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A MECHANICAL METHOD FOR CONTROLLING LAND SNAILS ON PEAR TREES IN EGYPT.

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Abstract

The aim of the present study is to protect the orchard trees from land snails by using a band of metal around the tree trunk. The rings tested were in the shape of a corona and were made of copper sheet, aluminium sheet, wire screen gauze (14 mesh) and a fibre cord (Rope).

This study was conducted in a severely infested pear orchard located at Alexandria governorate. The land snails found in this orchard were Eobania vermiculata (Muller), Helicella vestalis (Pfeiffer), Theba pisana (Muller) and Cochlicella acuta (Muller).

The results revealed that wire screen rings gave the highest percentage of protection against the different snails followed by the copper sheet rings. Aluminium sheet rings gave intermediate protection, while the rope rings gave poor protection.

INTRODUCTION

Recently, the land snails became a real threat to fruit trees, vegetable crops and ornamental plants. The literature revealed that land snails cause economic damage to several host plants in Egypt (Kassab and Daoud 1964; Bishara *et al.,* 1968; El-Okda 1981).

The loss to most fruit trees by some species of snails may form a serious problem especially if large numbers of those animals are present.

Many wokers had drawn the attention to control land snails by chemical methods (Smith, 1959; Brooks and Kelsheimer, 1961; Campbell and Taylor, 1962; Anonymous, 1966; Smith, 1967; and El-Okda 1978, 1984).

The aim of the present study is to protect the orchard trees from the injury of land snails without pollution to the environment by using a ring of metal around the tree trunk.

MATERIALS AND METHODS

The study was conducted in a severely infested pear orchard located at Alexandria governorate. The species of land snails found in this orchard were *Eobania vermiculata* (Muller), *Helicella vestalis* (Pfeiffer), *Theba pisana* (Muller) and *Cochlicella acuta* (Muller).

The experiment consisted of 4 treatments and a control with 10 replicates (trees) in each treatment. All the land snails, sticking or crawling on the trees experimented, were collected to make the trees free from snails in the initial stage of the experiment. In each treatment, the tree trunk was surrounded 30-35 cm above the ground with one of the following rings: a) copper sheet, 4-inch wide, with the upper half being bent vertically and cut end all round as shown in Fig. 1; b) aluminium sheet with the same shape; c) wire screen gauze (14 mesh) with long pricky end; d) thick fibre rope.

The trees in the control treatment were marked with a white paint at the 35 cm height at monthly intervals starting from August to October 1992 (the period of snails activity). The land snails were collected from each tree above and blow the rings separately, then identified and counted for each species.

Analysis of variance and least significant difference were used to test the differences between treatments (Snedecor and Cochran, 1956).

RESULTS AND DISCUSSION

Table 1 represents the mean numbers of the different snails found on the trees in the 4 treatments below and above the rings. In order to reveal the effect of the

Table 1. The mean number of snails of each species found below and above the different kinds of corona rings fixed around the tree trunks and their percentages related to total number per tree and to control.

Kind of corona ring	Observed place	*E.vermiculata*			Theba pisana			*H.vestalis*			*Cochlicella acuta*			General					
		Mean	% related to Total	% related to Cont.	Mean	% related to Total	% related to Cont.	Mean	% related to Total	% related to Cont.	Mean	% related to Total	% related to Cont.	Mean	% related to Total	% related to Cont.	Mean	% related to Total	% related to Cont.
Wire Screen	Above	0.0	0.00	0.00	9.0	18.75	4.24	6.2	40.52	6.67	0.0	0.00	0.00	15.2	24.13	3.62			
	Below	8.4	100.0	27.50	19.0	81.25	8.95	9.1	59.48	9.78	11.3	100.0	12.93	47.8	25.87	11.37			
	Total	8.4	100.0	27.50	28.0	100.0	13.19	15.3	100.0	16.45	11.3	100.0	12.93	63.0	100.0	14.99			
Copper Sheet	Above	0.0	0.00	0.00	10.2	31.19	4.81	6.0	32.79	6.45	5.2	42.62	5.95	21.4	30.40	5.09			
	Below	7.2	100.0	26.18	22.5	68.81	10.60	12.3	67.21	13.23	7.0	57.38	8.01	49.0	69.60	11.66			
	Total	7.2	100.0	26.18	32.7	100.0	15.41	18.3	100.0	19.68	12.2	100.0	13.96	70.4	100.0	16.75			
Aluminium Sheet	Above	5.1	35.42	18.55	17.3	38.19	8.15	8.3	30.40	8.92	15.0	39.47	17.16	45.7	36.56	10.86			
	Below	9.3	64.58	33.81	28.0	61.81	13.20	19.0	69.60	20.43	23.0	60.53	26.32	79.3	63.44	18.86			
	Total	14.4	100.0	52.46	45.3	100.0	21.35	27.3	100.0	29.35	38.0	100.0	43.48	125.0	100.0	29.73			
Rope	Above	11.6	47.35	42.18	183.	92.33	86.24	60.0	67.92	64.52	63.5	90.07	72.65	318.1	85.70	75.67			
	Below	12.9	52.65	46.91	15.2	7.67	7.16	18.8	23.08	19.35	7.0	9.93	8.01	53.1	14.30	12.63			
	Total	24.5	100.0	89.09	198.2	100.0	93.40	78.0	100.0	83.87	70.5	100.0	80.66	371.2	100.0	88.30			
Control	Above	19.0	69.09	69.09	205.	96.47	96.47	80.0	86.02	86.02	76.4	90.52	90.52	380.4	91.14	91.14			
	Below	8.5	30.91	30.91	7.5	3.53	3.53	13.0	13.98	13.98	8.0	9.48	9.48	37.0	8.86	8.86			
	Total	27.5	100.0	100.	212.5	100.0	100.0	93.0	100.0a	100.0	84.4	100.0	100.0	417.4	100.0	100.0			
	"F"	19.33***			23.40			13.81**			18.0**								
	L.D.S.	3.15			4.39			5.85			3.82								

