

ECOLOGICAL STUDIES ON RODENTS IN THE FARM OF AL-AZHAR UNIVERSITY AT ASSIUT GOVERNORATE

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ABSTRACT

Survey of rodents was conducted, at Al-Azhar University Experimental Farm in Assiut. This studies were achieved throughout two year in field crops and woodlands areas . In both areas 50 wire-box traps of the usual spring door (25×12×10 cm) were baited and distributed twice every 15 days. the Survey of rodents in field crops and woodlands areas revealed the presence of four species of rats and mice . These species were ranked in the field crops as percentage of the total rodents in each year in the following orders, *Arvicanthis niloticus* (Desm.) (63.09 and 72.08%), *Rattus. Rattus frugivorus* (5.58 and 3.6%), *Rattus. r. alexandrinus* (1.28 and 5.4%) while *Mus musculus* Linn. (30.05 and 18.92%) for the first and second year respectively. While in woodlands area were (37.33 & 32.8 %), (9.22 & 13.6%) , (23.05 & 26.4%) and (29.95 & 27.2%) for the same species and two years respectively. Also, it was found five individuals of the spiny mouse, *Acomys cahirinus cahirinus* were captured during the same period. Generally, the number of rodents trapped from the field crops and woodlands areas during 2004/2005 (236 individuals) was decreased as compared with the number trapped from the same areas through 2003/2004,(450 individuals) .The decreased of the density may be due to the shortage of food in this area through the last year . In the woodlands area the highest seasonal index was recorded in spring while the lowest one in winter.

INTRODUCTION

In Egypt, rodents problem increased in the last two decades. The main reasons are due to the diversion in agricultural system, land reclamation and construction of new cities in the desert areas, the wide usage of pesticides for controlling agricultural pests lead to rodent natural enemies reduction such as some reptiles and wild birds. Ibrahim (1995) studied the population dynamics of rodent species in certain habitats and found that, the relative abundance of rodent species differed considerably according to the type of habitat and season. The highest population density of rodents was recorded during the spring, following winter crop harvesting, while the lowest was during the winter season. *Rattus rattus*(Linn.) was abundant in field crop habitats during the spring, summer and autumn seasons, and nearly absent during the winter Sicard *et al.*, (1996) mentioned that

seasonal changes in reproduction and mobility of tropical rodents depend almost on the amount of food available .

MATERIALS AND METHODS

Survey of rodents was conducted at Al-Azhar University Experimental Farm in Assiut. This studies were achieved throughout two years from Dec., 2003 to Nov., 2005. It was chosen to resemble the traditional cultivated lands in Upper Egypt. These areas were chosen districts contained many hundred of feddans cultivated with varied field crops, vegetables and fruit trees, and also some sheep farms. There were also many of irrigation, drainage canals, and woodlands.

In both areas 50 wire-box traps of the usual spring door (25x12x10 cm) were baited and distributed twice every 15 days at 6 pm. with cucumber slices. Next morning, traps were checked, recorded as trap index (No. of rats / trap). The captured rodents were classified into species and subspecies in each locality .

To estimated the population density of rodent species under the field conditions. The capture rodents were classified into species and subspecies. The percentage of every species was estimated monthly and seasonally along the year of the study as trap index. In this study three laboratories were chosen. In every one bait station containing 250 g from wheat was put, the decrease of the wheat was estimated weekly.

RESULTS AND DISCUSSION

Survey of rodents:

The study revealed the occurrence of four rodent species in the field crops :[viz., *Arvicanthis niloticus*, *Mus musculus*, *Rattus rattus frugivorus*, *Rattus rattus alexandrinus* and *Acomys cahirinus* (Desm.)]. while In woodlands (viz., *A. niloticus*, *M. musculus*, *R. r. frugivorus* and *Rattus rattus alexandrinus*) (Tables 1 and 2).

1-In field crops :

The abundance of rodent species in the first and second year could be arranged quantitatively in the following descending order: The Nile grass rat, *A. niloticus* (63.09and 72.07%).The House mouse, *M. musculus* (30.04 and 18.92%)The White bellied rat, *R. r. frugivorus* (5.58 and 3.6%).The Gray bellied rat, *R. r. alexandrinus* (1.29 and 5.41%) for the first and second year, respectively. and five individuals of Spiny mouse, *A. c. cahirinus* were recorded throughout the study years. similar results obtained by Abdel-Gawad *et al.*, (1982), Abazaid (1990) and Abdel-Galil (2005) they found different between species through the year at same field .

