adult longevity, daily deposited eggs, the number of eggs/female, periods of immature stages (in day) and sex ratio.

5- Statistical analysis:

Data were statistically analyzed according to Snedecor and Cochran, (1980). Means were compared using the least significant difference (L. S. D.) test at 0.05 significance level.

RESULTS AND DISCUSSION

1- The toxic effect:

A- Toxicity of plant extracts:

Data in Table (1) indicate that *A. sativum* and *E. helioscopia* extracts showed high toxicity to the adult stage of *L. sativae* with LC_{50} of 3.8 x 10^3 and 4.0 x 10^3 ppm, respectively.

The immature stages showed tolerance to both extracts with LC_{50} of 4.5 x 10^3 and 4.3 x 10^3 ppm for the pupal stage and LC_{50} of 4.6 x 10^3 and 4.6 x 10^3 ppm for the larval stage, respectively.

B- Virulence of *P. funiculosum*

Data in Table (1) show that adult stage appeared to be more sensitive to infection with virulence of the pathogenic fungus *P. funiculosum* than pupae followed by larvae. LC_{50} values were 5.8 x 10^4, 5.5 x 10^4 and 4.5 x 10^3 spores /ml for larvae, pupae and adult stage, respectively.

Table (1) LC_{50} value and slope of different stages of *L. sativae* treated with various plant materials.

Species / Stage	*A. sativum*		*E. helioscopia*		*P.funiculosum*	
	LC_{50}	**Slope**	**LC_{50}**	**Slope**	**LC_{50}**	**Slope**
Larvae	$4.6x10^3$	0.9	$4.6x10^3$	0.9	$5.8x10^4$	0.5
Pupae	$4.5x10^3$	0.8	$4.3x10^3$	0.6	$5.5x10^4$	0.4
Adult	$3.8x10^3$	1.1	$4.0x10^3$	0.8	$4.5x10^3$	0.4

LC_{50} = ppm for *A. sativum* and *E. helioscopia.*
LC_{50} = spores / ml for *P. funiculosum.*

These results indicated that adult stage was more sensitive for all used materials than pupae followed by larvae. Also, *A. sativum* extract was the most toxic against *L. sativae* while pencillium spores suspension was the least effective and *E. helioscopia* lies in between. The sensitivity of the adult may be due to the direct contact of the tested agents however, in the case of larvae, the toxicity of these agents depend on its ability to translocated through the leaf of the plant.

2- The latent effect.

A- Effect on the tomato leaf miner, *L. sativae*

Data presented in Table (2) reveal that oviposition period, female and male longevity were 2.90, 3.85 and 4.0 days, respectively (correlated with 11.2 eggs/ female and 3.86 eggs/ female /day) of oviposition period were obtained by *P. funiculosum* spore suspension. These periods were reduced to 1.90, 2.97 and 2.95 days besides 10.3 eggs/ female and 5.42 eggs/ female/

day using *E. helioscopia* extract compared with 3.95, 5.90 and 6.40 days (correlated with 15 eggs/ female and 3.80 eggs /female /day) for the control. Percentage of the survived females was reduced slightly to reach 50% in the fourth day using *A. sativum* extract compared with 95% at the same period in the control. Also, these percentages were reduced sharply from 100% in the first day to 25% in the second day using *E. helioscopia* extract and reduced from 100% in the first day to 60 and 35% in the second and third days, respectively. As shown in Table (3) total immature stages duration and percentages of mortality were 19.60 days (with 10.5% mortality), 19.81 days (with 14.3% mortality) and 20.03 days (with 11.6% mortality) using *P. funiculosum, E. helioscopia* and *A. sativum* respectively compared with 18.02 days and 7.7% mortality for the control.

Table (2): Biological parameters of *Liriomyza sativae* adults treated with LC_{50} of *Allium sativum* and *Euphorbia helioscopia* extracts and *Penicillium funiculosum* spore suspension.

