

RESIDUAL EFFECT OF CERTAIN PESTICIDES AGAINST TWO LAND SNAILS SPECIES, *Monacha contiana* AND *Eobania vermicutata* UNDER LABORATORY AND FIELD CONDITIONS.

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Abstract: Effect of six pesticides against the two land snails species, *Monacha contiana* (Muller.) and *Eobania vermiculata* (Muller.), were investigated under laboratory and field conditions by using poison baits technique at three concentrations (i.e. 1, 3 and 5%). Also its residual effects were evaluated. Laboratory results showed that the three concentration used as a poison bait, Pyriban was the highest mortality percentage one against the two land snail species followed by Ekatina, while Admir and Admiral was the least mortality percentage at 1% and 3% concentration after 12 days post treatment. In the same trend, Ekatina, Pyriban, polo and Applaud were the

most mortality percentage (100%) against to same land snails species, while Admir and Admiral were the lowest mortality percentage at 5% concentration after 12 days post treatment. On the other hand, *Eobania sp.* was more susceptible than *Monacha sp.* for insecticides tested.

The field results were in harmony with those which were obtained from laboratory as Pyriban and Ekatina baits were the highest molluscicidal potential against two land snail species followed by with polo and Applaud, while Admiral showed the lowest effect molluscicide after 12 days post – treatment at the two concentration (i.e. 3% and 6%) respectively.

Key words: residual, pesticides, land snails , field.

Introduction

The unavoidable increased of new pesticides may cause great hazard to living world, when carelessly applied. There is an urgent need for the use of pesticides to protect plants and animals against pests.

Several pesticides (i.e. organophosphorus, Carbamate, pyrothriod and thiourea) were widely used in various purposes. These application lead to pollution for the ecosystem, i.e. air, plant, earth, water and human ecosystem.

Land snails are injurious pests to ornamental flowers, shrubs and to a wide variety of vegetables and fruits

(Miller *et al.*, 1988). These animals are attack plants at different growth stages and reducing their yields (El -Okad . 1984 and Baker., (1989). The land snails were mostly controlled using mullicicides (Caulliard and Laverriere., 1989). Insecticides are the most powerful too available for use in pest management. They are highly effective, rapid in curative action, adaptable to most situations, flexible in meeting changing organomic and ecological conditions and economical.(El-Masry, 1997).

The present work was carried out to study the toxic effect of some pesticides as a poison baits against two land snails species , i.e. *Monacha contiana* and *Eobaina vermiculata* under the laboratory and field conditions.

Materials and Methods

A. Pesticides Used :

1 – Ekaton (Thiometon 25% Ec.). S 0 [2 – (ethylthi.) ethyl] 0.0 dimethyl phosphoro dithioate.

2 – Pyriban (Chloropyrifos 48% Ec.) 0.0 – diethyl 0 – (3, 5, 6 trichloro – 2 – pyridinyl) phosphoro thioate.

3 – Polo (Diafenthiuron 50% Sc.) N- [2, 6 bis (1- methyl ethyl) – 4 – phenoxyphenyl] – N – (1, 1 – dimethyl) thiourea.

4 – Applaud (Buprofezin 25% Sc.) 2 – tetra butylimino – 3 – isoprapyle –

5 – phenylperhydro – 1, 3, 5 – thiodiazin – 4 – on .

5 – Admiral (Pyriproxyfen 10% Ec.) 2– [1 – methyl – 2 – (4 – phenoxyphenoxy) ethoxy] pyridine.

6 – Admire (Imidacloprid 20% Sc.).1– [C 6 – chloro – 3 – pyridiyl) methyl] – N – nitro – 2 – imidazolidinimine.

B. Experimental animals :

Adults of the two land snails species, *Monacha contiana* and *Eobaina vermiculata* (Muller) were used as a tested animals. At Kafr – El – Sheikh district, *M. contiana* snails were collected before treatment from the Egyptian clover, *Trifolium alexandrinum* (L.) and *E.vermiculata* were collected from ornamental plants. Both snails were kept at $25 \pm 2^{\circ}\text{C}$ and $80 \pm 3\%$ R.H (EL – Okda, 1981).

C. Bioassay technique :

1.Under laboratory conditions:

The tested compounds were evaluated and poison baits. With different concentration for each compound were tested, (i.e. 1, 3 and 5%). The poison baits were prepared by mixing with each concentrated compound + 2% molasses + 93% bran, respectively. The bran was moist end with water before mixing with compound. Five grams of the poison baits was put on plastic sheet placed on the surface of the soil in each box (Crowell, 1977; Parrella *et al.*, 1985 and Miller *et al.*, 1988).

Fourty animals from each age mentioned above of each species were divided into four replicated and exposed to the candidate concentration of the tested compound. Mortality percentage was recorded firstly after 24 hours and continued at 3, 6, 9 and 12 days post treatment and corrected by Abbott's formula (1925). A control group was maintained untreated for comparison.

