

FOOD PREFERENCE ESTIMATION FOR SOME LAND SNAILS SPECIES AND THEIR SENSITIVITY TO VERTIMEC BIOCIDES UNDER LABORATORY CONDITIONS COMPARING WITH STANDARD MOLLUSCIDE CEKUMETA 5%.

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ABSTRACT

Laboratory experiments were conducted to study the food preference and consumption of certain vegetables for two species of land snails, *Thebia pisana* and *Eobania vermiculata*. Also, the study included the effect of vertimec (1.8% EC) against the two mentioned species. The results proved that the lettuce was the most preferable for the two species followed by cucumber and carrots. In addition, the gained data cleared that the squash was the lowest preferable for the tested species. The consumption as a percentages were (45.45% and 46.1%) for lettuce, (20.9% and 14.6%) for cucumber, (18.2% and 25.8%) for carrots and (15.5% and 13.5%) for squash for the two tested species *T. pisana* and *Eobania vermiculata* respectively. For the effectiveness of the concentrations used 0.06% and 0.11% of vertimec (1.8% EC) against the same mentioned species, the results revealed that the mortality went up to 100% for both species at 0.11% concentration. Meanwhile, the concentration 0.06% gave 40% and 45% mortality for *Thebia pisana* and *Eobania vermiculata* respectively. The molluscicide compound cekumeta 5% (metaldehyd) gave complete kill after three days and four days *T. pisana* and *E. vermiculata* respectively.

INTRODUCTION

The phylum Mollusca is probably the third most important animal group after the arthropoda and vertebrates. The great damage of Mollusca to many agricultural and horticultural crops in Egypt has become increasing apparent over the past 30 or 40 years. Mollusca are important pests of fruit trees, vegetables, medical plant, ornamental plants and field crops (El-Okda 1980) in addition to their role as intermediate hosts for many of the parasitic diseases which infected the human, animals and birds.

This manuscript aims to spot light on food preference of both *T. pisana* and *E. vermiculata* besides the effectiveness of vertimec (1.8% EC) against the same species under the laboratory condition to add some informations to enhancement the land snails control.

MATERIALS AND METHODS

The tested species were collected from gardens (Mango and Apple) and clover fields at Noharia district, El Behira Governorate and El Fayoum Governorate. The snails transported to laboratory into closed sac and classified according to Godan (1983) as follow *Thebia pisana* and *Eobania vermiculata*. Animals were starved 24 hours before starting the test as reported by Miller et al (1988). Host plants were 4 vegetables; carrots, (*Dacus corots*), squash (*Cacurbita pepa*), lettuce (*Lactuce sative*) and cucumber (*Cucumis sativus*). Three wooden boxes (40 x 40 x 11 Cm) contained mixed soil with 85% moisture and 7 Cm depth. Ten mature and

healthy individuals of snails for each species were selected and put at the middle of the wooden boxes. Four vegetables were put at each of four sites around the snails (Ten individuals) with change the sites every day along the experiment period. The consumed amount of each food material per each species was recorded daily and boxes were replenished with diet again.

Another experiment was done in lab to clarify the effect of each one of the vegetables used singly on the body weight of the target land snails species.

Vertimec (1.8 EC) biocide produced by the Merck shaop campany, Rahway NJ. USA as a natural compound. The vertimec active ingredient produced by the soil microorganism *Streptomyces avermitilis*, two concentrations were prepared from vertimec 1.8% such as 0.06% and 0.11%. to test the toxic effect of vertimec as a biocontrol on the different land snails. The lettuce plants were dipped in the vertimec concentrations 0.06% and 0.11% and offered to the two investigated species. The results of response to vertimec were recorded daily.

Cekumeta 5% (metaldhyd) ready made moullscicide granules bait, also offered to the investigated land snails.

RESULTS AND DISCUSSION

The gained data in Tables (1 & 2) showed the weight of tested snails, weight increasing percentages, the daily bait consumption and the relative percentages of consumption for each of the two land snails species.

