

TRIAL TO IMPROVE THE MOLLUSCICIDAL BAITS BY USING SOME NATURAL MATERIALS AT DIFFERENT DISTANCES

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ABSTRACT

Three natural materials (apple and lemon essences and dry powdered yeast) were used to improve the methomyl molluscicidal baits, also, the preferences of different foods were studied by using cabbage, lettuce and squash leaves comparing with wheat bran for choosing which one to be attractant for the brown garden snails (*Eobania vermiculata*). The results showed that wheat bran more attractant because the percentage of consumption was 56%, while. Lettuce, cabbage and squash leaves, their consumption percentage were 31.4, 19.09 and 6.22% respectively. These baited natural materials in addition to control free of them were applied at several distances (0.5, 1.0, 1.5, 2.0 and 3.0 meters) from the tested land snail (100 snails). The results demonstrated that the distance was found to be very important to collect large number of snails on the different baits. So, methomyl bait free of the additive natural materials as control collected large number of dead snails at 0.5 meter with mean (25) dead snails than the other tested distances. However, the presence of lemon essence in methomyl bait increased the collected dead snails to be (56.3 in mean) more than the other tested natural materials (37.0) and control (25) at 0.5 meter. The shortest distance (0.5 m) was found more effective than the other long distances, in addition lemon essence was the best than other tested natural materials.

Keywords: Molluscicides baits, *Eobania vermiculata*, natural materials, distances, additives materials.

INTRODUCTION

The using of molluscicides baiting system are considered common and effective methods for controlling the land snails. Metaldehyde, methomyl and thiodicarb have recommended as effective molluscicides by several scientists (Crowell, 1967; Judge, 1969; Hunter and Johnson, 1979; El-Okda, *et al.*, 1989; Radwan and El-Wakil, 1991 and Hanafy *et al.*, 1998). On the other hand, natural products has been using for controlling the land snails (Tolba, 1997; Singh and Singh, 2001; Ebenso, 2004 and Youssef, 2006). The preferences of different foods to the land snails were studied by several scientists, cabbage plant (Doucette, 1954), lettuce (Chang, 1991) and varieties of agricultural plants, (El-Okda, 1979; Goden, 1983; Hirai, 1988 and Baker, 1989)

The present research was find out the preferred food to *Eobania vormiculata* to be using as bait carrying the molluscicides and evaluate the using of some additive on the chosen molluscicides baits to improve their attractants to land snails, on different distances. So, the brown snails (*Eobania vormiculata*) was used to detect their response to the molluscicides methomyl baits alone or combined with determined concentration of apple and lemon essences or dry powdered yeast on different distances.

MATERIALS AND METHODS

A. Experimental snails

Land brown snails (*Eobania vermiculata*) were collected from the farms of Sabahia Research Station and Faculty of Agriculture, Abbis, Alexandria. The obtained snails were kept in glass basin under laboratory conditions and fed on fresh lettuce leaves for 14 days. During the experiments the tested snails were marked with red colours to be characterized of the other snails.

B. Tested molluscicide

Common name: Agrinate sp.

Scientific name: Methomyl 90%

Chemical name: S-methyl N [(methyl carbamoyl) oxy] thioacet imidate.

Company: Fabco – Jordon.

C. The additive attractants natural materials

- Apple essence.
- Lemon essence.
- Dry powdered yeast.

D. Methods of experiments:

1- Consumption of different non-poison baits:

Ten snails of *E. vermiculato* were kept for 12 days in glass jar with 3 gm of the tested bait which was cabbage, lettuce, squash leaves or wheat bran. Fresh weight of the tested food was added daily. The jar was covered with muslin fitted with rubber band. Ten replicates were conducted for each tested food. The consumption percentages were calculated. The rate of daily consumption snail was determined.

2- The activity of bran poison baits at different distances and presence of several additives:

a) Preparation of baits

The wheat bran (400 gm) was well mixed with the attractant materials (2% w/w) then the methomyl (2%) dissolved in 300 ml water was gradually added to the bait with continuous well mixing until the bait become relatively wet. Control was prepared free of the tested attractant materials.

b) Baits evaluation experiments

The areas of experiment were prepared to be soft, clean and well wetted with water. Each area was 3 × 3 m at garden of integrated protection laboratory in Sabahia Research Station. A hundred of the brown land snails (*Eobania vermiculata*) were placed in the center of the area of experiment surrounded with the poison bait stations at different distances (0.5, 1.0, 1.5, 2.0 and 3.0 meters). Each bait was weighing 50 gm. The experiments were repeated three times for each tested materials.

