

CULTURAL CONTROL OF TERRESTRIAL MOLLUSCA. 2. HAND COLLECTION OF REST SNAILS.

BY

M. M. Kh. El-Okda, M. S. El-Shahaat, M. M. Emara and
A. H. Hanafi

Integrated Protection Lab., Agric. Res. Cent., Egypt, Alex.

ABSTRACT

The infestation of fruit orchards pear and guava by snails in El-Maamoura region, Alexandria Governorate, during the period from 1988-1989 is estimated. Hand collection application of the rest snails was carried out by collectors that were divided into three ages of collecting groups as 14-15, 18-20 and 24-25 year-old. The obtained results indicated the herbivorous snails, *Theba sp.*, *Helicella sp.* and *Cochlicella sp.* are the dominant stuck snails upon the followed by the active snail, *Eubania sp.* The evaluated collectors executed an efficient collection as (87.2-94.2)% of the total number of snails. It is showed that the young collectors are better as hand collector than the older ages, 24-25 year-old. It is demonstrated that the hand collection of rest terrestrial mollusca is a favourable and efficient practice as cultural control against snails.

INTRODUCTION

Lately, horticultural farmers in some Egyptian Governorates, particularly Alexandria-Boheira extend, are interested for asking about controlling the land snails upon fruit trees. The previous studies announced that the herbivorous snails, *Cochlicella sp.*, *Theba sp.* and *Helicella sp.* ascend the trees during summer days and stick themselves it (1,2,4). Recently, it is showed that the terrestrial mollusca as economic pests could take place in some northern coast regions, especially the new reclaimed lands near Alexandria Governorate. This pest, generally, is very active during spring and autumn days, and the common rest snails,

Theba sp., *Helicella* sp. and *Cochlicella* sp. are known as harmful mollusca or herbivorous mollusca in another meaning.

This study is to evaluate the hand collection application of rest terrestrial snails as a cultural control practice.

MATERIALS and METHODS

1. Mollusca Infestation

Twelve trees of 1.5-2.5 feet pear and guava fruit trees were selected randomly to be hand made as some studies located in Alexandria governorate. Mollusca infestation as population density and distribution % values were recorded during four seasons from 1988-1989.

2. Hand collection of rest snails

The hand collection was run for 30 trees batches, June-August. The snails were hand picked up. The remaining mollusca was carried out to trees belonging 17 days of 14-17, 18-20 and 24-26 year old. The rest snails were counted pre-and post-picking up directly and after 15 days of collection.

3. Evaluation of the hand snail collection

The hand snail collection is evaluated as following:

A- The efficacy of collection at the same day of collection, is expresses as

$$\text{mollusca collection \%} = \frac{a - b}{a} \times 100.$$

B- The efficacy of collection after 15 days of collection, is expressed as

$$\text{mollusca collection \%} = \frac{a - c}{c} \times 100 \text{ where:}$$

a = population density of rest snails pre-collection (snail / tree).

b = population density of rest snails post-picking up directly (snail / tree),
and

c = population density of counted snails after 15 days of collection

C- The rate of snail collection; $R(\text{tree/hr}) = \frac{N}{t}$ where "N" is the total number of selected trees (30 trees) and "t" is the time (hr.) for snail collection.

The surveyed snails were identified (5,6,7,8).

RESULTS and DISCUSSION

1- Mollusca infestation upon selected fruit trees

The average of the rest land snails infested pear and guava trees during whole season is shown in Table (1). It is showed that 19-32 snails / pear tree during Sept.-Feb. increased to 275 snails during March-May then the maximum increase was 1621 snail / pear tree in July-Sept. However, the population for guava tree was 19-32 snails / tree increased to 108 then 309 and 921 snail / guava tree during the previous mentioned periods, respectively. On the other hand, the distribution % of snail species upon both guava and pear trees shows that the most popular one was *Helicella sp.* during July-Sept period followed by *Theba sp.* during March-May period then *Cochlicella sp.* during May-July. The least distributed snail sp. was *Eubania sp.* during July-Sept. period. These findings indicated that small *Cochlicella* snails were the earliest snails binded on the tree, followed by *Theba sp.* and *Helicella sp.* The garden snails, *Eubania sp.* were the most active mollusca.