The gained data in Table (1) indicated that the body weight of each of *Thebia pisana* and *Eobania vermaculata* affected according to the kind of vegetables which were introduced to them during the experiment period. The body weight of the tested species ranged from 1.2% (0.1 gr) to 4.4% (0.4 gr) for cucumber and lettuce for *T. pisana* and from 1.9% (0.2 gr) to 6.1% (0.6 gr) for carrots and lettuce for *E. vermaculata*, respectively. The results proved that lettuce caused cleared increasing in body weight of *T. pisana* and *E. vermaculata* both.

Table (1): Effect of certain vegetables on body weight of Some land snails under laboratory conditions.

Species	Vegetables	Weight of 10 individual (in gr)			
		Before	After	Increasing	
				In gr	%
<i>Thebia pisana</i>	Carrots	8.2	8.4	0.2	2.4
	Squash	9.0	9.2	0.2	2.2
	Lettuce	9.0	9.4	0.4	4.4
	Cucumber	8.05	8.1	0.1	1.2
<i>Eobania vermeculata</i>	Carrots	10.6	10.8	0.2	1.9
	Squash	10.2	10.4	0.2	2.0
	Lettuce	9.8	10.4	0.6	6.1
	Cucumber	9.2	9.4	0.2	2.2

The daily bait consumptions by the investigated snails species from the all offered vegetables for 4 days were; 1.1 gr and 0.89 gr for *Thebia pisana* and *Eobania vermiculata*, respectively (Table 2). The daily bait consumption of *T. pisana* and its relative percentages could be arranged decendingly as follows; lettuce (0.5 gr and 45.45%), cucumber (0.23 gr and 20.9%), Carrots (0.20 gr and 18.2%) and squash (0.17 and 15.5%). In addition the results proved that the lettuce plant (46.1%) was more acceptance to *Eobania vermiculata* than the other plants. This finding cleared that the lettuce plant was the most preferred food for the two tested species followed by carrots and cucumber. Meanwhile, the squash was the lowest favorable host (Table 2). There are many researchers interested in the studied points some of them are:-

- Bishara *et al.* (1968) found that the snail *Thebia pisana* fed mainly on Egyptian clover and to some extent on beans and rice.
- Kassab and Daoud (1964), El-okda *et al.* (1983) and Nakhla (1991) showed that snails are essentially vegetarian and feed on wide variety of plant materials, both wild and cultivated.
- Also, the results agree with Rumham and Hunter (1970) found that the gastropod pests fed on cereals, potatoes, vegetables, lettuce, maize, carrots, beet root, clover and cabbage as well as other agricultural horticultural crops, and ornamental plans.

The tabulated data in Table (3) demonstrated the effectiveness of two concentrations of vertimec (1.8% EC) against the same land snails species which mentioned previously. The recorded results showed that the effect of vertimec was zero (0.0) at 0.06% concentration after 24 hrs of the treatment for *Thebia pisana* and *Eobania vermiculata* snails. Meanwhile, the same concentration gave 40% and 45% mortality for both species after 96hrs of starting respectively. The concentration 0.11% vertimec gave complete kill for each species. The specific molluscicide cekumeta 5% gave complete kill after 72hr for *T. pisana* meanwhile gave complete kill after 96hr for *E. vermiculata*.

- The results are in agreement with those of meny outhers. Idress (2003) evaluated the activity of various microbial – compounds against *Monacha cartusiana*, *Succinea putris* and *Thebia pisana* land snails using leaf dipping method under laboratory conditions. She found that the LD₅₀'s values of Agrien, Dipel 2x, Vertimec anf Biofly for the three tested snails as follow (594.4, 841, 1.32 and 1.48 ppm), (733, 1054, 1.42 and 1.33 ppm) and (364, 731, 1.25 and 1.41 ppm) respectively.
- Daoud (2004) studied the activity of vertimec 1.8% EC. Against *M. cartusiana* and *E. vermiculata* land snails using poisonous bait method under laboratory conditions. He found that LC₅₀ values after 4 days exposure period were 0.54 and 0.64% respectively.
- Also the results agree with Gabr, W.M. *et al* (2006). They found that the cekumeta 5% was the most toxic for *Monacha obstructa* and *Eobania vermiculata* followed by vertimec.

