EFFICACY OF SOME PESTICIDE BAITS FOR CONTROLLING THE LAND SNAIL *Monacha cantiana* (Montagu) UNDER FIELD CONDITIONS AT KAFR EL-SHEIKH GOVERNORATE

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ABSTRACT

Field experiment was conducted to evaluate the efficacy of different pesticides against the land snail *Monacha cantiana* in Egyptian clover field at Kafr El-Sheikh Governorate during the spring of 2004. According to mortality percentages, all the tested compounds, Carbaryl (Sekib), Fenpyroximate (Ortus), Hexaflumuron (Consult), Buprofezin (applaud) and Chlorpyrifos (Pestban) gave the high efficacy against the land snail *M. cantiana* after one and three days of field application. Whereas, the mortality percentages were 100%, after six days of field treatment, percent mortality ranged between 75.7 to 95.9%.

All the tested pesticides showed high toxicity and persistence against the land snail *M. cantiana* within six days after field application and then rapidly decreased with time. The mean mortality percentages ranged between 69.7 to 76.2% for the same snail after nine days from field application.

LT_{50} and LT_{95} values against the land snail *Monacha cantiana* were ranged between 7.1 to 7.6 and 3.6 to 6.0 days respectively, for all the tested pesticides.

INTRODUCTION

Land snails pests are serious problem every year, damage involving considerable financial losses is inflicted on cereal, vegetables, Egyptian clover as well as other agricultural and field crops. The land snails feed on leaves, roots, tuber and all soft part of nearly all vegetables, field crops, fruits and ornamental plants (Bishara *et al.*, 1968, El-Okda, 1979 & 1980, El-Deeb *et al.*, 1999 and Okka, 2003).

Insecticides may be considered a useful tactic against pests with sustained or plus eruptions (Berryman, 1987).

The juvenile hormones on the other hand have proved to be eminently suitable as insecticides (Staal, 1987).

The aim of this work was to evaluate the effectiveness of five pesticides for controlling the land snail *M. cantiana* under field conditions using low rate of pesticides for minimizing the environmental pollution. The persistence of the tested pesticides on treated bran under field conditions was also studied.

MATERIAL AND METHODS

1. Pesticides used:

Five pesticides, related to different pesticidal groups, were used at the recommended rates of field application as shown in Table (1).

Table (1): Trade, common and chemical name of tested pesticides and their rate of application.

Trade name	Common name	Group	Chemical name	Field dose /one kg bran
Sekib 85% WP	Carbaryl	Carbamate Insecticide	1-naphthyl methyl carbamate	100 gm
Ortus 5% SC	Fenpyroximate	Acaricide	Tert-butyl(E)-4-[(1,3-dimethyl-5 phenoxypyrazol-4l) methylenaminooxymethyl] benzoate	25 ml
Consult 10% EC	Hexaflumuron	IGR Insecticide	1 [3,5 dichloro-4-(1,1,2,2-tetrafluoroethoxy) phenyl]-3-(2,6-difluorobenzoyl) urea	25 ml
Applaud 25% SC	Buprofezin	IGR	2-tetra-butylimina-3-isopropyl-5-phenyl-1,3,5,thiodiazinon-4-one	75 ml
Pestban (Dursban) (48% EC)	Chlorpyrifos	Organophosphate insecticide	o,o-diethyl-o-3-5-6-trichloro-2-pyridyl phosphorothioate	100 ml.

2. Control measures:

Application of the tested pesticides were used as baits. However, the compounds were applied at field rate per one kg. bran mixed with 400 ml. water.

3. Preparation of bait:

The used techniques were just the same described by Crowell (1967) and Miller *et al.* (1988) and it is in brief as follows:

Bait formulation constituted of 150 gm bran mixed with 60 ml, 30 ml water containing appropriate amount of applied compound plus 30 ml fermentative sugar cane juice which is attractive to snail, addendum with granulated dry yeast (25 gm. dry yeast per one liter, was added). Fermentation was run over night (Okka, 1998 & 2003).

