EFFECT OF SOME INSECTICIDES ON CITRUS LEAF MINER *Phyllocnistis citrella* (ST.) (LEPIDOPTERA, PHYLLOCNICTIDAE) IN ALEXANDRIA GOVERNORATE, EGYPT

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Abstract

Effect of four insecticides belonging to different groups {KZ oil " menial oil" , Dimectin (Abamectin), Equador (Imidacloprid), Agrimic- gold (Abamecpin)} at three recommended rates (0.5, 1 and 1.5) on the natural population density of citrus leaf miner *Phyllocnistis citrella* (St.) was evaluated in Alexandria governorate during 2011 season. The efficiency of the tested compounds as coverage foliar spray differed in the mean reduction percent of *Phyllocnistis citrella* (St.) . After three sprays Agrimic – gold gave the highest value of reduction followed by KZ- oil , Equador and the lowest value was for Dimectin with 94.97, 94.84, 93.96 and 91.77 respectively.

INTRODUTION

Citrus leaf miner (CLM), *Phyllocnistis citrella* (St.) is considered one of the most seriously insect pests for *Citrus* trees. It quantitatively reduces fruit production due to inducing severe damage to the new leaves at the different periods of flushes, in many countries all over the world. Many authors in several countries tried to control this harmful insect- pest with conventional insecticides and their alternatives such as insect growth regulators, mineral oils and biocides (Weires *et. al.,* 1982*,* Jerraya *et. al.,* 1997*,* Iordanou & Charalambous, 1998*,* Raga *et. al.,* 1998 b*,* Caizijian, 1999*,* Yamamoto *et. al.,* 2000*,* Zhang Quan Bing *et. al.,* 2001*,* Miyata & Okazaki, 2002*,* Shaban & Nobou, 2006*,* Cnki-sun-zgten, 2007 and Mosallam *et. al.,* 2008).

The aim of the present work is to evaluate the efficiency of KZ oil, Dimecten, Equador and Agrimic- gold as control methods against the citrus leaf miner in Alexandria governorate, Egypt.

MATERIALS AND METHODS

This experiment was conducted in a citrus orchard of two feddans in Maamora region, Alexandria governorate. The trees were irrigated by flooding and the other horticultural practices were conducted. Treatments were took place on severely-infested trees of navel orange of 15 years old .

Several insecticides were used in addition to mineral oil at different rates (0.5, 1 and 1.5 recommended rate) as follows:

1 – KZ oil 95% EC (mineral oil) at 0.75, 1.5 and 2.25 liter/ 100 liter water.

2 – Dimectin 1.8% EC (Imidacloprid) at 12.5, 25.0 and 37.5 ml/ 100 liter water.

3 – Equador 35%SC at 37.5, 75.0 and 112.5 ml/ 100 liter water.

4 – Agrimic- gold 8.4%SC at 7.5, 15,0 and 22.5 ml/ 100 liter water.

The area was divided to 39 plots where every treatment was replicated three times. The trees were totally covered with spray solution in 6/7/2011. Randomly samples of 20 newly vegetative twigs of 10 - 15 cm long were collected before and 5, 10, 15 days after treatment. Samples were kept in plastic bags. Five leaves per each twig were inspected in laboratory using a stereoscope microscope (100 leaves/ replicate). The reduction percentage of infestation and alive individuals were calculated according to Hendrson and Tilton (1995). The significance variations between treatments were calculated according to T- test (Snedecor and Chochran, 1981).

RESULTS AND DISCUSSION

The first spray

Results in Table (1) show that the reduction percentage of larvae of *Phyllocnistis citrella* resulted in the used insecticides were 95.40, 95.19, 94.5 and 93.72 % for KZ oil, Equador, Agrimic- gold and Dimectin, respectively. While average reduction percentage recoded for the used rates were 95.85, 95.08 and 93.20% for 1.5, 1 and 0.5 recommended rate, respectively.

Table. 1. Reduction percentage of citrus leaf miner *Phyllocnistis citrella* after the first spray.

Insecticide	Leaf Surface	% Reduction of rates			Mean
		0.5	1.0	1.5	
KZ oil	Upper	91.47	94.98	95.32	
	Lower	96.05	97.21	97.37	
	Mean	93.76	96.09	96.35	95.40
Dimectin	Upper	89.64	92.20	93.03	
	Lower	95.12	95.99	96.37	
	Mean	92.38	94.09	94.70	93.72
Equador	Upper	92.98	93.96	95.17	
	Lower	95.25	96.43	97.36	
	Mean	94.12	95.19	96.27	95.19
Agrimic gold	Upper	89.97	93.26	94.65	
	Lower	95.11	96.61	97.48	
	Mean	92.54	94.94	96.07	94.52
Mean		93.20	95.08	95.85	

These results are in agreement with those obtained by Cnki- sun- zgten (2007) who has made the life tables according to various factors, the index of population trend and the interference index of population control which were used as the basic sampling parameters to evaluate the controlling effects of eight common- used insecticides on the natural population dynamics of the citrus leaf miner (CLM) *Phyllocnistis citrella* (St.). According to the obtained results petroleum oil is the most promising as a pesticide application for green food production. Acetamiprid biosulfan lambda Cyhalothrine and dimthypo could be selected as alternative insecticides. Chlorpyrifos and Chlorfluazuron are not advocated to control CLM in groves. In this respect Weires *et. al.* (1982), recorded that spoilt tentiform leaf miner, *Phyllonorycter blancardella* (F.), moths collected from New York commercial apple orchards were highly resistant to azinphosmethyl and carbaryl but susceptible to demeton, endosulfan, methomyl and oxamyl . Control is recommended by using the systemic carbamates methomyl or oxamyl when larval populations exceed action threshold levels of one mine per leaf during the first brood or lower surface mines per leaf during the second brood.