2- Hand collection of rest snails

Table (2) shows the efficacy of three collecting groups for rest snails on pear trees. The groups of collection ages are 14-15, 18-20 and 24-25 year-old picked up the snails during 3.1, 4.2 and 8.9 hr / 30 tree respectively. They are respectively gave an efficient collection as 93.8, 91.2 and 87.6% of the total counted snails showing the rate of collection values are 9.7, 5.1 and 3.4 tree / hr. In regarding to guava trees, it is cleared that the collection group age of 18-20 year-old picked up the rest snails during ca. 6.7 and 4 0 hr on June and August respectively. Thus, they respectively have an efficient collection as 88.2 and 94.2% showing that the values of collection rate are 4.5 and 7.5 tree / hr. It is evident that the collectors of 14-15 and 18-20 year-old are more efficient to collect the

rest snails with a high rates of collection. The climbed snails revealed to be picked up in the early morning or late afternoon during summer season.

3- The efficacy of rest snail collection

It is well known that the investigated snails are full rest during July-August period, also the proposed 15-day period post-snail collection is a suitable for detecting the efficacy of rest snail collection (Table 3). The efficacy values as snail reduction % post 15 days of picking up were 94.4, 94.0 and 80.4 for guava trees cultivated in Scott, Tartosia and Machina villages respectively. The values for pear trees were 75.7% in Raharna village and 95.6% in Islaah village. *Helicella* counts were increased after the collection in pear orchards, while *Eubania* counts generally were increased in guava ones and locomote upon the trees without binding. Many investigators (1,2,3) summerized that *Theba sp.*, *Cochlicella so.* and *Helicella sp.* are the most abundant snail types. The highest counted snails are recorded during summer days, falsely upon trees as adults, youngsters and their generations before. The snails enter the rest state, forming binds of chalky covers attaching the shell mouth on the support. It is showed that the rest snails stucked the tree parts and appeared to be motionless, therefore they could be collected easily. The snail infestation is occurred almost by the herbivorous snails, harmful mollusca. The control of rest snails by the hand collection is favarable before they can resume their normal locomotion after rasping away binding doors. On the other hand, snail collection will induce the useful mollusca carnivorous and ominivorous snails, which can attack the harmful snails. In the other viewpoint, weed picking up reduced mollusca population to achieve about (22.4-69.2)% mollusca reduction (4). So, hand collection of rest snails will have a benfit consequence as cultural control being a principle items of the Integrated Protection Programme.

REFERENCES

- 1- El-Okda, M. M., 1981. Locomotion activity and inestation abundance of certain terrestrial mollusca in fruit orchards, Alexandria province, A R E. Proc. 4th. Arab Pest. conf. Tanta Univ. II: 279-287.
- 2- ----- and K. Khalil, 1981. Land mollusca as economic pest attacking fruit orchards at Alexandria governorate. Ibid., II: 289-302.
- 3- -----, 1983 Terrestrial snails and slugs plumonata as destructive mollusca in ornamental plantages in Alexandria. Egypt. Proc. 5th. Arab pest. Conf. Tanta Univ., II: 369-378.
- 4- -----, 1983 Rest aspect of certain snails under field and laboratory conditions. Ibid. V: 202-211.
- 5- -----; M. M. Emara and A. H. Selim 1989. The response of the harmful and useful terrestrial mollusca towards several toxicants: I. Efficacy of six toxicants under laboratory conditions. Alex. Sci. Exch. No. 110 No. 3: 375-385.
- 6- Janus, H. 1965. Mollusca. Land fresh water mollusca. Burke. London, pp, 180.
- 7- Kassab, A and D. Daoud, 1964. Notes on the biology and control of land snails of economic importance in UAR. Agric. Res. Rev. Cairo. Min. of Agric., 42: 47-88.
- 8- Mordam, B. 1976. Personal Communication. Mollusca section of Zoology, Museum, London. U.K.

Table 1: Population and distribution of snails; Maamourah region during 1988-1989 season.

Date	Pear trees					Guava trees				
	Snail population (snail / tree)*	Snail types distribution, %				Snail population (Snail / tree)	Snail types distribution, %			
		a	b	c	d		a	b	c	d
March, 29 - May, 13	275	22.0	60.2	9.0	8.8	108	20.0	61.0	8.7	10
May-July, 12	838	23.3	26.0	13.1	37.0	309	18.3	44.2	13.9	23.6
July-Sept., 15	1621	4.6	9.0	76.0	10.4	921	0.4	29.2	63.0	7.45
Sept., 28-Feb., 28	19-32 / tree, are mostly <i>Eubania</i> sp. and <i>Monach</i> sp.									

a, b, c, and d are *Eubania sp.*, *Theba sp.*, *Helicella sp.* and *Cochlicella sp.* respectively.

* each value is the average of 10 trees.

Table 2: Mollusca collection by three different ages of collectors (30 trees with 3 reps-. Maamourah).

