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MONTHLY ABUNDANCE OF RODENT AND THEIR ECTOPARASITES IN NEWLY SETTLED AREAS, EAST OF LAKES, ISMAILIA GOVERNORATE, EGYPT

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Abstract

Rodents and their ectoparasites were studied inside and outside houses in the newly settled areas, east of lakes, Ismailia Governorate, Egypt. Forty traps per month in each of the two sides were used for collecting rodent during 2009. From 221 rodent were collected from inside houses; *Mus musculus* N=115 (52.04%), *Rattus rattus. frugivorous* N=54 (24.43%), *R. r. alexandrinus* N=40 (18.10%) and *R. norvegicus* N=12 (5.43%). From 177 rodent were collected from outside houses; *M. musculus* N=4 (2.3%), *R. r. frugivorous* N=29 (16.43%), *R. r. alexandrinus* N=37 (20.9%), *R. norvegicus* N=36 (20.3%), *Gerbillus pyramidum* N= 67 (37.9%) and *Jaculus jaculus* N=4 (2.3%). Total ectoparasites per rat inside houses were 765 (3.46 E/Rat) which were classified as fleas, N=464 (2.11 F/R); lice N=150 (0.68 L/R) and mites N=151 (0.68 M/R). From outside house, total ectoparasites per rat were 984 (5.5 E/R) which were classified as fleas, N=410(2.31 F/R); lice N=100 (0.56 L/R), mites N=400 (2.23 M/R) and ticks, N=74 (0.42 T/R). From indoors two fleas species were recorded (*Xenopsylla cheopis* and *Ctenopsyllus segnis*); one species of lice (*Polyplax spinulosa*) and four species of mites (*Laelaps nuttall, Ornithonyssus bacoti, Dermanyssus gallinae* and *Eulaelaps stabularis*).

The outdoors ectoparasites were; six fleas species (*X. cheopis, X. ramesis, Pulex irritans, C. segnis, Stenoponia tripectinata* and *Nosopsylla sinaiensis*); one lice species (*P. spinulosa*); Six mites species (*L. nuttalli, O. bacoti, D. gallinae, E. stabularis*, *Haemogamasus pontiger* and *Hirstionyssus isabellinus*) and immature stages of two ticks species (*Rhipicephalus* sp. and *Hyalomma* sp.). Most of these ectoparasites were recorded infesting *G. pyramidum*.

Keyword: Egypt, Ismailia Governorate Rodents, Ectoparasites, Newly settlement.

Introduction

The several ambitious developmental programs have been planned and started in east of the Suez Canal lakes, Ismailia Governorate. More than 500,000 acres were reclaimed; cultivated and new villages were built in this desert and supplied with regular supply of water from the Nile. The goals of these newly reclaimed area are cultivation of 1000,000 acres and establishment of 35 new village settlements of 5000,000 inhabitants most of them young graduates coming from the Nile Delta. The ecosystem of these new areas will certainly be affected and changed as a re-

sult of extensive agricultural and other civic activities of the new settlers during the coming years. Therefore much efforts and researches are needed to avoid the creation of new epidemicity of zoonotic diseases in this area.

The rodents are mainly reservoirs for many disaster diseases, infested with many ectoparasite-vectors (Shoukry *et al,* 1991; El Kady *et al*, 2007; El Bahrawy *et al,* 2008). They play an important role in diseases transmission to human or animals (Morsy *et al,* 1988; Shoukry *et al,* 1993; El Kady *et al*, 1995; Reeves *et al,* 2007). Rodents are real factor markedly affecting human health and welfare (El Gindy *et al,* 1987). They have followed man to all parts of the world carrying to him the dangerous zoonotic diseases. These are too much to tell as plague, murine typhus, rickettsial diseases (Abdou and Samaan, 1962; Shoukry *et al,* 1993; Reeves *et al,* 2007) cutaneous leishmaniasis (Morsy *et al,* 1982, 1987; El Kady *et al,* 1998) trichinosis (Morsy *et al,* 2000), toxoplasmosis (Rifaat *et al,* 1978) and others. Man is infected with the diseases by contact or by their ectoparasites.

The work aimed to study the monthly abundance of rodents and their arthropods ectoparasites from inside and outside houses in newly settled areas, east of lakes, Ismailia Governorate, Egypt.

