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EFFECT OF SOME PESTICIDES AGAINST THE GLASSY CLOVER SNAIL, *MONACHA OBSTRUCTA,* UNDER LABORATORY AND FIELD CONDITIONS

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ABSTRACT: *The current work were conducted under laboratory and field conditions, to study the effect of four pesticides (Lebaycid 50%, Neemix 4.5%, Neomyl 90% and Sencor 70%) as poison bait or spray against the land snail, Monacha obstructa, at Giza Governorate. Laboratory results showed that when the four tested pesticides used as a bait, Neomyl was the most toxic one against the tested land snail, followed by Lebaycid and sencor, while Neemix was the lowest. The mortality percentages of pesticide treatments were gradually increased with the prolongation of exposure periods to tested toxicant (1, 3, 5 and 10 days) then decreased. The same trend was nearly observed when the tested pesticides were applied as a spray. On the other hand, the toxicity of the tested pesticides decreased in case of spray than of bait under laboratory and field conditions. It is evident that the toxicity level of tested pesticides against land snail, M. obstructa, differed according to the method of application (bait or spray). Statistical analysis revealed that there were significant differences between the tested pesticides when used as bait or spray. The field results were in harmony with those obtained from the laboratory as Neomyl was the most efficient.*

Key words: *Land snail, Monacha obstructa, pestisides, control.*

INTRODUCTION

Land snails are one of the main spectacular gastropods. They comprised a large number of species which might be found as a terrestrial species causing serious economic problems to fields and vegetable crops, fruit trees, ornamental flowers and shrubs (Miller *et al.*, 1988). In Egypt, the terrestrial snails become a serious economic pest in several governorates (EL-Okda, 1980). Therefore, the biologists working in this field concerned with investigation of the molluscicidal activity of the various pesticides for controlling this pest (Bishara *et al.*, 1968, Hegab, 2003, Ebenso *et al.*, 2005, Ismail, 2008, Ismail and Shetaia, 2009, Awad and Mourad, 2012 and Mortada *et al.*, 2012).

The present work was carried out under laboratory and field conditions to evaluate the effect of some pesticides i.e. Lebaycid, Neemix, Neomyl and Sencor, against the glassy clover snail, *Monacha obstructa*, which is considered one of the most common species in Egypt.

MATERIALS AND METHODS

1-Tested Animals:

Adult individuals of glassy clover snail, *Monacha obstructa*, were collected from infested Egyptian clover fields at Giza Governorate. Animals were transferred to the laboratory, kept in glass boxes contain a layer of moisted soil and fed on fresh lettuce leaves.

2-Tested Pesticides:

A-Lebaycid 50% EC:
Chemical group: organophosphorous.
Trade name: Lebaycid 50% EC.
Common name: Fenthion.

B- Neemix 4.5%: (Ready made crude)
Chemical group: *Azadirachta indica*.
Trade name: Neemix 4.5%.
Common name:Plant extract of Neem.

C-Neomyl 90% wp:
Chemical group: carbamate.
Trade name: Neomyl 90% wp.
Common name: Methomyl.

D-Sencor 70% wp:
Chemical group: Triazinone.
Trade name: Sencor 70% wp.
Common name: metribuzin.

3-Laboratory Experiments:

3.1. Baiting Technique: The poison baits of Lebaycid, Neemix, Neomyl and Sencor were prepared by mixing each pesticide with 5% molasses +93% bran. Five grams of poison bait were put on plastic sheet placed on the surface of the soil in each box. Ten healthy adult snails were introduced for each box. Each treatment was replicated four times. Control treatment was prepared using bran 93% + molasses 5% bait only without pesticide. New baits were provided twice weekly. Treatments were Kept under 25°C ± 2°C and 65 % ±5%RH. Mortality percentages were recorded after 1, 3, 5, 10 and 15 days post-treatment. Observation of mortality entailed using stainless steel needle according to El-Okda (1981). Dead snails were removed after testing and mortality percentages were calculated and corrected for natural mortalities (Godan, 1983 and Abbott's formula, 1925).