The number of dead snails was counted at each distance and the average was determined for each additive material. The data were reported in histogram for comparison. The data were statistically analyzed and L.S.D. was determined (Steel and Torrie, 1980).

RESULTS AND DISCUSSION

1- Consumption of different foods (non-poison baits)

It was found that bran was more preferred by *Eobania vermiculata* snails than the other tested foods as in Table (1). So, the consumption percentages were 56.0, 31.4, 19.1 and 6.2% from bran, lettuce, cabbage and squash leaves, respectively. On other hand, rate of daily consumption per one snail was 1.69, 0.93, 0.57 and 0.19 gm/ snail/ day from bran, leaves of lettuce, cabbage and squash respectively. Therefore, bran was taken to be a carrier in a poison bait with some additive attractant natural materials for field testing at different distances.

Table (1): Consumption of different foods (non-poison baits) by *Eobania vermiculata* snails during 12 days

Types of food	Mean of snails weight (gm)	Total weight used (gm)	Total consumed weight (gm)	Mean of consumption (gm)	Rate of daily consumption gm/ snails	Consumption %
Bran	3.91±0.31	360	203.0	20.3±0.83	1.69±0.06	56.0±1.98
Lettuce leaves	3.91±0.31	360	112.1	11.21±1.3	0.95±0.11	31.4±3.89
Cabbage leaves	3.85±0.42	360	68.2	6.82±0.88	0.57±0.06	19.09±2.2
Squash leaves	3.92±0.13	360	22.38	2.24±0.39	0.19±0.03	6.22±1.16

2- The activity of bran poison baits at different distances and in the presence of some additives

The results obtained in Table (2) and Figure (1) as a comparison between molluscicidal effect of different baits against *Eobania vermiculata* with different additive natural materials (dry powdered yeast) and apple and lemon essences) and control bait free from the additive materials were placed at different distances (0.5, 1.0, 1.5, 2.0 and 3.0 meters).

Table (2): Comparison between molluscicidal baits at different distances

Bait with attractive substance	No. of Collected dead snails on										L.S.D.
	0.5 m		1.0 m		1.5 m		2.0 m		3.0 m		
	Total	Mean	Total	Mean	Total	Mean	Total	Mean	Total	Mean	
Control*	76.0	25.3±2.4 ^a	49.0	16.3±0.61 ^b	41.0	13.7±0.96 ^b	31.0	10.3±0.78 ^{cd}	21.0	7.0±0.88 ^d	4.48
Yeast bait	111.0	37.0±5.1 ^a	76.0	25.3±2.15 ^b	54.0	18.0±1.47 ^{bc}	28.0	9.3±1.07 ^c	29.0	9.7±0.76 ^c	10.16
Apple bait	111.0	36.7±1.93 ^a	35.0	11.7±1.46 ^b	30.0	10.0±0.83 ^b	29.0	9.7±0.91 ^b	28.0	9.3±0.91 ^b	8.27
Lemon bait	169.0	56.3±1.90 ^a	62.0	20.6±1.35 ^b	33.0	11.0±0.85 ^c	24.0	8.0±0.76 ^c	24.0	8.0±0.76 ^c	5.61

* Control is methomyl bait free the additive natural materials.

The collected dead snails in control free additive natural materials ranged between 25.3% and 7.0% dead snails at 0.5 and 3.0 meters respectively.

So, the short distance (0.5 m) was very effective than long distance (3.0 m). By using additive natural materials for attracting the tested snail, the short distance was also very effective to attract relatively larger number of snails than control. There were similar ratio in range between 37.0 – 36.7 dead snails for both baits of yeast and apple. However, lemon essence bait increased the number of dead snails at 0.5 m with mean 56.3 but number of dead snails were still in small ratios. It could be said that, the shortest distance (0.5 m) was nearly ideal to attract the snails and the distances more than 0.5 m were not suitable in this respect. These results agreement with results of Hanafy (1995) who studied the effect of distance on Mediterranean fruit fly *Ceratitis capitata* (Wied) to be attracted by certain food attractants. He recorded that the high numbers of flies were collected at the shortest distance (25 cm) and least numbers at the longest distance (2.0 meters). Lemon essence was nearly attractants for snails at 0.5 m more than the other two tested essences.