The second spray

Shaban and Nobou (2006), the experiments were conducted to determine the relative toxicity of insecticides against the two parasite wasps of citrus leaf miner (CLM), *Phyllocnistis citrella* on eggs and larvae which showed relative toxicity of 12 common insecticides against the egg and first instar larvae of the pest. All the insecticides tested showed almost over 90 % mortality of the first instar larvae of citrus leaf miner, but a less effect to the eggs. Data in Table (2) indicate that the different insecticides reduced infestation by 95.37 (Agrimic- gold), 94.46 (KZ oil), 92.90 (Equador) and 90.63% (Dimectine). The reduction percentages recorded for the three tested rates were 95.61 (1.5 recommended rate), 93.60 (recommended rate) and 90.81 (0.5 recommended rate).

Mosallam *et. al.* (2008), when treated citrus seedlings of 6, 12 and 18 months old with acetamiprid against *Phyllocnistis citrella* (St.) as coverage foliar spray they found that the toxicity of tested toxicants ranged between 2.01% - 4.18% and 2.82% - 6.72% after the first and second treatments .

Table. 2. Reduction percentage of citrus leaf miner *Phyllocnistis citrella* after the second spray.

Insecticide	**Leaf Surface**	**Reduction Percentage of Concentration**			**Mean**
		0.5	1.0	1.5	
KZ oil	Upper	90.40	92.25	95.25	
	Lower	95.23	96.22	97.37	
	Mean	92.82	94.24	96.31	94.46
Dimectin	Upper	78.20	90.10	93.51	
	Lower	90.48	94.89	96.57	
	Mean	84.34	92.50	95.04	90.63
Equador	Upper	89.09	89.14	93.26	
	Lower	94.74	92.14	96.01	
	Mean	91.92	92.14	94.64	92.90
Agrimic gold	Upper	92.35	94.10	95.11	
	Lower	95.95	96.91	97.76	
	Mean	94.15	95.51	96.44	95.37
Mean		90.81	93.60	95.61	

The effect of third spray

Reduction percentages in alive individuals of *Phyllocnistis citrella* shown in Table (3) ranged between 91.00- 95.03% for the tested treatments, whil mean reduction percentages were 90.55, 94.19 and 96.02% for the three tested rates, respectively.

Table. 3. Reduction percentage of leaf miner *Phyllocnistis citrella* larvae of certain insecticides at different concentrations.

Insecticide	Leaf Surface	Reduction Percentage of Concentration			Mean
		0.5	1.0	1.5	
KZ oil	Upper	90.10	93.57	95.31	
	Lower	94.05	96.81	97.30	
	Mean	92.08	95.19	96.31	94.53
Dimectin	Upper	81.05	87.5	93.84	
	Lower	91.50	94.97	97.12	
	Mean	86.28	91.24	95.48	91.00
Equador	Upper	88.76	93.08	93.99	
	Lower	93.82	96.25	96.75	
	Mean	91.29	94.67	95.37	93.78
Agrimic gold	Upper	90.17	94.36	95.95	
	Lower	94.86	96.96	97.90	
	Mean	92.52	95.64	96.93	95.03
Mean		90.55	94.19	96.02	

Acetamiprid was examined as a new insecticide against *Phyllocnistis citrella* in (Jerraya et. al. 1997) and (Miyata &Okazaki 2002). It could be concluded that the insecticides were successful to be used against *Phyllocnistis citrella*. Two insecticides Agrimic- gold and KZ oil were more

effective and 1.5 conc. gave good result, while leaf miner on lower surface was more affected than upper surface of the leaves of orchards.

In the table (4) the highest percentage was 95.40 % for KZ oil insecticide (in first spray) followed by 95.37 % for Agrimic – gold (in the second spray) and 95.03 % for Agrimic –gold (in the third spray) , while the lowest percentage was 93.72 % for Dimectin (in the first spray), 90.63 % for Dimectin insecticide (in the second spray) against leaf miner *Phyllocnistis citrella* and 91.00 % for Dimectin (in the third spray) .

Table. 4. Mean reduction percentage for *Phyllocnistis citrella* after three sprays of different insecticides .

Insecticide	**Sprays**			**Mean**
	1st	2nd	3rd	
KZ oil	95.4	94.46	94.53	94.84
Dimectin	93.72	90.63	91.00	91.78
Equador	95.19	92.90	93.78	93.96
Agrimic gold	94.52	95.37	95.03	94.97

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تاثير بعض المبيدات على صانعة أنفاق اوراق الموالح كوسيلة مكافحة فى محافظة الإسكندرية، مصر

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تم تقييم تأثير اربعه مبيدات مختلفة (كزد اويل – ديمكتين – اكوادور – اجريمك جولد) بثلاث معدلات (٠،٥ – ١– ١،٥) على العشيره الطبيعيه لصانعة انفاق اوراق الموالح بمنطقة الاسكندريه خلال موسم ٢٠١١. تم اختبار هذه المبيدات عن طريق رش المجموع الخضرى ثلاثة رشات على الاشجار المثمره. حيث ادت المعامله الى خفض درجة الاصابه لهذه المبيدات فكانت اعلى متوسط نسبة ابادة فى الثلاثة رشات مرتبة تنازليا على النحو التالى ٩٤,٩٧ ،٩٤,٨٤ ،٩٣,٩٦ ، ٩١,٧٨ % لمبيدات اجريمك جولد ، كزد اويل ، اكوادور ،ديمكتين على الترتيب.