3.2. Spray Technique: Fresh lettuce leaves were sprayed with each treatment (3 cm of each of Lebaycid, Neemix, Neomyl and Sencor. Sprayed lettuce were left to dry and offered to the snails after 24 h starvation (Zidan *et al.*, 2001). Forty adult animals of each treatment were divided into four replicates (10 animals each), in addition to another one, using plain water as control. Fresh lettuce leaves were renewed twice weekly sprayed with different materials. Mortality percentages were counted after 1, 3 , 5 ,10 and 15 days.

4-Field Experiments:

The field trails were performed at Saft EL-Laban village Giza governorate. An area of about two feddans cultivated with Egyptian clover (*Trifolium alexandrium*), was heavily infested with the land snail, *Monacha obstructa*. The field was irrigated only one day before any treatment. The four tested pesticides were evaluated against land snail under field condition.

4.1. Baiting Application: The poison baits of the four tested pesticides were prepared by mixing 2 parts of each pesticide + 5 parts molasses + 93 parts bran and used at an infested area. The area was divided into four plots represent the number of the tested pesticides, the area of each plot was half feddan divided into four replicats. About 100 gm of each tested bait were offered on a plastic pieces (50X50cm). Control treatment was designed by the same manner without any chemicals. The population of snails were counted daily in quadrate area (1×1 meter) and the population reduction percentages were recorded after 15 days post-treatment according to Henderson and Tilton (1955).

4.2. Spray Application: The four previous pesticides were tested as a spray against land snail. The tested area was chosen by the same method mentioned above. Each pesticide was applied as a spray at the rate of 2%, on plants using hand sprayer. The population reduction percentages were calculated as mentioned above, also statistical analysis according to Fisher (1944).

RESULTS AND DISCUSSION

1-Laboratory Experiments:

Data in Table (1) showed the efficacy of the four tested pesticides (Lebaycid, Neemix, Neomyl and Sencor), when used as poison baits against land snail, *Monacha obstructa*. Results showed that mortality percentages increased gradually with increasing the duration of exposure till the tenth day, then decreased. Neomyl was the most effective pesticide, with the highest mortality percentages between (77.5 – 87.5%) after 10 days. Lebaycid came in the second categories of molluscicidal efficiency recording 75 - 85% mortality percentage after 10 days. Sencor was less effective than Neomyl and Lebaycid after 10 days. Finally, Neemix had the least toxic effect, with mortality percentage ranged between

12.5% and 20%, after 10 days. It is clear that *M. obstructa* revealed higher sensitivity towards Neomyl followed by Lebaycid, Sencor and Neemix.

Data in Table (2) illustrated the effect of the same tested pesticides when used as spray against land snail, *M. obstructa*. The same trend was nearly observed when the tested pesticides were applied as a spray, with Neomyl as the most effective. After 15 days, mortality percentages were 76.3%, 73.7%, 23.7% and 13.2% for Neomyl, lebaycid, Sencor and Neemix, respectively. Statistical analysis revealed that there were significant differences between the tested pesticides when used as a bait or spray.

In view of the above results from Tables (1 and 2), it is evident that the toxicity level of the tested pesticides against land snail, *M. obstructa* differed according to the method of application (bait or spray).

2- Field experiments:

Table (3) showed the field performance of the four tested pesticides when applied as baits against the land snail, *Monacha obstructa*. Data indicate that Neomyl gave the highest population reduction percentage (76.15%) followed by Lebaycid and Sencor (73.96% and 25.93%, respectively). Neemix gave the lowest value with 12.75% population reduction percentage.

Data in Table (4) showed the effect of four tested pesticides when applied as a spray against the same land snail under field conditions. Neomyl gave the highest population reduction percentage (72.88%) after 15 days post-treatment followed by Lebaycid, Sencor and Neemix: 69.23%, 20.51% and 11.82%, respectively. The field results of tested pesticides were slightly weak when used as spray than bait.

Field results are in harmony with those obtained from the laboratory. Neomyl was the most efficient pesticide against land snail, *M. obstructa* under laboratory and field conditions, followed by Lebaycid and Sencor while Neemix was the least effective one. Reviewing the above mentioned results, it is obvious that there are different toxicity levels between the four tested pesticides according to pesticide chemical group and method of application (bait or spray).