Materials and Methods

The present study was carried out in El Takadom village, east of lakes, Ismailia Governorate, located at 30^{O} 37\ N & 32^{O} 22\ E. Rodents were trapped alive from inside and outside houses. Monthly visits were made alternatively to one of the two sides of the village over one year period extending from January to December 2009. A total of 40 wire box traps were used to collect rodents. The rodents were anesthetized with the least amount of chloroform and were identified by sex and species according to standard keys (Osborn and Helmy, 1980; Morsy *et al,* 1988). The ectoparasites were carefully collected by brushing the animal with a stiff-hair brush. The ectoparasites of each rodent were preserved separately in 70% ethanol in labeled specimen tubes. Ectoparasites were mounted as usual and identified by species. Ectoparasites identification; fleas, lice, ticks and mites were done after the international keys (Lewis, 1967; Hubbard; 1947; Hoogstraal, 1956; Baker *et al,* 1956). Indices calculation: rat index=number of trapped rat/ trap/night. General index of an ectoparasite on a given rat host= number of an ectoparasite on rats of same species/total number of collected rats belonging to the same species. Data were analyzed using one way ANOVA test.

Results

A total of 221 rats were captured from indoors during the study period which extended from January to December 2009 (Tab. 1). Out of these *M. musculus* N=115 (52.04%), *R. r. frugivorous* N=54 (24.43%), *R. r. alexandrinus* N=40 (18.10%) and *R. norvegicus* N=12 (5.43%). *Mus musculus* was the most dominant rodent species. Significant temporal variations were recorded in rodents densities trapped from indoors (F= 6.845607; P=0.01). The highest rat index was recorded in Au-

gust (0.68 rat/ trap) while the lowest was recorded in January (0.28 rat/trap).

A total of 765 ectoparsites were recovered from different rodent species trapped indoors. Highest total ectoparasite index (10.42 ectoparasite /rat) was on *R. norvegicus* while lowest (1.869 ectoparasite/rat) was recorded on *M. musculus*. The recovered ectoparasites were two fleas species *X. cheopis* and *C. segnis* (n= 464, 60.65%) one louse, *P. spinulosa* (n=150, 19.6%) and four mites, *L. nuttalli, O. bacoti, D. gallinae* & *E. stabularis* (n=151, 19.74%). Maximum ectoparasites indices were on *R. norvegicus,* which were 3.67flea/rat for *X. cheopis*, 3.17 lice/rat for *P. spinulosa* and 1.58 mite/rat for *D. gallinae*.

Table 1: Monthly abundance of rodents collected from indoors at east of lakes, Ismailia Governorate over the year 2010**:**

Month*	Rodents Number	Rodent species					%
		Rodent Index **	*M. m. muscuslus*	*R. r. frugivorous*	*R .r. alexandriuns*	*R. norvigicus*	
Jan.	11	0.28	6	2	3	-	4.98
Feb.	12	0.30	6	2	4	-	5.43
Mar.	15	0.38	8	3	3	1	6.79
Apr.	18	0.45	8	5	4	1	8.14
May.	21	0.53	10	6	3	2	9.50
Jun.	25	0.63	12	6	4	3	11.31
Jul.	26	0.65	15	7	3	1	11.76
Aug.	27	0.68	18	5	3	1	12.22
Sep.	25	0.63	12	7	5	1	11.31
Oct.	15	0.38	7	3	4	1	6.79
Nov.	14	0.35	7	4	3	-	6.33
Dec.	12	0.30	6	4	1	1	5.43
Total	221	0.46	115	54	40	12	
%			52.04	24.43	18.10	5.43	

*40 Traps /Month, ** Rodent index = no. of trapped rodents/no. of trap nights

Table 2: Ectoparasite indices on indoors collected rodents from at east of lakes Ismailia Governorate over year 2010:

Rodent sp.	Rodents number	Ectoparasites number	Ectoparasites Indices	Ectoparasite species	Ectoparasites number	Ectopara-site/rodent
M. musculus	115	215	1.087	*X. cheopis* (F.)	163	1.4
				P. spinulosa (L.)	52	0.45
R. r. Frugivorous	54	238	4.41	*X. cheopis* (F.)	134	2.5
				P. spinulosa (L.)	43	0.8
				L. nuttalli (M.)	47	0.9
				O. bacoti (M.)	14	0.3
R. r. alexandrinus	40	187	4.68	*X. cheopis* (F.)	118	2.95
				P. spinulosa (L.)	17	0.43
				L. nuttalli (M.)	15	0.38
				D. gallinae (M.)	29	0.73
				E. stabularis (M)	8	0.2
R. norvigicus	12	125	10.42	*X. cheopis* (F.)	44	3.67
				C. segnis (F.)	5	0.42
				P. spinulosa (L.)	38	3.17
				L. nuttalli (M.)	9	0.74
				O. bacoti (M.)	10	0.83
				D. gallinae (M.)	19	1.58

