

Ecological studies and control of certain species of rodent inhabiting the industrial area of Assiut Governorate

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Abstract:

The present study was carried out in the industrial area of Assiut City, in order to survey the rodent species and study the population dynamics of the rodents all over the year by using the food consumption method. The use of anticoagulant rodenticides for controlling rodent species was also possible.

Data cleared the presence of three rodent species captured from the studied area. The first one was the white bellied rat, *Rattus rattus frugivorus* represented by 58.0% from total rat captured; the second species was the grey bellied rat, *R. r. alexandrinus* with 33.0% and the third species was the Nile grass rat, *Arvicanthis niloticus* with 9.0% from the total population.

Study of population dynamics showed that, high population of rodents was observed during spring with 39.36% followed by autumn 23.0% and the lowest population was counted during summer and winter with 18.9% and 18.6%. The same

trend was recorded when using food consumption method in order to study the occurrence of rodent members in the studied area.

The use of anticoagulant rodenticides in control rodents in the studied area resulted of 84.8% reduction in the total of rodent population when used these materials twice as compared with the untreated areas or the using of these materials one time treatment only

Key words: Rodent population – rodent species – food consumption – industrial area, marble.

Introduction:

Rodent pests in urban and rural areas have been presented in different situations all over the world. In general, most of these pests inflict economics loss and public health problems **Dolbeer, (1999).**

In many countries due to the lack of such researches concerning either control programs, or reduction of rodent populations or estimation the rodent risk. Thus, specific treatments

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were made by **Abdel-Gawad [(2010)a]**. On the other hand, most of the treated materials have been designed to be used in the developed countries. (**Singleton and Brown, 1999**).

In Egypt, the changes of the environment by reclamation the desert and increase the cover plants in this area have been a great effect to the distribution of rodent species on abundance in the studied area (**El-Sherbiny, 1987; Desoky, 2007 and Abdel-Gawad [(2010)b]**). Thus the present work was planned in order to study the ecology and control of certain species of rodent in the industrial area of Assiut Governorate.

Material and methods:

The present work was conducted in order to study the population density of control of rodent species inhabiting the industrial area of Assiut city. This study was started from July 2011 to June 2012

The area of study was about 15 Feddans, surrounding with the wooden trees such as camphor and casuarina and some fruit specially date palm and grab trees. In this area, some storages and house buildings were also found. The area was divided into three sub-areas; each one was about 5 Fedans.

A. Survey of rodents :

In each sub-area, twenty wire box traps were baited and distributed in this area during three successive days and repeated twice monthly. The traps were put at 6pm and collected at 7am. The captured rodents were taken and classified into species and subspecies. Rodents captured were released again to the sub-areas. The monthly and seasonal numbers of rodent species were recorded.

A. Estimation of rodents population:

In order to estimate rodent population densities by using food consumption method, one hundred of plastic tubes 50 × 15 cm. contain 100 g of crushed maize were distributed in each sub-area as the bait stations during three successive days, and repeated twice monthly. The average consumption was recorded monthly.

C. Control of rodents:

In order to estimate the population density of rodents the previous method of food consumption was used the bait stations contained 100 g of rodenticides. Three rodenticides were used in this experiment

(i.e., Caied 0.004%; Supercaied 0.005% and Ratak 0.004%). These baits were distributed in each sub-area for seven days. After 21 days from the poisons treatment, rodents were estimated by using crushed maize and the reduction

of the food consumption .The percentage of reduction was also recorded After one month from the first treatment this experiment was repeated again and the second bait reductions were also recorded.

Results and discussion

A. Survey of rodents:

Data in Table (1) showed the survey of rodent species in the study area. It was observed that there was three species of rodent species studied areas. The rodent species ranked according to the percentage of each species as follows. The first was the white bellied rat, *Rattus rattus frugivorus*, it represented by 58% of the total numbers of rodents highly den existing this area. This high density may be due mainly to the presence of wooden and fruit trees that make a good environmental places for building nests and for food.

The second species was the grey bellied rat, *Rattus rattus alexandrinus* occurred with 33.0% from the total population of rodents. This species was found beside the houses and storages which the human food was found. The third species in the study area was the Nile grass rat *Arvicanthis niloticus* with low density consisted of 9.0% from the total rodents captured. This low density of may *A.niloticus* be

due to the competition with *Rattus r. frugivorus*.

B: Rodents population and fluctuation

Study of the rodent population by using captured method for determining the population densities as shown from Table (1). High rodents population was observed during spring season with 39.36% followed by autumn (23.0%). Low density was recorded during summer and winter seasons. These finding were in agreement with those obtained by **Maher Ali et al. (1982), Abdel-Gawad [(2010)a] and Bakri and Al-Gendy (2007).**

The study of the rodent population fluctuation using food consumption method was recorded in Table (2). Highly food consumption was observed during autumn season (30.6%) followed by spring (28.4%) without any significant difference, and low consumption was observed during summer and winter season (21.9% and 19.1%).

October exhibited high food consumption (13.4%) as compared with May and November, and low consumptions of food were recoded (5.3%, 5.6% and 5.9%) during January, February and December respectively. Both of food consumption method and captured methods gave the same results in determining the rodents

population all over the year of study.