Table (2): Food consumption of some land snails to certain vegetables under free choice test in lab.

Species	Weight of 10 snails (in gr)		Average of daily consumption (in gr)								Total of food consumption	
	Before	After	Weight % Increase in g	Caroles		Squash		Lettuce		Cucumber		
				In gr	%	In gr	%	In gr	%	In gr		%
<i>Thebia pisana</i>	9.9	10.2	3	0.2	18.2	0.17	15.5	0.5	45.45	0.23	20.9	1.1
<i>Eobania vermeculata</i>	9.1	9.3	2.2	0.23	25.8	0.12	13.5	0.41	46.1	0.13	14.6	0.89

Table (3): Effect of certain concentration of vertimec (1.8% EC) on different land snails Comparing with Cekumeta 5% (Metaldehyd) under laboratory conditions (25oC + 5 & 65 + 5 R.H.)

concentration %	Land snails species	Total no of snails	Av. no of died individuals after						Total	Mortality%	
			24h		48h		72h				96h
			In gr	%	In gr	%	In gr	%			
Vertimec 0.06	<i>T. pisana</i>	10	0.0	0.0	0.0	4.0	0.0	0.0	4.0	40%	
	<i>E.vermeculata</i>	10	0.0	0.0	0.0	1.5	3.0	4.5	45%		
Vertimec 0.11	<i>T. pisana</i>	10	0.0	0.0	2	8	0.0	10	100		
	<i>E.vermeculata</i>	10	2	2	6	6	0.0	10	100		
Cekumeta 5%	<i>T. pisana</i>	10	1	6	3	0	0	10	100		
	<i>E.vermeculata</i>	10	1	4	3	2	10	100			
Control	<i>T. pisana</i>	10	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
	<i>E.vermeculata</i>	10	0.0	0.0	0.0	0.0	1.0	1	10		

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أفضلية الطعوم لبعض أنواع القواقع الأرضية وكفاءة الفيرتيميك بالنسبة لها مقارنة بمبيد القواقع ميتالدهيد

طلعت محمد سليمان قشطة ، عبد المقصود عبد المقصود محمد أبو هاشم و ياسر محمد عبد القوي عبد الجليل
معهد بحوث وقاية النباتات - مركز البحوث الزراعية- وزارة الزراعة

- أجريت بعض التجارب المعمولة لدراسة أفضلية أربعة أنواع من الخضروات وهي الجزر والخس والكوسة والخيار على بعض القواقع الأرضية *Tebia pisana, Eobania vermiculata* وقد أشارت النتائج الي أن الخس هو المفضل لدي القواقع المختبرة يليه الخيار ثم الجزر ، وأشارت النتائج الي أن الكوسة كانت الأقل تفضيلا الي كليهما.
- وقد بينت النتائج أن الخس يؤدي الي زيادة في وزن الجسم بالنسبة للنوعين المختبرين بنسبة ٤,٤% و ٦,١ لكل منها علي التوالي يليه الجزر ثم الكوسة ثم الخيار بالنسبة لقوقع *T. pisana* يلي الخس زيادة وزن الجسم بالنسبة لقوقع *E. vermiculata* الخيار والكوسة والجزر.
- كذلك أجريت تجارب علي تأثير المركب الحيوي فيرتيمك (١,٨% إياماكتين) علي كل من النوعين المختبرين بإستخدام تركيز ٠,٠٦% وتركيز ٠,١١% وقد أعطي التركيز ٠,١١% نسبة موت ١٠٠% بينما أعطي التركيز ٠,٠٦% نسبة موت ٤٠% بالنسبة *T. pisana* و ٤٥% بالنسبة *E. vermiculata*.
- مركب الميتالدهيد (سكيوماتا ٥%) أعطي نسبة موت ١٠٠% بعد ثلاثة أيام بالنسبة لقوقع *T. pisana* وأعطي نفس النسبة بعد ٤ أيام لقوقع *E. vermiculata*.