2- In the woodlands area :

The Nile grass rat was the most dominant species constituting 37.33% and 32.8% of the total trapped rodents for both first and second year. Followed by the house mouse 29.95% and 27.2% . then the gray bellied rat 23.5% and 26.4%. and the white bellied rat was the last species of occurrence 9.22% and 13.6% for the first and second year respectively. Concerning the percentage of the total numbers of the trapped rodents during 2003/2004 in the two areas of study were 51.77% in the field crops and 48.23% in the woodland area , while 2004/2005.were (47.04 %) in the field crops and (52.96 %) in the woodland area. The high population density of rodents in the both areas may be due mainly to the availability of food and shelters in these areas. On the basis of density percentages, *A. niloticus* ranked the first constituting 63.09%& 37.33% of the total trapped rodents from the field crops and woodland areas during the first year.

While, 72.07%& 32.8% of the total rodent trapped from the same areas in the second year, respectively. It may be concluded that the availability of preferred food in both areas led the rats to feed, and produce higher reproduction rat in both areas, wholly in agreement with the findings obtained by Abdel-Gawad *et al.*, (1987) and El-Feky (1990). Khalid *et al.* (1992) Mourad (1997) they found the density of rodents depend on availability of food and *A. niloticus* was the major one .

Population density of rodents

1- in the field crops:

Data in (Table 3 and 4) show that the highest seasonal index of rodent during 2003/2004 was recorded in winter (0.27) while the lowest one in autumn (0.113) the peak of rodent population was recorded in January (0.43) and the least density was recorded in December (0.07). This may be due to the stay of the rodent in their shelters to avoid the cold weather during December and go out their shelters to bring their food during January. On the other hand, in 2004/2005 the highest seasonal indices of rodents were observed in Summer (0.123) and the lowest in spring (0.07). the peak of rodent population in 2004/2005 was recorded in July (0.14) and the least density during April (0.05).The same results founded by Abdel-Gawad *et al.*, (1982) Zaghloul and Zakaria (1986) and El-Deeb *et al.* (1992b) they found the population density of rodents differed from season to another

2- in the woodlands:

As shown in (Tables 5 and 6) the highest rodents seasonal indices of during 2003/2004 was obtained in spring (0.350) and the lowest in winter (0.073). In March the density of rodent population reached its maximum (0.39), whereas the least density reached its minimum in February (0.05). The highest seasonal indices of rodents during 2004/2005 was in summer (0.147) and the lowest in winter (0.073).

In May the density of rodent population reached its maximum (0.19), whereas the least density reached its minimum in April (0.03). The decrease of the density through April may be due to the migratory of rodent from the woodlands to the wheat fields or to the storage. This data was in agreement with the obtained by Maher Ali et.al.(1974); Abdel Gawad (1979). Ali, M.K. (1985); Yossef, A.E. (1996); Embarak, M.Z. (1997) and Ahmed, M.Y.M. (2001) they found that the population density of the rats mains on food and climatic factors .

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دراسات بيئية عن القوارض في مزرعة جامعة الأزهر بأسسيوط
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أجريت بعض الدراسات على القوارض في مزرعة كلية الزراعة جامعة الأزهر بأسسيوط بمنطقة زراعية تحتوى على نوعين مختلفين من البيئات الأولى هي بيئة المحاصيل الزراعية والثانية بيئة الأحرش (المناطق الغير منزرعة التي تنمو بها نباتات الحلفا والبوص والغاب) وذلك بهدف إجراء حصر لأنواع الفئران والجرذان الموجودة في تلك البيئات وكذلك دراسة الكثافة العددية لأنواع الفئران والجرذان خلال فصول وشهور السنة لمدة عامين.

أولاً :- الحصر : أظهر البحث وجود ثلاثة أنواع من الجرذان ونوعين من الفئران في بيئة المحاصيل الزراعية والأحرش ويمكن ترتيبها كما يلي : جرد الحقل النيلى *Arvicanthis niloticus* الفأر السيسى *Mus musculus* ، جرد النخيل ذو البطن البىضاء *Rattus rattus frugivorus* ، الجرذ المتسلق ذو البطن الرمادي *Rattus rattus alexandrinus* الفأر الشوكي القاهري *Acomys cahirinus cahirinus*.