Orchard	Collected* snail; %	Time required for collection hr.	Rate of collection; (tree/hr)
Pear, 10 year-old, June	<u>A- 14-15 year-old collector</u>		
	93.8	3.75	9.7
		3.00 (3.08±0.36)	
		2.50	
	<u>B- 18-20 year-old collector</u>		
	91.2	5.45	5.1
		6.43 (5.83±0.31)	
	<u>C- 24-25 year-old collector</u>		
	87.6	10.00	3.4
7.55 (8.85±0.71)			
9.00			
Guava, 4 year-old, August.	<u>18-20 year-old collector</u>		
	94.2	4.30	7.5
		4.45 (3.99±0.38)	
		3.23	
	88.2	6.75	4.5
		6.38 (6.63±0.12)	
		6.75	

* It represents the efficacy of the collectors.

Table 3: Population and distribution of test snails pre-and 15 days post-collection, Manamoua region.

Fruit tree*	Village	Population (snail / tree)		Reduction**	Snail type distribution(%)							
		pre- (i)	post- (ii)		<i>Eubania</i> sp.		<i>Licba</i> sp.		<i>Helicella</i> sp.		<i>Coenobellia</i> sp.	
				%	Pre-	post-	pre-	post-	pre-	post-	pre-	post-
Guava	Scott	921	52	94.4	6.6	39.2	37.3	34.7	0.0	0.0	56.1	29.1
	Tartosa	382	75	99.0	6.4	46.5	77.8	43.7	0.0	0.0	20.0	4.3
	Machina	194	38	80.4	32.2	34.6	21.8	48.2	41.7	52.2	4.3	3.6
Mean		469.0	37.7	89.6	15.1	40.8	47.2	29.3	13.9	17.6	26.8	12.1
Pear	Rahma	136	33	75.7	46.7	58.2	33.7	14.2	15.3	27.2	4.3	6.6
	Islah	1540	68	95.6	0.0	0.0	18.7	16.4	38.0	66.0	70.3	17.6
Mean		838.0	50.5	85.7	23.4	29.1	26.2	15.3	13.2	46.6	37.3	9.0
Common mean		624.6	42.3	88.0	18.4	36.3	37.9	24.9	13.6	20.3	34.4	10.9

* 30 trees and collections of (18-20) year-old are used.

** each value $\times 100$.

المعاملات الزراعية لمكافحة رخويات التربة

٢ - الجمع اليدوي للقواقع في طور الراحة

محمد محمد خليل العقدة محمد سعيد الشحات
مختار محمد عمارة أحمد حسين خنفي
معمل الوقاية المتكاملة - مركز البحوث الزراعية

تم تتبع الاصابة بالقواقع الارضية وذلك في مساتين كل من الكشرى والجوانفة في
قرى منطقة المعصرة بمحافظة الاسكندرية خلال فصول موسم ١٩٨٨ - ١٩٨٩ وتم
جمع القواقع يدويا عن طريق ثلاثة مجاميع مختلفة الاعمار من العمال بغرض تبيان
كفاءة كل مجموعة سنية ٠ والنتائج المتحصل عليها يمكن تلخيصها كالآتي :-

١ - القواقع العشبية والتي تضم ابوشفة بنفسجى ، ابوسرة ، الحلزون الصغير
تمثل القواقع مستديرة الالتصاق وكانت الاكثر انتشارا يليها قواقع الحدائق البنى
حيث كان أكثر نشاطا وأقل التصاقا على الاجزاء النباتية ٠ وقد كان التعسداد
الكلى للقواقع ٢٢٥ قوقع لكل شجرة في الفترة من مارس الى يونيو بينما وصل الى
١٦٢١ قوقع لكل شجرة في الفترة من يوليه الى سبتمبر ٠

٢ - اظهرت اعمار الجمع - بصفة عامة - كفاءة في جمع القواقع تراوحت من ٨٧,٦% الى
٩٤,٢% موضحة أن اعمار الجمع ذات الاعمار (١٤ - ١٥) و (١٨ - ٢٠) سنة
ذات معدل أداء عال وأكبر من المجموعة السنية الأكبر سنا (٢٤ - ٢٥ عاما) ٠
كما أن معدل أداء المجموعة السنية (١٨ - ٢٠ سنة) كان أكبر في حالة الجوانفة
عمر ٤ سنوات خلال أغسطس عن مثيلة في حالة الجوانفة عمر ١٤ عاما خلال شهر
يونيو ٠

٣ - اظهرت النتائج كفاءة عملية الجمع اليدوي للقواقع أثناء وجودها على الاشجار
في طور الراحة - خلال أشهر الصيف - كأحد الوسائل الزراعية لتقليل تعسداد
هذه الآفة ٠٠