The slope, LT_{50} and LT_{95} confidence limits were calculated by computerized probit analysis programme.

2. Under field conditions :

Field experiments were carried at Kafr El –Sheikh Governorate. The tested area was grown up with the Egyptian clover *Trifolium alexandrinum* (L.) located Biala, El – Hamol and Kafr El – Sheikh districts, ½ feddan at each selected city was infested with *Monacha spp.* The same districts mentioned above was used to application of the tested compounds on *Eobania spp.*, ¼ feddan (ornamental plants) was infested by *Eobania spp.* Five insecticides (i.e. Ekation, Peyriban, Polo, Apploud, Admiral and Admir) were used against the two land snails, *Eobania spp.* and *Monacha spp.* The used technique were just the same described by Crowell., (1977) and Miller *et al.*, (1988). The same preparation of Bait were used under laboratory conditions were used under field conditions,

formulation was run over night. The numbers of dead and live snails were counted and reduction percentage were recorded after one, three, Six, nine and twelve days from the field application (Anonymous, 1965).

Results and Discussion

The effect of six compounds representing different groups of pesticides by using as a poison baits technique against the two land snails species, *Eobania spp.* and *Monacha spp.* under laboratory and field conditions. Data obtained were tabulated in tables from 1 to 5.

To facilitate the presentation of data each target pest was discussed separately in the following.

1. Under laboratory conditions :

Data in Table (1) indicate that the tested pesticides when used as toxic baits at 1% concentration. Showed poor efficiency against the two land snail species, *Monacha spp.* and *Eobania spp.*, twelve days after hating. By the prolongation of post – hating period, their molluscicidal actives were gradually increased to 76, 70, 48, 46, 42, 10% and 80, 76, 64, 55, 49 and 14% after 12 days in incase of pyriban, Ekatin, Apploud, Polo, Admiral and Admir against two land snail species, respectively. pyriban showed quick action compared with other pesticides, followed by Ekatin and Apploud, while Admir caused slow action behavior. The LT_{50} , being 7.31,

9.15, < 12, < 12, < 12 and < 12, 7.13, 10.25, 11.76, < 12 days in Ekatina it was and Apploud in was while in Apploud the LT_{50} was 17.87 days. with the same mentioned two land snail pesticides, respectively.

Data in Table (2) presents cumulative of the two treated snail species when used as poison baits at 3% concentration. Results showed that the mortality percentage increased gradually with increasing the compound concentration in case of pesticides. The most efficient pesticides were Pyriban (goand 100% mortality) against *M. contiana* and *E. vermiculata* respectively after 12 days from exposure period. Required time to achieve 50% Kill (LT_{50}), being 5.27 and 3.68 with the same mentioned two land snail and pesticides, respectively. also, condonable mortalities were obtained by the application of Ekatina followed by Polo and Apploud against the two land snails species (88 and 100, 78 and 86 & 70 and 80% mortality) and 6.28 & 4.33 and 7.55 & 5.59 and 9.30 & 6.78 LT_{50} , respectively. Poor results were obtained with Admiral and Adimir.

The concentration of 5% in Table (3), each of Pyriban, Ekatina, Apploud and Polo resulted in 100% mortality. The LT_{50} , being 3.04, >12, 3.61 & 2.28, 5.31 & 3.34 and 5.67 and 3.34 days. against the two land snails species after 12 days post treatment. On the other hand,

Admiral and Adimir were given a kill rate of (70 and 88%) and (22 and 34%) after the same period (12 days) against *M. contiana* and *E. vermiculata* respectively. Also, pesticides could be arranged descendingly according to their lethal median time ($LT_{50,S}$) as follows: Admiral (10.66 and 5.76 hrs.) respectively.

Data showed that the molluscicidal activities of the tested chemicals were different according to their chemical structure, tested concentration and method of application.

Data also indicated that the slope values of the toxicity regression line slightly varied according to snail species, pesticide compounds and applied techniques. This revealed that there are slight differences in homogeneity of the tested snail population in concern with their responses toward the investigated pesticides.

This finding is parallel to those reported by El-Okda (1984) and Miller *et al.*, (1988) mentioned that metaldehyd was highly toxic compound against snails. The obtained results agreed with those obtained by El-Masry (1997) and Abdel – Karim, Nehmedo (2000) who worked on the toxic effect of sumithion and skipper compounds were studies against *Eabania vermiculata*, *Monacha obstructa* and *theba pisana* under laboratory conditions. The result indicated that

M. obstructa species was the most sensitive one for sumithion compound as its lowest concentration (0.5%) while it failed to cause any mortality for the other two species.

2. Under field conditions :

Data in Table (4) indicate that the important role of pesticides period in determining their bio – residual activity against the two land snails species, *M. contiana* and *E. vermiculata* pyriban showed superior molluscicidal effect two snails species, during twelve days after application (80.0 and 85% reduction), followed by Ekatina (70.0 and 80.0% reduction), and Polo (63.0 and 71.0% reduction).