Treatment	**Ovipositional periods**			**Adult longevity**		**Daily deposited eggs**				**Total deposited eggs/♀**	
	Pre.	Oviposi.	Post.	♀	♂	1	2	3	4	Total	Rate/ day
A. sativum	1.0 - 1-1	3.80 ± 0.1 3-4	1.0 - 1-1	5,91 ± 0.0 5-6	6.1 ±0.0 6-7	9.2 ±0.1 9-10 (100)	2.1 ±0.1 2-3 (85)	1.9 ±0.1 1-2 (60)	2.1 ±0.2 2-3 (50)	15.3 - -	4.00 - -
E.helioscopia	1.0 - 1-1	1.90 ±0.2 1-2	- - -	2.97 ±0.0 2-3	2.95 ±0.0 2-3	9.2 ±0.1 9.10 (100)	1.1 ±0.03 1-2 (25)	- - -	- - -	10.3 - 10-11	5.42 - -
P.funiculosum	1.0 - 1-1	2.90 ±0.1 2-3	- - -	3.85 ±0.0 3-4	4.0 ±0.0 0-1	6.6 ±0.06 6-7 (100)	2.3 ±0.1 2-3 (60)	2.3 ±0.1 2-3 (35)	- -	11.2 - -	3.86 - -
Control	1.01 ±0.2 1-2	3,95 ±0.1 3-4	1.10 ±0.1 1-2	5.9 ±0.1 5-6	6.4 ±0.1 6-7	2.8 - 2-3 (100)	3.1 ±0.01 3-4 (100)	4.5 ±0.01 4-5 (95)	4.6 - 4-5 (95)	15.0 - -	3.80 - -
L.S.D $_{(0.05)}$	-	0.09*	-	0.43	1.09*	-	-	-	-	0.22*	-

* N = 20 couples of *L. sativae*

* Data in brackets represent survival percentage.

Table (3): Efficacy of *A.sativum* and *E.* helioscopia extracts and *P.funiculosum* spores suspension at LC_{50} on the different immature stages of *L. sativae*.

Treatment	Eggs	Larval stage	Pupal stage	Total	Sex ratio	
					♀	♂
A. sativum	4.93 ± 0.3 4-5 (11.6)	7.80 ± 0.2 7-8 (0.0)	7.30 ±0.1 7.8 (0.0)	20.03 - 20-21 (11.6)	2.0 - - -	1.0 - - -
E.helioscopia	4.98 ±0.2 4-5 (14.3)	7.92 ± 0.1 7-8 (0.0)	6.91 ± 0.1 6-7 (0.0)	19.81 - 19-20 (14.3)	1.3 - - -	1.0 - - -
P.funiculosum	5.20 ± 0.1 5-6 (10.5)	7.20 ± 0.2 7-8 (0.0)	7.20 ± 0.2 7-8 (0.0)	19.60 - 19.20 (10.5)	1.9 - - -	1.0 - - -
Control	6.96 ± 0.2 4-5 (7.7)	6.10 ± 0.2 6-7 (0.0)	6.96 ± 0.1 6-7 (0.0)	18.02 - 18-19 (7.7)	1.6 - - -	1.0 - - -
L.S.D $_{(0.05)}$	0.21	0.43	0.12	0.62	-	-

* Data in brackets represent mortality percentages.

B- Effect on the ectoparasitoid, *N. formosa.*

It is clear from Table (4) that periods of pre- and post- oviposition were not present and the period of oviposition was the same of female longevity in all tested treatments and control. Consequently, female and male longevity were 4.90 and 5.50 days (with 7.9 eggs/ female and 1.61 eggs/female /day) using *A. sativum extract.*

This period was reduced to 3.95 days in both sexs (with 5.3 eggs /female and 1.34 eggs /female /day) when *P. funiculosum* spores suspension was used compared with 5.95 and 6.70 days (with 1.61 eggs / female and 2.70 eggs /female/day) in the control. Percentages of survived females was 100% in all periods of oviposition.