ثانياً:- التذبذبات الشهرية والموسمية للقوارض : تم دراسة التذبذبات الشهرية و الموسمية لأعداد القوارض في كلا البيئتين محل الدراسة وذلك لمدة عامين متتاليين ٢٠٠٣/٢٠٠٤ م و ٢٠٠٤/٢٠٠٥ م ولقد تبين من هذه الدراسة أن أعلى كثافة عددية سجلت خلال العام الأول ٤٥٠ فرد مقارنة ٢٣٦ فرد في العام الثاني وكان أعلى تعداد لمجموع الأنواع في المنطقتين معاً في العام الأول قد سجل في الربيع (١٥٢ فرد) وكانت اقل كثافة عددية قد سجلت في الخريف(٧٠ فرد) ، بينما في العام الثاني كانت أعلى كثافة عددية قد سجلت في فصل في الصيف (٨١ فرد) واقل كثافة كانت في الشتاء (٤٤ فرد) .

Table (3): Monthly and seasonal distribution of rodent species in the field crops, at Al-Azhar University Exptl. Farm, Assiut (2003-2004).

Month Season	<i>Arvicanthus niloticus</i>		<i>Rattus rattus frugivorus</i>		<i>Rattus rattus alexandrinus</i>		<i>Mus musculus</i>		Total rodent spp.	
	No. rat	Trap index	No. rat	Trap index	No. rat	Trap index	No. mice	Trap index	No. rodent	Trap index
Dec.	6	0.06	0	0	0	0	1	0.01	7	0.07
Jan.	21	0.21	9	0.09	0	0	13	0.13	43	0.43
Feb.	15	0.15	2	0.02	0	0	14	0.14	31	0.31
Winter	42	0.14	11	0.036	0	0	28	0.093	81	0.27
Mar.	8	0.08	1	0.01	0	0	8	0.08	17	0.17
Apr.	7	0.07	0	0	0	0	7	0.07	14	0.14
May	10	0.10	0	0	0	0	6	0.06	16	0.16
Spring	25	0.083	1	0.003	0	0	21	0.07	47	0.156
Jun.	15	0.15	0	0	0	0	8	0.08	23	0.23
Jul.	23	0.23	0	0	0	0	4	0.04	27	0.27
Aug.	16	0.16	1	0.01	1	0.01	3	0.03	21	0.21
Summer	54	0.18	1	0.003	1	0.003	15	0.05	71	0.237
Sep.	9	0.09	0	0	0	0	3	0.03	12	0.12
Oct.	9	0.09	0	0	1	0.01	2	0.02	12	0.12
Nov.	8	0.08	0	0	1	0.01	1	0.01	10	0.10
Autumn	26	0.086	0	0	2	0.007	6	0.02	34	0.113
G. total	147	0.122	13	0.011	3	0.003	70	0.058	233	0.194

Table (4): Monthly and seasonal distribution of rodent species in the field crops, at Al-Azhar University Exptl. Farm, Assiut (2004-2005).

Month Season	and	<i>Arvicanthus niloticus</i>		<i>Rattus rattus frugivorus</i>		<i>Rattus rattus alexandrinus</i>		<i>Mus musculus</i>		Total rodent spp.	
		No. Rat	Trap index	No. rat	Trap index	No. rat	Trap index	No. mice	Trap index	No. rodent	Trap index
Dec.		7	0.07	0	0	0	0	1	0.010	8	0.08
Jan.		5	0.05	3	0.03	0	0	0	0	8	0.08
Feb.		4	0.04	1	0.01	1	0.01	0	0	6	0.06
Winter		16	0.053	4	0.013	1	0.003	1	0.003	22	0.073
Mar.		6	0.06	0	0	0	0	0	0	6	0.06
Apr.		3	0.03	0	0	1	0.01	1	0.010	5	0.05
May		8	0.08	0	0	0	0	2	0.020	10	0.1
Spring		17	0.057	0	0	1	0.003	3	0.010	21	0.07
Jun.		9	0.09	0	0	0	0	4	0.040	13	0.13
Jul.		11	0.11	0	0	0	0	3	0.030	14	0.14
Aug.		9	0.09	0	0	0	0	1	0.010	10	0.1
Summer		29	0.097	0	0	0	0	8	0.027	37	0.123
Sep.		5	0.05	0	0	2	0.02	3	0.030	10	0.1
Oct.		9	0.09	0	0	1	0.01	1	0.010	11	0.11
Nov.		4	0.04	0	0	1	0.01	5	0.050	10	0.1
Autumn		18	0.06	0	0	4	0.013	9	0.030	31	0.103
G. total		80	0.067	4	0.003	6	0.005	21	0.018	111	0.092

Table (5): Monthly and seasonal distribution of rodent species in the woodlands, (2003-2004).