On the control, Apploud and Admiral showed the least performance (62.0 and 66.0% reduction) and (50.0 and 58% reduction), respectively. The mean kill percent reached to 40.8 & 64.2 ; 33.0 & 39.2, 28.8 & 34.2 ; 25.2 & 34.8 and 62.4 and 25.8 in case of pyriban, Ekatina, Polo, Apploud and Admiral, respectively. Statistical analysis by Duncan's multiple range test confirmed the significant effect of snail type, treatment and interaction snail type and treatment on molluscicidal activity. The L.S.D. 0.05 being 1.71, 3.50, 2.97 and 2.93; 1.82, 2.70, 5.52, 4.08 and 4.57 for snail type and treatment, respectively. while no significant for interaction between type and treatment.

Results illustrated in Table (5) showed that Pyriban bait achieved the highest molluscicidal effect against the two land snail species, (*M. contiana* and *E. vermiculata*) followed by Ekatina and Polo baits, while the lowest were obtained by Admiral. The reduction of residual activity of pesticides were (50.8 & 56.8%), (40.2 & 46.0%), (35.4 & 45.0%), (32.4 & 41.0%) and (29.2& 35.0%) reduction by Pyriban, Ekatina, Polo, Apploud and Admiral after post treatment, respectively.

Statistical analysis indicate that the significant role of snail type and snail , treatment and interaction between type of snail and treatment in determining molluscicidal activity of tested compounds. No significant differences between type of snail and treatment, except significant difference between type of snail and treatment after six day post treatment were L.S.D. 0.05 (4.72). The L.S.D. 0.05 were 1.20, 1.77, 2.11 and 3.50 and 1.90, 2.80, 3.33, 5.55 and 7.40 in case of snail type and post – treatment period, respectively.

Field results are in harmony with those which were obtained from laboratory Pyriban and Ekatina molluscicide bait was the most efficient one against both tested snail species under laboratory and field conditions followed by polo Apploud while Admiral and Admir compound was the lowest effective

one. Similar results were obtained by Ghamry *et al.*, (1993), Hamdy *et al.*, (1994), Ghamry (1997), Youssef (2001) and Abd El-All (2004 and 2005).

Reviewing the aforementioned results that obtained from the previous tables, it is obvious that there are different susceptibility levels between the two tested snail species according to type compound (Chemical group) and method of application (Poison baits). These difference in the sensitivity leaves may be due to physiological state of the snail which changes from species to another.

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تأثير بعض مبيدات الآفات على نوعين من القواقع الأرضية

Monacha contiana and *Eobania vermicitata*

تحت الظروف المعملية والحقلية في محافظة كفر الشيخ

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أما بالنسبة 5% فقد أعطى كلا من إيكاتين ، والبيران ، والبولو ، وأيلود أعلى نسبة موت حيث كانت (100%) بينما أعطى الأدمير ، والأدميرال أقل نسبة موت حيث كانت (22-34%) ، (70-88%) لنفس نوعي القواقع بعد 12 يوم من بدء المعاملة ، ولقد أظهرت النتائج أيضاً أن قوقع *Eobania sp* أكثر حساسية بالمبيدات من قوقع *Monacha sp* 0

وكانت النتائج الحقلية متوافقة مع النتائج المعملية حيث كان مبيد البروبان (80-85% خفض) ، (89-90% خفض) وإيكاتين (70-80% خفض) ، (83-85% خفض) أعلاها كفاءة ضد نوعين القواقع يليه مبيد البولو (63-71% خفض) ، (73-79% خفض) ، وأيلود (62-66% خفض) ، (66-70% خفض) ، وكان أقلهم كفاءة مبيد الأدميرال (50-58% خفض) ، (62-68% خفض) بعد 12 يوم من بدء المعاملة باستخدام تركيزين هما (3 و 5%) على التوالي.

أجرى هذا البحث بهدف دراسة تأثير بعض مبيدات الآفات حيث تم استخدام ستة مبيدات هما إيكاتين 25% E.C ، البيران 48% E.C و بولو 50% S.C ، وأيلود 25% S.C ، وأدميرال 10% E.C وأومير 20% S.C عند استخدامهم كطعوم سامة ضد نوعين من القواقع وهما *Monacha contiana* and *Eobania vermicitata* باستخدام ثلاث تركيزات (1 ، 3 ، 5%) على خمسة فترات (1 ، 3 ، 6 ، 12 يوم) تحت الظروف المعملية بمحافظة كفر الشيخ 0

أظهرت النتائج المعملية أن مبيد البيران كان أعلاها في نسبة الموت (76-80%) ، (90-100%) بعد 12 يوم من بدء المعاملة يليه مبيد إيكاتين (70-76%) ، (88-100%) بينما عند نفس الفترات كان مبيد الأدمير والأدميرال أقلهم في نسبة الموت (10-14%) ، (16-18%) ، (42-49%) ، (62-66%) عند استخدام تركيزين (1 ، 3%) لكلا النوعين من القواقع 0