F. = Fleas L.= Lice M.= Mites T.= Ticks

A total of 177 rodents were captured from outdoor. Out of them *M. musculus* (n=4, 2.3%), *R. frugivorous* (n=29, 16.43%), *R. alexandrinus* (n=37, 20.9%), *R. norvegicus* (n=36, 20.3%), *G. pyramidum* (n=67, 37.9%) and *J. jaculus* (n=4, 2.3%). The commonest rat was *G. pyramidum*, significant temporal variation were recorded in the rodent densities captured from outdoors (F=74.05, P<0.001). The maximum rat index (0.58 rat/trap) was recorded in June while the minimum (0.13 rat/trap) was recorded in January.

A total of 984 ectoparasites were recovered from different rat species captured from outdoors; these were six fleas species (n=410, 41.7%), one louse species (n=100, 10.2%); six mites species (n=400, 40.7%) and immature stages of two ticks species (n=74, 7.5%). The maximum flea indices (2.62, 2.48 & 2.06 flea/rat) were recorded on *X. cheopis* on *R. alexandrinus, R. frugivorous* and *R. norvigicus* respectively. The louse, *P. spinulosa* showed maximum lice' index; 1.2 louse/rat on *R. norvigicus*. The maximum mites' indices (1.97, 1.88 mite/ rat) were recorded for *L. nuttalli* on *R. frugivorous* and *O. bacoti* on *G. pyramidum* respectively. Immature tick stages were recorded only on *G. pyramidum and J. jaculus* with maximum ticks index for *Hyalomma* sp. (1.0 tick/rat) on the latter. The general indices of all ectoparasites recovered from outdoors' rodents were significantly higher than the indoors' ones (F=4.772, P=0.039).

Table 3: Monthly abundance of outdoors collected rodents from at east of lakes, Ismailia Governorate over year 2010:

Month	No. Rodent	Rodent species							% Species
		Rodent Index	*M. musculus*	*R. r. frugivorous*	*R .r. alexandriuns*	*R. norvigicus*	*G. pyramidum*	*J. jaculus*	
Jan.	5	0.13	-	2	2	1	-	-	2.82
Feb.	7	0.18	-	2	2	2	1	-	3.95
Mar.	11	0.28	-	1	2	2	6	-	6.21
Apr.	14	0.35	-	2	2	4	5	1	7.91
May.	18	0.45	1	2	3	3	8	1	10.17
Jun.	23	0.58	1	2	2	4	12	2	12.99
Jul.	22	0.55	-	5	4	5	8	-	12.4
Aug.	20	0.50	-	3	6	4	7	-	11.3
Sep.	21	0.53	-	4	6	4	7	-	11.9
Oct.	16	0.40	1	3	3	3	6	-	9.04
Nov.	12	0.30	-	2	3	2	5	-	6.78
Dec.	8	0.20	1	1	2	2	2	-	4.52
Total	177		4	29	37	36	67	4	
%			2.3	16.4	20.9	20.3	37.9	2.3	

Discussion

As regards the indoor results, four species of rodents were collected, Norway rat, *R. norvegicus*, the grey bellied rat *R. r. alexandrinus*, white-bellied rat, *R. r. frugivorous* and house mouse *M. musculus*. The latter was the commonest species at the new settlements, west of Ismailia Governorate. Rat species captured outdoors had only two more species, *G. pyramidum* and *J. jaculus*. *Gerbillus pyramidum* was the most dominant species collected from outdoor.