Table (4): Biological parameters of the parasitoid *Neochrysocharis formosa* treated with (LC^*_{50}) of *Allium sativum* and *Euphorbia helioscopia* extracts and *Penicillium funiculosum* spore suspension.

Treatment	Ovipositional periods			Adult longevity		Daily deposited eggs					Total deposited eggs/♀	
	Pre.	Oviposi.	Post.	♀	♂	1	2	3	4	5	Total	Rate/ day
A. sativum	0.0 - 0-0	4.90 ±0.1 4-5	0.0 - 0.0	4.90 ±0.1 4-5	5.5 ±0.01 5-6	1.8 ±0.01 1-2 (100)	1.8 ±0.01 1-2 (100)	2.0 ±0.02 1-2 (100)	1.7 ±0.01 1-2 (100)	1.6 ±0.01 1-2 (100)	7.9 - -	1.61 - -
E.helioscopia	0.0 - 0-0	4.90 ±0.3 4-5	0.0 - 0-0	4.90 ±03 4-5	5.3 ±0.03 5-6	1.6 ±0.1 1-2 (100)	1.6 ±0.1 1-2 (100)	1.6 ±0.1 1-2 (100)	1.6 ±0.01 1-2 (100)	1.7 ±0.01 1-2 (100)	8.1 - -	1.65 - -
P.funiculosum	0.0 - 0-0	3.95 ±0.1 3-4	0.0 - 0.0	3.95 ±0.1 3-4	3.95 ±0.02 3-4	1.5 ±0.01 1-2 (100)	1.4 ±0.01 1-2 (100)	1.3 ±0.01 1-2 (100)	1.1 ±0.01 1-2 (100)	- - -	5.3 - -	1.34 - -
Control	0.0 - 0-0	5.95 ±0.1 5-6	0.0 - 0.0	5.95 ±0.3 5-6	6.7 ±0.1 6-7	2.9 ±0.1 2-3 (100)	2.8 ±0.1 2-3 (100)	2.6 ±0.1 2-3 (100)	2.5 ±0.1 2-3 (100)	2.5 ±0.1 2-3 (95)	16.1 - -	2.70 - -
L.S.D $_{(0.05)}$	-	0.14*	-	0.14	0.41*	-	-	-	-	-	0.51*	

* N = 20 couples of *N. formosa* / five larvae of *L. sativae*

* Data in brackets represent survival percentage.

* Median lethal concentrations determined for the insect pest *L. sativae* adults.

Results in Table (5) indicate also that immature stages duration could be arranged ascendingly as follows: 18.01, 18.70 and 19.40 days for *A. sativum, P. funiculosum* and *E. helioscopia* compared with 16.90 days in the control.

Therefore, the immature stages of eggs, larvae and pupae increased significantly using these abovementioned treatments compared with the control.

Table (5): Efficacy of *A.sativum* and *E. helioscopia* extracts and *P.funiculosum* spores suspension at (LC_{50}) on the different immature stages of *N. formosa*.

Treatment	Eggs	Larval stage	Pupal stage	Total	Sex ratio	
					♀	♂
A. sativum	3.90 ± 0.2 3-4 (0.0)	7.20 ± 0.2 7-8 (0.0)	6.91 ± 0.1 6-7 (0.0)	18.01 - 18-19 (0.0)	1.0 - - -	1.0 - - -
E.helioscopia	4.10 ± 0.1 4-5 (0.0)	8.20 ± 0.2 8-9 (0.0)	7.10 ± 0.2 7-8 (0.0)	19.40 - 19-20 (0.0)	1.9 - - -	1.0 - - -
P.funiculosum	3.90 ± 0.1 3-4 (0.0)	7.90 ± 0.1 7-8 (0.0)	6.90 ± 0.1 6-7 (0.0)	18.70 - 18-19 (0.0)	1.8 - - -	1.0 - - -
Control	4.20 ± 0.1 4-5 (0.0)	6.20 ± 0.2 6-7 (0.0)	6.50 ± 0.2 6-7 (0.0)	16.90 - 16-17 (0.0)	2.8 - - -	1.0 - - -
L.S.D $_{(0.05)}$	0.08*	0.97*	0.38*	1.3	-	-

* Data in brackets represent mortality percentages.