different rings for preventing the snails from climbing above them, the percentages of controlling each land snail caused by each type of ring were calculated (Table 2.)

Data in table 2 indicated that rings made of wire screen, gave the highest protection against the different snails. These wire rings gave complete protection against *E.vermiculata* and *C.acuta* and over 90% protection against *T.pisana* and *H.vestalis*. Rings made of copper sheet ranked the second in its protection against the different snails, since it gave complete protection against *E.vermiculata* and over 90% against *T. pisana, H.vestalis* and *C.acuta*.

The protection given by the rope rings was the lowest as it gave only 10.73% in case of *T.pisana*. Its effect on the other land snails was 16.88, 25.00 and 38.95% for *C.acuta*, *H.vestalis* and *E.vermiculata*, respectively.

The protection given by rings made of aluminium sheet was intermediate. It gave over 90% protection only in case of T.pisana, and over 80% protection in case of *H.vestalis* and *C.acuta*. These rings gave only 73.16% protection against *E.vermiculata*.

The 4 types of rings could therefore be arranged according to their efficiency in mechanical control of land snails in the following descending order : Wire screen gauze, copper sheet, aluminium sheet and fibre rope.

In conclusion, using either wire gauze or copper sheet rings could be successfully recommended for protecting the trees against the climbing land snails.

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Table 2. Percentage of protection for pear trees from land snail species by using different rings.

	E. vermiculata	*T. pisana*	*H. vestalis*	*C. acutal*	General
Wire screeen	100.00	95.61	92.25	100.00	96.00
Copper sheet	100.00	95.02	93.50	93.19	94.37
Aluminum sheet	73.16	91.56	89.63	80.37	87.99
Rope	38.95	10.73	25.00	16.88	16.38

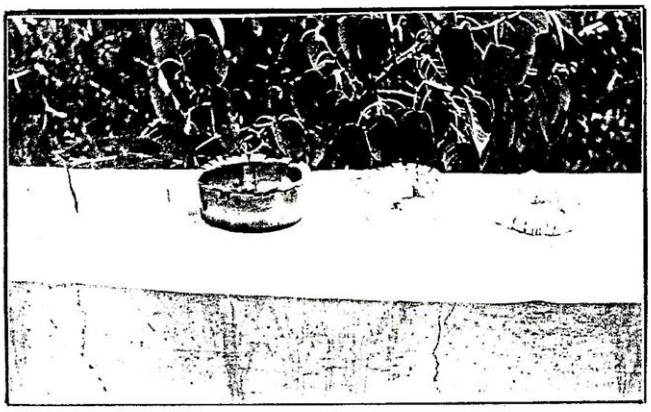

Fig. 1 (A) : Types of rings ; left to right: wire screen, cooper, aluminium and rope.

Fig. 1 (B) : Land snails accumulated below copper ring.

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طريقة ميكانيكية لمكافحة القواقع الأرضية على أشجار الكمثرى فى مصر

چوزيف مترى نخله

تهدف هذه الدراسة إلى حماية أشجار الحدائق من القواقع الأرضية وذلك باستخدام حلقات من المعدن حول جذوع الأشجار . والحلقات التى تم اختبارها كانت فى شكل حلقات مصنوعة من شريط نحاس، شريط ألومنيوم وسلك شبكى (١٤ ثقب فى البوصة) وحبل من الألياف. وقد تم تنفيذ هذه الدراسة فى محافظة الاسكندرية باحدى حدائق الكمثرى شديدة الاصابة بالقواقع الأرضية التى تم التعرف عليها ، وهى قوقع الحدائق البنى الكبير "ايوبانيا فرميكيوليتا" والقوقع المخروطى الصغير "كوشيليسلا اكيوتا".

وقد أعطت حلقات السلك الشبكى أعلى نسبة من الحماية ضد الأنواع المختلفة من القواقع يليها فى الكفاءة الحلقات المصنوعة من الشريط النحاسى ثم الحلقات المصنوعج من شريط الالومنيوم حيث أعطت نسبة حماية متوسطة بينما الحلقات المصنوعة من الحبال أعطت نسبة حماية ضعيفة.