Table 4: Indices of ectoparasite species infesting rodents collected from outdoors at east of lakes, Ismailia Governorate, over year 2010:

Rodent Species	No. of rodents	No. of ectoparasites	Ectoparasites Indices	Ectoparasite species	No. of Ectoparasites	Ectoparasite /Rodent
M. musculus	4	6	1.5	*X. cheopis* (F.)	3	0.75
				P. spinulosa (L.)	1	0.25
				O. bacoti (M.)	2	0.50
R. r. frugivorous	29	174	5.07	*X. cheopis* (F.)	72	2.48
				X. ramesis (F.)	15	0.52
				P. spinulosa (L.)	17	0.59
				L. nuttalli (M.)	57	1.97
				O. bacoti (M.)	13	0.45
R .r. alexandrinus .r.	37	207	5.59	*X. cheopis* (F.)	97	2.62
				X. ramesis (F.)	18	0.49
				P. irritans (F.)	13	0.35
				P. spinulosa (L.)	38	1.03
				L. nuttalli (M.)	18	0.49
				D. gallinae (M.)	12	0.32
				E. stabularis (M.)	11	0.30
R. norvegicus	36	201	5.58	*X. cheopis* (F.)	74	2.06
				C. segnis (F.)	9	0.25
				P. irritans (F.)	12	0.33
				P. spinulosa (L.)	44	1.22
				L. nuttalli (M.)	35	1.0
				O. bacoti (M.)	17	0.47
				D. gallinae (M.)	10	0.28
G. pyramidum	67	375	5.6	*X. cheopis* (F.)	37	0.55
				X. ramesis (F.)	18	0.27
				P. irritans (F.)	17	0.25
				S. tripictinata (F.)	8	0.12
				N. sinaiensis (F.)	7	0.10
				L. nuttalli (M.)	60	0.90
				O.bacoti (M.)	126	1.88
				H. pontiger (M.)	14	0.21
				H. isabellinus (M.)	18	0.27
				Rhipicephalus (T.)	27	0.40
				Hyalomma sp. (T.)	43	0.64
J. jaculus	4	21	5.25	*X. ramesis* (F.)	5	1.25
				P. irritans (F.)	2	0.50
				S. tripictinata (F.)	3	0.75
				O. bacoti (M.)	4	1.0
				E. stabularis (M.)	3	0.76
				Hyalomma sp.(T.)	4	1.0

F. = Fleas L.= Lice M.= Mites T.= Ticks

Table 5: Total ectoparasites associated with rodents both indoors and outdoors at east of lakes, Ismailia Governorate, Egypt during 2010:

Ectoparasites ---------- site	Fleas			Lice			Mites			Ticks		
	No. Rodent	No. fleas	Flea index	No. Rodent	No. lice	Lice index	No. Rodent	No. mites	Mite index	No. Rodent	No. ticks	Flea index
Indoors	221	464	2.09	221	150	0.64	106	151	1.42	_	_	_
Outdoors	177	410	2.31	106	100	0.94	177	400	2.2	71	74	1.04

The domestic rodent species in Egypt were reported by several authors; Mahdi *et al*. (1971) found that *R. norvegicus* was the dominant species at Suez area. Morsy e*t al*. (1986) identified five species of rodents in Suez Governorate (G.) they were, *M. musculus, R. rattus, R. norvegicus, Acomys cahirinus* and *Sekeetamys calurus*. In Alexandria city Morsy *et al*. (1988) found that *R. norvegicus* was commonest than *R, alexandrinus*. It is worthy to refer to the role played by these species in the transmission and dissemination of serious pathogens to man. The usual infestation of plague in rats occurs in the Norway rat and less frequently in roof rat and house mouse Soliman *et al.* (2010). Allam *et al.* (2002) identified common domestic rodents in Damietta and Qualyobia Gs; they were *R. alexandrinus*, *R. frugivorus* and *R. norvegicus*. Shoukry *et al.* (2006) in three different habitats (domestic, peridomestic & wild rodents) identified *R. norvegicus*, *R. alexandrinus*, *R. frugivorus, M. musculus*, *A. russatus, Meriones sacramenti* and *G. pyramidum*. Mahmoud *et al*. (2008) found *R. norvegicus*, *R. alexandrinus*, *R. frugivorus,* M. *musculus*, *A. cahirinus* in Suez, Menoufia, Giza, Demiatta and Beni-Suef Governorates. *R. norvegicus* showed higher frequency in Suez, Giza and Damietta Governorates. On the other hand, *R. alexandrinus* and *M. musculus* were the most dominant species in Menoufia and Beni-Suef respectively. They also found that the frequency of males *R. norvegicus* were significantly higher than females in all governorates.