* Median lethal concentrations determined for the insect pest *L. sativae* adults.

C- Effect on the endoparasitoid, *N. punctiventris*

Data in Table (6) reveal that pre- and post- oviposition were not found therefore, oviposition period is equal to female longevity. Female and male longevity were 4.7 and 5.8 days (with 8.10 eggs/ female and 1.72 eggs/female/day) using *E.helioscopia* extract.

This period decreased to 3.95 and 3.98 days (with 5.90 eggs /female and 1.51 eggs/ female/ day) using *P. funiculosum* spores suspension compared with 4.95 and 5.90 days (with 8.60 eggs /female and 1.73 eggs /female/ day) in the control. As shown in Table (7) that the immature stages produced from untreated females were 2.99, 7.40 6.99 and 17.38 days for the stages of eggs, larvae, pupae and their total respectively.

Table (6): Biological parameters of *Neochrysocharis punctiventris* treated with (LC^*_{50}) of *Allium sativum* and *Euphorbia helioscopia* extracts and *Peni cillium funiculosum* spore suspension.

Treatment	Periods of ovipositional			Adult longevity		Daily deposited eggs					Total deposited eggs/♀	
	Pre.	Oviposi.	Post.	♀	♂	1	2	3	4	5	Total	Rate/ day
A. sativum	0.0 - 0-0	4.80 ± 0.1 4-5	0.0 - 0.0	4.80 ± 0.2 4-5	5.5 ± 0.01 5-6	1.8 ±0.01 1-2 (100)	1.8 ±0.01 1-2 (100)	2.0 ±0.02 2-3 (100)	1.7 ±0.01 1-2 (100)	1.6 ±0.01 1-2 (100)	7..90 - -	1.64 - -
E.helioscopia	0.0 - 0-0	4.70 ±0.2 4-5	0.0 - 0-0	4.70 ± 0.1 4-5	5.8 ±0.0 8 5-6	1.6 ±0.1 1-2 (100)	1.6 ±0.1 1-2 (100)	1.6 ±0.1 1-2 (100)	1.6 ±0.1 1-2 (100)	1.7 ±0.01 1-2 (100)	8.10 - -	1.72 - -
P.funiculosum	0.0 - 0-0	3.95 ±0.1 3-4	0.0 - 0.0	3.95 ±0.1 3-4	3.98 ±0.0 3-4	1.5 ±0.01 1-2 (100)	1.4 ±0.01 1-2 (100)	1.8 ±0.01 1-2 (100)	1.1 ±0.01 1-2 (100)	- - -	5.90 - -	1.51 - -
Control	0.0 - 0-0	4.95 ±0.1 4-5	0.0 - 0.0	4..95 ±0.2 4-5	5.9 ±0.1 5-6	1.7 ±0.1 1-2 (100)	1.9 ±0.1 1-2 (100)	1.8 ±0.1 1-2 (100)	1.7 ±0.1 1-2 (100)	1.5 ±0.1 1-2 (100)	8.60 - -	1.73 - -
L.S.D $_{(0.05)}$	-	0.27*	-	0.27*	0.49*	-	-	-	-	-	1. 19*	-

* N = 20 couples of the *N. punctiventris* / five larvae of *L. sativae*

* Data in brackets represent survival percentage.

* Median lethal concentration determined for the insect pest *L. sativae* adults.

These periods increased significantly when the females were treated with tested materials. Regarding sex ratio to the emerged adults (of the second generation) females were always outnumbered males compared with the control it was the same.

These results indicated that *E. helioscopia* extract was more effective on *L. sativae* whereas *P.funiculosum* was more active on the ecto- and endoparasitoids.