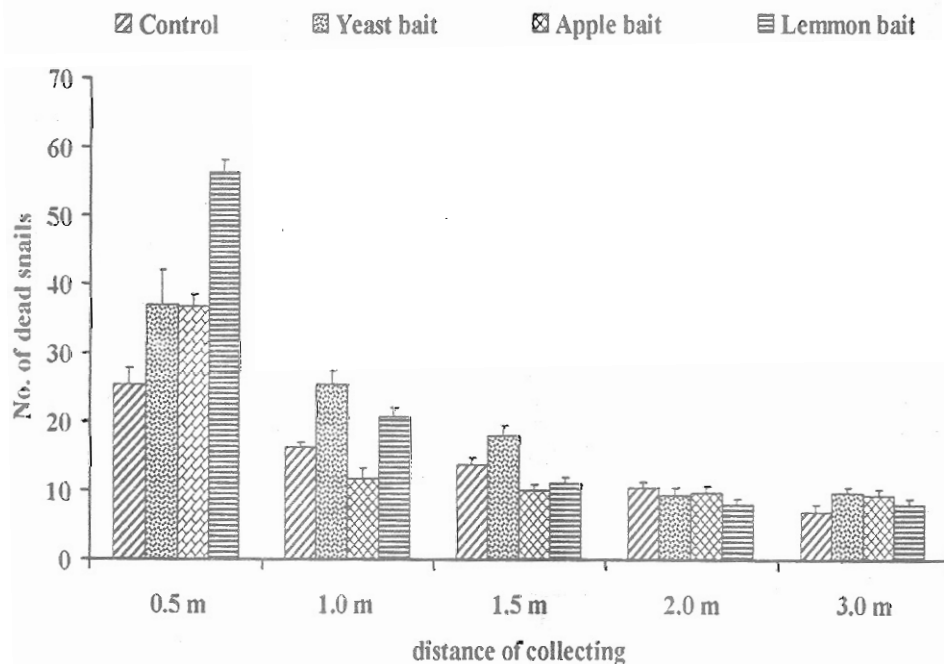


Fig. (1): Comparison between molluscicidal baits effects at different distances

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محاولة لتحسين طعوم القواقع السامة باستخدام بعض مواد طبيعية على مسافات مختلفة

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استخدمت ثلاثة مواد طبيعية وهو إيسانس الليمون والتفاح والخميرة للجافة لتحسين طعوم الميثوميل السامة وقد تم دراسة الأفضلية لبعض المواد النباتية مثل أوراق الخس والكرنب والكوسة مقارنة بالردة وذلك لاختبار أفضلها ليكون أكثر جذباً لكثير من أعداد قواقع الحدائق البني (*Eobania vermiculata*). وقد أوضحت النتائج أن الردة هي الأكثر جذباً حيث أن النسبة المستهلكة منها ٥٦% بينما النسبة المستهلكة من أوراق الخس والكرنب والكوسة كانت ٣١,٤، ١٩,٠٩، ٦,٢٢ على التوالي.

هذه الطعوم بالإضافة إلى الكنترول الخالي من المواد الطبيعية طبقت باستخدام مسافات مختلفة ٥,٠، ١,٠، ١,٥، ٢,٠، ٣,٠ متر من القواقع المختبرة وعددها ١٠٠ قوقع. وقد أوضحت النتائج أن تحديد المسافة مهم جداً لجمع أكبر عدد من القواقع المختبرة على الطعوم السامة المختلفة أيضاً طعم الميثوميل الخالي من المواد الإضافية الطبيعية (الكنترول). جمع عدد كبير من القواقع الميتة على مسافة ٠,٥ متر بمتوسط ٢٥,٣ قوقع ميت عن المسافات الأخرى المختبرة. طعم الميثوميل المضاف إليه إيسانس الليمون قد زاد من جمع عدد القواقع الميتة بمتوسط (٥٦,٣) عن المواد الأخرى المختبرة بمتوسط (٣٧) للخميرة والكنترول (٢٥) قوقع ميت على مسافة ٠,٥ متر. وقد وجد أن مسافة ٠,٥ متر هي الأكثر جذباً للقواقع عن المسافات الأخرى بالإضافة إلى إيسانس الليمون هو الأفضل من المواد الطبيعية المختبرة.