In the present study the highest rat indices were 0.68 and 0.58 at indoors and outdoors respectively. Previous records of rat indices in Egypt ranged between 0.100 (Morsy *et al*, 1982) and 0.847 (Morsy *et al*, 1987) in Ismailia G. However, Soliman *et al.* (2001b) in Sharkia G. found relatively lower rat index 0.086 was recorded. The variations in rat indices reflect the degree of application of control measures to rodents in different study areas. Doubtless the areas with relatively high rat indices still need more applications of intensive control measures. In the present study, *R. norvegicus* was the least indoors abundant species. This may partly be attributed to the unsuitable conditions inside houses to be invaded with this species. The houses in the study area were mostly built of red bricks and had tile- covered floor which were not matching with the strong tendency of this species for burrowing (Brooks and Rowe, 1987). The significant increase in rat indices during summer months both indoors and outdoors may be due to the increased availability of food during summer when seed and grains are stored inside houses and in cereal granaries near houses which might allow an increase in pregnancy rates during summer months. High rodent indices were recorded in different areas in spring (Abdel-Gawad and Maher, 1987), summer (Zeese *et al*, 1990), autumn (Shoukry *et al,*1986), winter (Shoukry *et al*, 1987a), but without clear season-based changes in rodent index (Soliman *et al*, 2001b).

The present study reported four flea species; *X. cheopis, X. ramesis*, *C. segnis* and *P. irritans*. The maximum flea indices were recorded for *X. cheopis* both indoors (3.67 flea/rat) and outdoors (2.62, 2.48, 2.06 flea/rat). In previous studies, the oriental rat flea *X. cheopis* was the predominant ectoparasite of rodents in Ismailia Governorate (Shoukry *et al*, 1987). Flea species, *X. cheopis, P. irritans, C. felis, C. segnis* and *Echidnophage gallinacea* were infesting different rodent species in Suez G. (Morsy *et al*, 1986). The maximum flea indices were recorded on *R. norvegicus, R. frugivorous* and *R. alexandrinus*. These species are characterized by relatively larger size compared to other species. Larger hosts generally have greater carrying capacities than smaller hosts belonging either to the same or different species (Phillips, 1966; Fahmy *et al*, 1971; Bu-delov *et al*, 1989; Soliman *et al*, 2001 a,b). In addition to differences in host body size variations in the general indices of fleas between rat species might be related to differences in, skin and hair characters of hosts as well as differences in the habit of fleas themselves (Soliman *et al*, 2001a).

Xenopsylla cheopis were associated with human settlements (Suntsov *et al*, 1997). In Burma, epizootics among rodents usually occurred when the *X. cheopis* general index exceeded 0.5 and human cases appeared when the general index was about 1.0 (Thaung *et al*, 1975). Unfortunately, the *X. cheopis* general indices in study sites reached 3.67 in *R. norvigicus* and 2.62 in *R. alexandrinus*. *X. cheopis* is considered the primary epidemic and enzootic vector of murine typhus (*Rickettsia typhi*). Antibodies against *R. typhi* were detected in 71% of *Rattus* spp. in Sharkia G. (Soliman *et al*, 2001a). Recorded percentages of rats positive against antibodies of *R. typhi* in Egypt were 47.3% in *Rattus* spp. collected from El Arish (Shoukry *et al*, 1991), 21.33% and 7.4% in *R. rattus* collected from different rural areas and urban Cairo (Hoogstraal, 1986). Zoonotic foci of flea disease like plague was not found in the study immediate vicinity of site, the disease persisted in a commensal rat-flea cycle in and around human settlement (Suntsov *et al*, 1997), but El-Bahnasawy *et al*. (2012a) raised a question about plague as a problem in Egyptians returning back from Libya.

The present study reported six mites' species. The maximum mite indices (1.97, 1.88 & 1.58 mite/rat) were recorded for *L. nuttali* on *R. frugivorous*, *O. bacoti*, on *G. pyramidum* captured from outdoors and *D. galinae* on *R .norvegicus* captured from indoors. The domestic rat mite *L. nuttali* is a parasite of rodents mainly of the genus Rattus. It has been reported in some Egyptian Governorates as South Sinai (Shoukry *et al*, 1993; El Kady *et al*, 1998) and Suez Governorate (Younis *et al*, 1995). The tropical rat mite *O. bacoti* infests rats and man nearly allover the world. It has been reported in many Egyptian governorate as Ismailia G. (Morsy *et al*, 1982), Sharkia G. (Zeese *et al*, 1990), Suez G. (Younis *et al*, 1995), Suez Canal Zone (El Kady *et al*,1995), Saint Catherine area (El Kady *et al,* 1998) and Dakahlia G. (El Kady *et al*,