These results are in sgreement with Azam *et al.*, (2003) who used plant extracts of *Sueda aegyptica, Azadirachta indica* and *Acacia nolitica* for controlling *L. trifolii* in cucumber under laboratory conditions. *A. indica* extract was the most effective with 94% mortality. Also, Immaraju (1998) found that azadirachtin extracted from *A. indica* exhibited insecticidal activity against leaf miners, thrips, aphids and caterpillars. He added that azadirachtin acts as insect growth regulator and had no adverse effect on the associated parasitoids. Prischepa *et al.* (2002) mentioned that the entomopathogenic fungus *Paecilomyces fumosorseus* decreased significantly the number of pests in greenhouse tomatoes including *L. sativae* and showed selectivity on large number of beneficials.

Table (7): Efficacy of *A.sativum* and *E. helioscopia* extracts and *P.funiculosum* spores suspension at (LC_{50}) on the different immature stages of *N. punctiventris*.

Treatment	Eggs	Larval stage	Pupal stage	Total	Sex ratio	
					♀	♂
A. sativum	2.98 ± 0.1 2-3 (0.0)	9.80 ± 0.3 9-10 (0.0)	7.94 ± 0.2 7-8 (0.0)	20.72 - 20-21 -	1.7 - - -	1.0 - - -
E.helioscopia	3.10 ± 0.1 3-4 (0.0)	9.90 ± 0.1 9-10 (0.0)	7.97 ± 0.1 7-8 (0.0)	20.97 - 21.22 -	1.8 - - -	1.0 - - -
P.funiculosum	3.20 ± 0.1 3-4 (0.0)	9.89 ± 0.1 9-10 (0.0)	7.90 ± 0.1 7-8 (0.0)	20.99 - 20-21 -	2.0 - - -	1.0 - - -
Control	2.99 ± 0.1 2-3 (0.0)	7.40 ± 0.1 7-8 (0.0)	6.99 ± 0.1 6-7 (0.0)	17.38 - 16-18 -	1.0 - - -	1.0 - - -
L.S.D $_{(0.05)}$	* 0.28	*0.44	*0.22	*0.38	-	-

* Data in brackets represent mortality percentages.

* Median lethal concentrations determined for the insect pest *L. sativae* adults.

REFERENCES

Abbott, W. S. (1925): Amethod of computing the effectiveness of an insecticide. J. Econ. Entomol. 18 (2): 265-273.

Azam, K. M.; A.A. Raeei and W.S. Bowers. (2003): Control of leaf miner *Liriomyza trifolii* (Burgess) on cucumber by plant extracts. Crop Research- Hisar. 25 (3): 567-571.

Carolina, J. C. and M. W. Johnson. (1992): Host plant preference of *Liriomyza sativae* (Diptera : Agromyzidae) population infesting green onion in Hawaii. Env. Ent. 21 (5): 1097-1102.

El-Nahal, A.K. and M.A. Assem .(1970): The chemical control of the broad bean leaf miner, *Liriomyza trifolii* (Burgess). Bull. Soc. Ent. Egypt, 4: 205-217.

Finney, D.J. (1952): Probit analysis and statistical treatment of the sigmoid response curve. Cambridge University Press pp. 256.

Gahbiche, H. (2001): Effects of spinosad against *Liriomyza sativae* and its ectoparasitoid *Diglyphus isaea*. Phytoma. 53 (8): 34-36.

Immaraju, J. A. (1998): The commercial use of azadirachtin and its integration into viable pest control programs. Pestic. Sci. 54 (3): 285-289.

Parrella, M.P. (1987): Biology of *Liriomyza*. Ann. Rev. Ent. 32: 201-224.

Prischepa, L.; H. Yankovskaya and E. Enkegaard. (2002): Microbial control of greenhouse pests in Belarus. Bulletin, SROP. 25 (1): 217-220.

Snedecor, G. W. and W. G. Cochran. (1980): Statistical Methods. 7th Ed., Iowa State Univ. Press, Ames, Iowa, USA.

Trumble, J. T. (1986): Planing a head for leaf miner control. California Agric. 38: 7-9.

Zehnder, G. W. and J.T. Trumble. (1984): Intercrop movement of leaf miners. California Agric. 38: 11-12.