4. Tested animals:

The tested five pesticides were evaluated against the land snail *M. cantiana* that infested Egyptian clover *Trifolium alexandrinum* (L.) at Sedi-Salem district, Kafr El-Sheikh Governorate during the spring of 2004.

Experiment was carried out in one feddan (0.42 hectare), in the shape of rectangle (81.7 x 51.4 meters) planted with the Egyptian clover and infested by *M. cantiana*. Baits (50 gm) were distributed in open white plastic bags (15 x 20 cm) and placed beneath the white land traps (each trap was plastic case (1.0 x 0.5 meters) containing one kg. Straw-rice to keep on the humidity of soil (Okka, 2003). Each treatment consisted of three replicates and another one left without treatment as check control. The traps were placed along the borders adjacent to irrigation canals (81.7 meters) arranged with repetition and an equal distance between each trap (3.75 meters).

Traps placed post-cutting and irrigation for ten days, from 4 to 13 May.

Mortality percentages were determined according to El-Okda (1982a) after one, three, six and nine days from field application. The snails of *M. cantiana* were handily collected from all parts of the trap and the surrounded soil. Death or alive snails were counted and data were statistically analyzed according to Finney (1962), LT_{50}'s and LT_{95}'s of these toxic baits were estimated and tabulated

RESULTS AND DISCUSSION

1. Molluscicidal activities:

Results of the field experiment designed to evaluate the molluscicidal activity of the tested compounds against *M. cantiana* are presented in Table (2). The data revealed that all the tested baits of the pesticides Carbaryl (Sekib), Fenpyroximate (Ortus)

Table (2): Efficiency of the tested pesticide baits on the land snail *M. cantiana* underneath the white land traps after field application.

Pesticide used	Mean no. of land snail *M. cantiana* after exposure period											
	1 day			3 days			6 days			9 days		
	Collected	Dead	% mort.	Collected	Dead	% mort.	Collected	Dead	% mort.	Collected	Dead	% mort.
Carbaryl	108.7 c	108.7	100	164.3 b	164.3	100	115.7 a	107.7	93.1	116.3 bcd	6.0	5.2
Fenpyroximate	113.0 bc	113.0	100	186.3 a	186.3	100	115.0 ab	110.3	95.9	124.7 ad	11.0	8.8
Hexaflumuron	168.3 a	168.3	100	129.7 c	129.7	100	116.0 a	103.7	89.4	125.7 ab	11.7	9.3
Buprofezin	82.0 c	82.0	100	81.7 d	81.7	100	74.0 d	56.0	75.7	113.7 bd	3.7	3.2
Chlorpyrifos	105.3 c	105.3	100	95.7 d	95.7	100	96.7 bc	86.3	89.3	139.3 ac	6.0	4.3
Control	158.0 ab	0.0	0.0	135.7 c	0.0	0.0	96.0 c	0.0	0.0	142.3 a	0.0	0.0
L.S.D. 5%	49.08			21.1			18.86			23.37		
L.S.D. 1%	67.97			29.23			26.14			32.36		

Hexaflumuron (Consult), Buprofezin (Applaud) and Chlorpyrifos (Pestban) exhibited highly toxic action against the land snail *M. cantiana* and the mortality percentages reached 100% after one and three days post-treatment. After six days of field application, the mortality percentages were 95.5, 93.1, 89.4, 89.3 and 75.7 for Fenpyroximate, Carbaryl, Hexaflumuron, Chlorpyrifos and Buprofezin, respectively. However, after nine days from the beginning of field application all the tested pesticides showed low molluscicidal activity against the land snail *M. cantiana* where the mortality percentages were less than 10%.

2. Residual toxicity:

Data concerning the residual toxicity of the tested compounds against *M. cantiana* are combined in Table (3). Median lethal values LT_{50}'s and LT_{95}'s were interpolated and included in the same table.