These results are in agreement with that reported by El- Okda *et al.* (1989), Aioub *et al.* (2002), Bailey (2002), Hegab (2003) and Daoud (2004) who found that carbamate compounds appeared to be most toxic than organophosphorous pestisides and herbicides against land snails. Also, Awad and Mahmoud (2009) reported that Lebaycid was the most effective against land snails under laboratory conditions when compared with compounds. Hilmy (2010) stated that carbamate compound appeared to be the most effective pesticide against the tested land snails. Hilmy and Hegab (2010) found that the organophosphorous and triazinon compounds were the most effectives against land snails.

Table (1): Effect of some pesticides as a bait against land snail, *Monacha obstructa*, under laboratory conditions.

Tested Pesticides	No. of snails/ treatments	% Mortality after (days)				
		1	3	5	10	15
Lebaycid	40	75.0	80.0	82.5	85.0	79.5
Neemix	40	12.5	20.0	25.0	20.0	15.4
Neomyl	40	77.5	82.5	85.0	87.5	82.1
Sencor	40	40.0	45.0	47.5	47.5	28.2
Control	40	0.0	0.0	0.0	0.0	2.5
L. S. D 5%	—	0.95	2.11	0.80	3.50	1.80

Table (2): Effect of some pesticides as a spray against land snail, *Monacha obstructa*, under laboratory conditions.

Tested Pesticides	No. of snails/ treatments	% Mortality after (days)				
		1	3	5	10	15
Lebaycid	40	70.0	72.5	77.5	80.0	73.7
Neemix	40	10.0	15.0	22.5	20.0	13.2
Neomyl	40	72.5	77.5	80.0	82.0	76.3
Sencor	40	32.5	35.0	40.0	35.0	23.7
Control	40	0.0	0.0	0.0	0.0	5.0
L. S. D 5%	__	1.83	0.90	1.22	0.80	0.75

Table (3): Effect of some pesticides as a bait against land snail , *Monacha obstructa* under field conditions.

Tested pesticides	No. of snail before treatment	No. alive snail after 15 days of treatment	% Population reduction (after 15 days)
Lebaycid	96	25	73.96
Neemix	102	89	12.75
Neomyl	130	31	76.15
Sencor	81	60	25.93
L.S.D 5%	-	-	2.03

Table (4): Effect of some pesticides as a spray against land snail , *Monacha obstructa* under field conditions.

Tested pesticides	No. of snail before treatment	No. alive snail after 15 days of treatment	% Population reduction (after 15 days)
Lebaycid	130	40	69.23
Neemix	110	97	11.82
Neomyl	118	32	72.88
Sencor	78	62	20.51
L.S.D 5%	-	-	1.20

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تأثير بعض المبيدات ضد قوقع البرسيم الزجاجى *Monacha obstructa* تحت الظروف المعملية والحقلية

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تمت دراسة تأثير فاعلية أربعة من المبيدات المختلفة وهى (ليباسيد و نيميكس و نيوميل و سنكور) كطعوم أو بالرش ضد قوقع البرسيم الزجاجى *Monacha obstructa* تحت الظروف المعملية والحقلية بمحافظة الجيزة. أظهرت النتائج المعملية أنه عند الاستخدام كطعوم مبيد نيوميل كان الأكثر سمية ضد قوقع البرسيم الزجاجى *M. obstructa* يليه مبيد ليباسيد ثم مبيد سنكور بينما جاء مبيد نيميكس فى المرتبة الأخيرة حيث كان أقلهم تأثيراً. كما أوضحت النتائج المتحصل عليها أن سمية نفس المبيدات المستخدمة تقل تأثيرها عند إستخدامها بالرش ضد نفس القوقع. كما أظهرت النتائج وجود فروق معنوية بين الأربع مبيدات المستخدمة وتأثير إبادى ملموس ضد قوقع البرسيم الزجاجى وذلك بعد عشرة أيام من المعاملة كنسب مئوية للموت بينما إنخفضت هذه القيم بعد خمسة عشر يوماً من المعاملة.وكانت النتائج الحقلية متوافقة مع النتائج المعملية حيث كان مبيد نيوميل هو الأعلى كفاءة ضد قوقع البرسيم الزجاجى *M. obstructa* يليه مبيد ليباسيد ثم سنكور بينما كان مبيد نيميكس أقلهم فاعلية عند استخدامهم كطعوم أو بالرش على النباتات.