التأثير الحيوى لمعلق جراثيم فطر البنسيليوم والمستخلصات النباتية على حشرة صانعات أنفاق الطماطم والطفيليات المصاحبة لها

محمد محمد حسين عبداللا[١] ، ابراهيم حامد حسين على[١]
أحمد حسين الهنيدى[٢] ، سيد محمد مصطفى[٢]
١- قسم وقاية النبات – كلية الزراعة – جامعة الفيوم - مصر
٢- معهد بحوث وقاية النباتات – مركز البحوث الزراعية – جيزة – مصر

تم دراسة التأثير الحيوى لمعلق جراثيم فطر البنسيليوم بالاضافة لنوعين من المستخلصات النباتية هما مستخلصى اللبينة والثوم على الأطوار المختلفة لحشرة صانعات انفاق اوراق الطماطم وكذلك دراسة تأثيرها المتأخر على الحشرة المختبرة وزوج من الطفيليات المرافقة لها إحداهما خارجى ويسمى نيوكريسوكارس فورموزا والاخر داخلى ويسمى نيوكريسوكارس بنكيفنترس ، وتشمل الدراسة النقاط التالية:

١- سمية المواد المختبرة:

وجد ان الاطوار الكاملة لحشرة صانعات انفاق اوراق الطماطم هى اكثر الاطوار حساسية لجميع المواد المختبرة فى حين كانت اليرقات اكثرها تحملاً كما وجد ان مستخلص الثوم هو الأكثر سمية يلية مستخلص اللبينة فى حين كان معلق جراثيم فطر البنسيليوم هو اقلها.

٢- التأثير المتأخر على حشرة صانعات انفاق الطماطم:

دلت النتائج ان التأثير المتأخر لمستخلص اللبينة كان الأكثر فاعلية حيث كانت فترة وضع البيض يومان انخفضت فيها نسبة الاناث الحية من ١٠٠% الى ٢٥% بينما امتدت فترة وضع البيض الى ٤ أيام فى الكنترول كانت فيها نسبة الاناث الحية من ١٠٠% الى ٩٥% وكانت كمية البيض الموضوع لكل انثى والمعدل اليومى لوضع البيض هو ١٠.٣ و ٥.٤٢ بيضة للإناث المعاملة بمستخلص اللبينة فى حين كانت ١٥ و ٣.٨٠ بيضة فى الاناث غير المعاملة، وكانت اعلى نسبة موت (١٤.٣%) فى البيض الناتج من الاناث المغذاة على مستخلص اللبينة مقارنة بنسبة موت (٧.٧%) فى البيض الناتج من الاناث غير المعاملة.

٣- التأثير المتأخر على الطفيليات:

أظهرت النتائج ان كل الاناث المعاملة بالاضافة الى الكنترول استمرت فى وضع البيض طول فترة حياتها وان كل البيض الموضوع وصل الى الطور الكامل فى كل المعاملات ولوحظ ان الاناث أطول عمراً من الذكور فى جميع المعاملات المختبرة فى حين كانت متساوية فى الكنترول وكان معلق جراثيم فطر البنسيليوم الأكثر تأثيراً حيث كانت أعمار الحشرة الكاملة ٣.٩٥ يوماًفى الاناث والذكور وكمية البيض الموضوعة لكل انثى والمعدل اليومى لوضع البيض هو ٥.٣٠ و ١.٣٤ بيضة مقارنة بـ ٥.٩٥ و ٦.٧٠ يوماً فى الاناث والذكور وكمية البيض الموضوعة هى ١٦.١ بيضة لكل انثى بمعدل يومى ٢.٧٠ بيضة فى الكنترول.

وقد أوضحت الدراسة ان معلق جراثيم فطر البنسيليوم اكثر تأثيراً على الطفيليات المصاحبة للحشرة فى حين كان مستخلص اللبينة اقلها تأثيراً على الطفيل الخارجى ومنعدم التأثير على الطفيل الداخلى مقارنة بالكنترول.