Month and Season	<i>Arvicanthus niloticus</i>		<i>Rattus rattus Frugivorus</i>		<i>Rattus rattus Alexandrinus</i>		<i>Mus musculus</i>		Total rodent spp.	
	No. Rat	Trap index	No. rat	Trap index	No. rat	Trap index	No. mice	Trap index	No. rodent	Trap index
Dec.	2	0.02	0	0	6	0.06	2	0.02	10	0.1
Jan.	2	0.02	0	0	5	0.05	0	0	7	0.07
Feb.	2	0.02	0	0	2	0.02	1	0.01	5	0.05
Winter	6	0.02	0	0	13	0.04	3	0.01	22	0.073
Mar.	12	0.12	4	0.04	10	0.1	13	0.13	39	0.39
Apr.	13	0.13	2	0.02	9	0.09	11	0.11	35	0.35
May	20	0.20	2	0.02	1	0.01	8	0.08	31	0.31
Spring	45	0.15	8	0.03	20	0.07	32	0.1	105	0.35
Jun.	5	0.05	6	0.06	3	0.03	10	0.1	24	0.24
Jul.	6	0.06	2	0.01	2	0.02	9	0.09	18	0.18
Aug.	3	0.03	1	0.02	2	0.02	5	0.05	12	0.12
Summer	14	0.05	9	0.03	7	0.02	24	0.08	54	0.18
Sep.	7	0.07	3	0.03	1	0.01	2	0.02	13	0.13
Oct.	5	0.05	0	0	3	0.03	3	0.03	11	0.11
Nov.	4	0.04	0	0	7	0.07	1	0.01	12	0.12
Autumn	16	0.05	3	0.01	11	0.07	6	0.02	36	0.12
G. total	81	0.068	20	0.017	51	0.043	65	0.054	217	0.181

Table (6): Monthly and seasonal distribution of rodent species in the woodlands, (2004-2005).

Month and	<i>Arvicanthus niloticus</i>	<i>Rattus rattus</i>	<i>Rattus rattus</i>	<i>Mus musculus</i>	Total rodent spp.
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Season			<i>Frugivorus</i>		<i>Alexandrinus</i>					
	No. rat	Trap index	No. rat	Trap index	No. rat	Trap index	No. mice	Trap index	No. rodent	Trap index
Dec.	2	0.02	0	0	6	0.06	2	0.020	10	0.1
Jan.	2	0.02	0	0	5	0.05	0	0	7	0.07
Feb.	2	0.02	0	0	2	0.02	1	0.010	5	0.05
Winter	6	0.02	0	0	13	0.034	3	0.010	22	0.073
Mar.	5	0.05	0	0	4	0.04	2	0.020	11	0.11
Apr.	2	0.02	0	0	0	0	1	0.010	3	0.03
May	9	0.09	3	0.03	0	0	7	0.070	19	0.19
Spring	16	0.053	3	0.01	4	0.013	10	0.033	33	0.11
Jun.	4	0.04	5	0.05	4	0.04	4	0.040	17	0.17
Jul.	5	0.05	2	0.02	3	0.03	5	0.050	15	0.15
Aug.	1	0.01	2	0.02	2	0.02	7	0.070	12	0.12
Summer	10	0.033	9	0.03	9	0.03	16	0.053	44	0.147
Sep.	5	0.05	0	0	2	0.02	2	0.020	9	0.09
Oct.	1	0.01	2	0.02	1	0.01	1	0.010	5	0.05
Nov.	3	0.03	3	0.03	4	0.04	2	0.020	12	0.12
Autumn	9	0.03	5	0.017	7	0.023	5	0.050	26	0.087
G. total	41	0.034	17	0.014	33	0.027	34	0.028	125	0.104

Table (1): Seasonal distribution of rodent species in the field crops and woodlands, at Al-Azhar University Exptl. Farm, Assiut (2003-2004).