The data presented herein are based upon snail moralities rather than upon actual toxicant levels within the bait. Factors as toxicant degradation through hydrolysis or other means and rate of metabolism are not considered in the present study. Nevertheless, based upon the percentage of snails moralities, it was evident that, the residual effect of the tested compounds maintained for six days after treatment, while this effect diminished at the 9th day after application.

Table (3): Persistence of pesticides on bran baits under field conditions and lethal time levels.

Pesticide used	Mortality % at the indicated date				Average mortality	LT_{50} in days	LT_{95} in days
	1st	3rd	6th	9th			
Carbaryl	100.0	100.0	93.1	5.2	74.6	7.4	5.0
Fenpyroximate	100.0	100.0	95.9	8.8	76.2	7.6	6.0
Hexaflumuron	100.0	100.0	89.4	9.3	74.7	7.5	4.5
Buprofezin	100.0	100.0	75.7	3.2	69.7	7.1	3.6
Chlor.pyrifos	100.0	100.0	89.3	4.3	73.4	7.4	4.5

The finding that the tested Carbamate and Organophosphate insecticides were highly effective against the land snail *M. cantiana*, agrees with the results of Judge and Kuhr (1972) and Kady *et al.* (1983), who showed that the most toxic compounds to snails were

Carbamates and phosphates. These chemicals action mammals and insect by inhibiting cholinesterase which cause disruption of nerve activity leading to death. Presumable, their mode of action is expected to be similar in land snails. In contrast, Kady (1972), found that Organophosphates and Carbamates were low toxic against aquatic snails. This finding is not surprising since it was reported in the literature that the mode of action of aquatic molluscicides is accompanied by reduction in oxygen consumption (Gonnert, 1961).

The low mammalian toxicity of the tested compounds supports the safe recommendation of using these chemicals by baiting technique to minimize environmental pollution and to keep natural enemies alive.

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فعالية طعوم بعض مبيدات الآفات لمكافحة القوقع الأرضى *Monacha cantiana* (Montagu) تحت ظروف الحقل الطبيعية فى محافظة كفرالشيخ

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أجرى هذا البحث فى ربيع ٢٠٠٤م لمكافحة القوقع الأرضى موناكا كانتيانا بخمسة مبيدات آفات من مجاميع مبيدات حشرية مختلفة على هيئة طعوم.

وكانت مبيدات الآفات المستخدمة والجرعة الحقلية للفدان هى: سكيب ١٠٠جم ، أورتس ٢٥مل ، كنسولت ٢٥مل ، أبلود ٧٥مل ، بستبان ١٠٠مل. ولقياس مدى سمية المواد المختبرة فقد تم تحضير طعوم تحتوى هذا المواد.

وقد أظهرت النتائج أن:

- المبيدات الخمس المختبرة كانت عالية الفعالية حيث وصلت نسبة القتل ١٠٠٪ للقوقع الأرضى موناكا كانتيانا بعد يوم واحد وثلاثة أيام من بداية التطبيق الحقلى.
- اليوم السادس من بداية وضع الطعم فى الحقل كانت نسبة الموت ٩٥,٩ ، ٩٣,١ ، ٨٩,٤ ، ٨٩,٣ ، ٧٥,٧٪ للأورتس ، سكيب ، كنسولت ، بستبان ، أبلود على التوالى.
- ثبات سمية المبيدات المختبرة ومتوسط نسب الموت بعد تسعة أيام من بداية التطبيق الحقلى كانت تتراوح ما بين ٦٩,٧ الى ٧٦,٢٪.

من ناحية اخرى كانت الفترة اللازمة لقتل ٥٠٪ ، ٩٥٪ من افراد القواقع اقصر فى حالة استخدام ابلود ثم بستيبان ثم كنسولت ثم سكيب ، بينما هذه الفترة كانت اطول فى حالة استخدام مبيد اورتس.

يوصى الباحث باستخدام الخمسة مبيدات الآفات المختبرة بالجرعة الحقلية الجديدة وبنفس التطبيق فى مكافحة القوقع الأرضى لمدة أسبوع فى حقول البرسيم المصرى.