2007). This species has a cosmopolitan distribution and occurs associated with mice, rat and other species found in both tropical and temperate areas of the world. It frequently attracts persons living in rodent infested buildings and its bites may produce irritation and sometimes painful dermatitis or mite allergy at the puncture site around particularly in children (Dove and Shelmir, 1933). The chicken mite *D. galinae* is also a cosmopolitan species parasitizes not only chicken but also many species of wild and domestic birds. It attracts man, causing painful skin irritation by its bites (Berndt, 1952; El Kady *el al,* 1995). Lesions resembled those of scabies *Urticaria papulosa*, and impetigo- like dermatitis have been reported in children (Frenken, 1962). *St. louis* encephalitis virus was isolated on several occasions from chicken mites (Hammon and Reeves, 1945) and western equine encephalomyelitis virus has been recovered from *D. americanus* Ewing, a species closely related to *D. galinae* (Miles *et al*, 1951). It is one of the avian spirochaetosis vectors (Seddon, 1951). As a parasite of chicken, *D. galinae* causes serious illness or death through exsanguinations. Apart from all the infectious diseases transmitted or caused by mites, atopic dermatitis (Morsy *et al*, 1994; Kenawi *et al*, 1993) and allergic respiratory diseases (Morsy *et al*, 1994, 1995) was attributed to mites' infestation particularly among Egyptian children.

As to lice, the species recovered was *P. spinulosa*, with maximum index; 1.22 louse/rat on the outdoors captured *R. norvigicus*. This species was reported on several rodent species in Egypt (Morsy *et al*, 1982, 1986; El Kady *et al*, 2007; Soliman *et al*, 2001a). Biting lice or *Polyplax* spp. can transmit rickettsia among rats (Mooser *et al*, 1931) but don't feed on man (Soulsby, 1978).

The ticks were very rare in the study reported only on *G. pyramidum* and *J. jaculus*. Tick indices were 0.40 for *Rhipicephalus* sp. on *G. pyramidum* and 0.64, 1.0 for *Hyalomma* sp. on *G. pyramidum* and *J. jaculus* respectively. *Rhipicephalus* sp. is mainly a dog tick, but recorded on rodents by many authors (Cooley, 1946; Theiler, 1950; Morsy *et al*, 1982, 1984, 1993). Species of genus *Rhipicephalus* are large, difficult to differentiate and are important vectors of infectious diseases. They transmit canine, bovine and equine piroplasmosis or biliary fever, dog Hepatozoon, *Coxiella burnetti, Rickettsia conori, R. rickettsii, Borrelia hispanica, Theileria* sp. and viral diseases of sheep (Zumpt, 1958; Arthur, 1962). *Hyalomma* spp. is vector of many pathogenic agents as *Babesia* sp., *Theileria* sp., *C. burnetti, R. bovis, R. conori* & viral hemorrhagic fever (El-Bahnasawy *et al*, 2012b). Commensal rodents infested by ticks have been implicated as reservoirs of rickettsial diseases in the reclaimed land of North Sinai (Shoukry *et al*, 1991). Besides, *B. microti* infection was detected among rats trapped in Ismailia and Port Said Gs (El Bahrawy *et al*, 1993). *Babesia sp*. was observed in about one third of rodent trapped in both Bilbeis and Salehiya (Farid *et al*, 1997), infection was reported in an Egyptian boy and his pet dog (El-Bahnasawy and Morsy, 2008).

The study area has been subjected to rapid environmental changes as a result of exploitation by an increasing number of humans and domestic animals. The area as a part of North Sinai desert was inhibited before with wild rodents (Shoukry *et al*, 1991). All wild species were more or less eliminated except *G. pyramidum* the outdoors most dominant species (n=67, 37.9%). It is the commonest wild rodent species recorded in most Egyptian deserts near housing (Morsy *et al,* 1988). However, the commensal rodents which are widely distributed in the Nile Delta and Nile Valley are rapidly spreading in the study area and have been reported both indoors and outdoors. The aggressive nature of *R. norvigicus* helps to attain its prevalence indoors and outdoors with *G. pyramidum*. However, its prevalence did not prevent other commensals ones outdoors.

Conclusion

The results showed wide abundance of rodents and their ectoparasites. Unfortunately the presence of both together in newly reclaimed area suggesting amplification of transmitting zoonosis not found before in the Nile Delta and Nile Valley which constitute a potential threat to the socio-economic progress of such areas. This fact should be considered by the Public Health and Veterinary Authorities

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