C. Rodent control:

Data in Table (3) showed the mean percentages of food consumption before and after treatment of three sub-areas (A, B and C) with the three anticoagulant rodenticides (Caied 0.004%, Super Caied 0.005% and Ratak 0.004%).

These data cleared that the one treatment of the studied area with anticoagulant gave low reduction of the rodents population when

used food consumption method by added Caied 0.004%, Super-caied 0.005% and Ratak 0.004% the reduction were (56.5%, 53.9% and 51.8%), respectively.

The second treatment after one month from the first one by using the same rodenticides gave high reductions of rodents population represented by 86.0%, 83.5% and 89.9%, respectively. This may be recommended in order to successfully control of rodents from comparable areas.

Table (1) Seasonal and monthly of rodents population captured from the industrial area of Assiut Governorate during, 2011/2012.

Months	Area			Total		Rodent percentage					
	A	B	C	No.	%	R. r. f		R. r. A		A. n	
						No.	%	No.	%	No.	%
July	30	18	33	81	7.2	42	51.8	30	37.0	9	11.2
Aug.	21	12	17	50	4.4	28	56.0	14	38.0	3	6.0
Sum.	38	25	19	83	7.4	44	53.0	29	34.9	9	10.8
Summer	89	55	69	214	18.9	114	53.5	78	36.6	21	9.3
Oct.	44	41	33	118	10.5	70	59.3	38	32.2	10	8.5
Nov.	39	22	21	82	7.3	45	54.8	29	35.4	8	9.7
Dec.	21	15	24	60	5.3	33	55.0	19	31.7	8	13.3
Autumn	104	78	76	260	23.0	148	56.9	86	33.1	28	10.8
Jan	18	13	19	50	4.4	26	52.0	21	42.0	3	6.0
Feb.	21	17	26	64	5.6	38	59.4	24	37.5	2	3.1
March	35	36	36	96	8.5	59	61.4	29	30.2	8	8.5
Winter	74	55	81	210	18.6	123	58.6	74	35.2	13	6.2
April	51	43	44	138	12.2	78	56.5	43	31.2	17	12.3
May	62	51	59	172	15.4	115	66.9	43	25.0	14	8.1
June	53	38	43	134	11.9	76	56.7	48	35.8	10	7.5
Spring	166	132	146	444	39.36	269	60.6	134	30.2	41	9.2
Total	433	320	374	1128		654	58.0	372	33.0	103	9.0

A= Treatment area 1
 B= Treatment area 2
 C= Treatment area 3

Table (2) Population dynamic of rodent species existing in the industrial area of Assiut by using food consumption method, during, 2011/2012

areas	Food consumption in gram				
Months	A	B	C	Total	Mean
July	250	350	330	930	310.0
Aug.	275	250	295	820	273.3
Sum.	360	415	515	1290	433.3
Summer	885	1025	1140	3050	1016.6
Oct.	615	540	715	1870	623.3
Nov.	490	570	495	1555	518.3
Dec.	220	295	315	830	276.6
Autumn	1325	1405	1525	4255	1418.3
Jan	195	235	315	745	248.3
Feb.	210	280	290	780	260.0
March	320	415	395	1130	376.6
Winter	725	930	1000	2655	885.3
April	395	415	390	1200	400.0
May	425	515	595	1555	515.0
June	385	415	415	1215	405.0
Spring	1205	1345	1345	3940	1314.3
Total	4205	4705	3660	12595	4189.0

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الدراسات الايكولوجية و السيطرة علي انواع معينه من القوارض التي تعيش في المنطقة الصناعية في محافظة اسيوط

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تهدف الدراسة الحالية الى حصر وتصنيف انواع القوارض الموجودة في المنطقة الصناعية بغرب اسيوط مع دراسة اعلى واقل كثافة عددية و استخدام مضادات التجلط مرتين متتاليتين لخفض الكثافة العددية الى الحد الذي يحافظ على التوازن البيئي في المنطقة. أظهرت النتائج المتحصل عليها الآتي

- 1 – من دراسة حصر انواع القوارض في المنطقة الصناعية وجد ان هناك ثلاثة انواع هي جرد النخيل ويكون نسبة 58.0% والمتسلق الرمادي ويعطى نسبة 33.0% واقلها جرد الحقل النيلى ويشكل نسبة 9.0% ومن دراسة الاعداد المصادرة وجد ان اعلى الفصول كثافة هو فصل الربيع والخريف ويليها الصيف والشتاء. ومن دراسة الكثافة العددية بطريقة المستهلك الغذائي اعطت نفس النتائج المتحصل عليها من المصايد كما كانت اعلى الشهور هو شهر اكتوبر ويليها مايو واقلها شهرى يناير و اغسطس.
- 2 – من دراسة استخدام مضادات التجلط في خفض الكثافة العددية لم يلاحظ اي فروق معنوية بين مضادات التجلط الثلاثة المستخدمه وقد لوحظ ان المعاملة مرة واحدة بمضاد التجلط اعطت نسبة خفض من المستهلك الغذائي يصل الي 54.0%. و لقد ارتفعت نسبة الحماية الي 84.8% بعد المعاملة الثانية التي تمت بعد شهر من المعاملة الاولى ولذلك يوصى باستخدام مضادات التجلط مرتين متتاليتين الثانية تكون بعد شهر من الاولى.