Site	Season	<i>Arvicanthus niloticus</i>			<i>Rattus rattus Frugivorus</i>			<i>Rattus rattus Alexandrinus</i>			<i>Mus musculus</i>			Total rodent		
		No. rat	%	Trap index	No. rat	%	Trap index	No. rat	%	Trap index	No. mice	%	Trap index	No. rodent	%	Trap index
Field crops	Winter	42	28.6	0.140	11	84.6	0.036	0	0	0	28	40.0	0.093	81	34.8	0.270
	Spring	25	17.0	0.083	1	7.7	0.003	0	0	0	21	30.0	0.070	47	20.2	0.156
	Summer	54	36.7	0.180	1	7.7	0.003	1	33.3	0.003	15	21.4	0.050	71	30.4	0.237
	Autumn	26	17.7	0.086	0	0	0	2	66.7	0.007	6	8.6	0.020	34	14.6	0.113
	Total	147	63.09	0.122	13	5.58	0.011	3	1.29	0.003	70	30.04	0.058	233	100	0.194
Woodlands	Winter	6	7.4	0.020	0	0	0	13	25.5	0.043	3	4.6	0.010	22	10.1	0.073
	Spring	45	55.5	0.150	8	40.0	0.027	20	39.2	0.067	32	49.2	0.107	105	48.4	0.350
	Summer	14	17.3	0.047	9	45.0	0.030	7	13.7	0.023	24	36.9	0.080	54	24.9	0.180
	Autumn	16	19.8	0.053	3	15.0	0.010	11	21.6	0.037	6	9.3	0.020	36	16.6	0.120
	Total	81	37.33	0.068	20	9.22	0.017	51	23.5	0.043	65	29.95	0.054	217	100	0.181
Field crops and Woodlands	Winter	48	21.0	0.080	11	33.3	0.018	13	24.1	0.022	31	23.0	0.052	103	22.9	0.172
	Spring	70	30.7	0.117	9	27.3	0.015	20	37.0	0.033	53	39.2	0.088	152	33.8	0.253
	Summer	68	29.8	0.113	10	30.3	0.017	8	14.8	0.013	39	28.9	0.065	125	27.8	0.208
	Autumn	42	18.5	0.070	3	9.1	0.005	13	24.1	0.022	12	8.9	0.020	70	15.5	0.117
	Total	228	50.67	0.095	33	7.33	0.014	54	12.0	0.023	135	30.0	0.056	450	100	0.188

Table (2): Seasonal distribution of rodent species in the field crops and woodlands, at Al-Azhar University Exptl. Farm, Assiut (2004-2005).

Site	Season	<i>Arvicanthus niloticus</i>			<i>Rattus rattus Frugivorus</i>			<i>Rattus rattus Alexandrinus</i>			<i>Mus musculus</i>			Total rodent		
		No. rat	%	Trap index	No. rat	%	Trap index	No. rat	%	Trap index	No. mice	%	Trap index	No. rodent	%	Trap index
Field crops	Winter	16	20.0	0.053	4	100	0.013	1	16.7	0.003	1	4.8	0.003	22	19.8	0.073
	Spring	17	21.2	0.057	0	0	0	1	16.7	0.003	3	14.3	0.010	21	18.9	0.070
	Summer	29	36.3	0.097	0	0	0	0	0	0	8	38.1	0.027	37	33.3	0.123
	Autumn	18	22.5	0.060	0	0	0	4	66.6	0.013	9	42.8	0.030	31	28.0	0.103
	Total	80	72.07	0.067	4	3.6	0.003	6	5.41	0.005	21	18.92	0.018	111	100	0.092
Woodlands	Winter	6	14.6	0.020	0	0	0	13	39.4	0.043	3	8.8	0.010	22	17.6	0.073
	Spring	16	39.0	0.053	3	17.6	0.010	4	12.1	0.013	10	29.4	0.033	33	26.4	0.110
	Summer	10	24.4	0.033	9	53.0	0.030	9	27.3	0.030	16	47.0	0.053	44	35.2	0.147
	Autumn	9	22.0	0.030	5	29.4	0.017	7	21.2	0.023	5	14.8	0.017	26	20.8	0.087
Total	41	32.8	0.034	17	13.6	0.014	33	26.4	0.027	34	27.2	0.028	125	100	0.104	
Field crops	Winter	22	18.2	0.036	4	19.0	0.007	14	35.9	0.023	4	7.3	0.007	44	18.6	0.073

and Woodlands	Spring	33	27.3	0.055	3	14.3	0.005	5	12.8	0.008	13	23.6	0.022	54	22.9	0.090
	Summer	39	32.2	0.065	9	42.9	0.015	9	23.1	0.015	24	43.6	0.040	81	34.3	0.135
	Autumn	27	22.3	0.045	5	23.8	0.008	11	28.2	0.018	14	25.5	0.023	57	24.2	0.095
	Total	121	51.27	0.050	21	8.89	0.009	39	16.53	0.016	55	23.31	0.023	236	100	0.098