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An inventory of the types of rodent spread in Houses with a study of external parasites of the most dominant species at Esna area, Luxor Governorate, Egypt

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ABSTRACT

This study was conducted to identify of rodent species and the ectoparasites are widely recognized for the type prevalent in homes, at *Esna* District, Luxor Governorate, Egypt, during 2020 year. The results were revealed that the presence of three species of rats included gray-bellied rat, *Rattus rattus alexandrinus* the dominant species from, *Rattus rattus frugivorus* and the Nile grass rat, *Arvicanthis niloticus*. The results also indicated that the identification of two types of fleas, *Xenopsylla cheopis & Pulex irritans*, and one species of lice, *Polyplax spinulosa*, associated with the gray-bellied was identified. The study reports the interest in making integrated control programs for rodents to get rid of them and the risks of their external parasites.

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Introduction

Rodents play an important role as hosts for ectoparasites and as repositories for various types of viruses, bacteria, rickets, protozoa, and parasitic worms that cause zoonotic diseases (Durden and Page, 1991; Azad and Beard, 1998; Coleman *et al*., 2003; Salibay and Claveria, 2005). Some examples of such diseases are rodent-borne hemorrhagic fever, plague, Lyme disease, leptospirosis, salmonellosis, murine typhus, scrub typhus, toxoplasmosis, shistosomiasis, nematodes and tapeworms. The close association between commensal rodents and humans and domestic animals is a risk factor for transmission of these diseases **(Kia *et al*., 2009)**. The aim of this study is to identify rodent species spread with a study of external parasites of the most dominant species in houses of study area.

Materials and methods

Study Area

The present study was carried out to inventory of the types of rodent spread in houses with a study of external parasites of the most dominant species at Esna area, Luxor Governorate, Egypt, during 2020 year.

Identification of the different species of rodents

Rodent species were collected from the aforementioned sites using 10 common wire traps. Each trap was stabbed with bread and distributed twice every 15 days at 6 PM. The next morning at 7 a.m., traps were examined, rodents identified and recorded for data processing. Captured rodents were graded and recorded **(Desoky, 2011**).

Identification *Rattus rattus alexandrinus* ectoparasites:

Five rats were taken all Month during the study period, rodent were anesthetized in jar containing a cotton pad with chloroform and then brushed in a deep white plate using a relatively hard brush. After collection of the ectoparasites, they were preserved in plastic bags containing 70% ethyl alcohol and labeled with necessary information. The parasites were sorted and transferred to the microscope slide for identification. The ectoparasites were classified. **(Soulsby, 1982 & Meerburg *et al*., 2009).**

Results and discussion

The results showed in table 1 and figure 1 a survey of three types of rodents: It was also found that the gray-bellied rat is the most common species in the study area (Esna homes), because the gray-bellied rat is considered a household climbing rodent **Abdel-Gawad (1974 and 2010).**

Table 1. Survey of rodent species in houses at Esna area, Luxor Governorate, during 2020 year.

Rodent ectoparasites	Common name	Percentage %)(
Rattus rattus frugivorus	White bellied rat and date palm rat	10
Rattus rattus alexandrinus	The gray bellied rat or *alexandrinus rat*	80
Arvicanthis niloticus	Field rat, grass rat, Nile rat and Nile grass rat	10

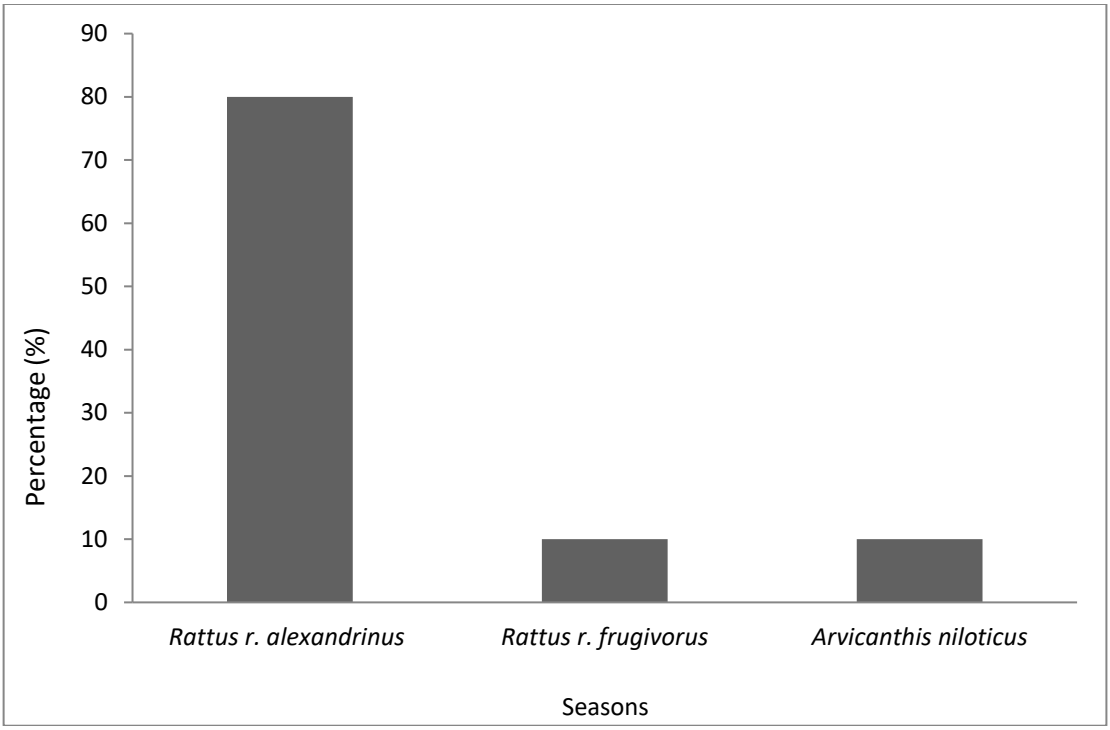

Figure 1. Survey of rodent species in houses at Esna area, Luxor Governorate, during 2020 year.

Data in table (2) the results showed that two types of fleas, *Xenopsylla cheopis & Pulex irritans*, and one lice, *Polyplax spinulosa*, infested the captured *Rattus rattus alexandrinus*. Results similar with **Vatandoost *et al.* (2003) & Telmadarraiy *et al*. (2004)** found that most medically important rodents belong to the families of Muridae and the Cricetidae. Rodents play a role in many diseases, such as plague, transmitted by the rat flea *Xenopsylla cheopis* and Weil's disease, a severe form of leptospirosis transmitted via infected rat urine, **Dada (2016).**

The study showed that infecting rodents with external parasites, which have a serious importance in transmitting diseases to humans or animals, for example, the eastern mouse flea has been identified, which may be a carrier of the bacteria that causes plague. The transmission of these rat-borne parasites is exacerbated in societies where environmental and personal health standards are not maintained. From these results, an integrated control program for the gray bellied rat must be established inside the houses.

Table 2. Types of external parasites identified on *Rattus r. alexandrinus*

Rat ectoparasites	Order	**Species**
Lice	Phthiraptera (Anopulra)	Polyplax spinulosa
Fleas	Siphonaptera	*Xenopsylla cheopis* *Pulax irritans*

Data in Table (3) and Figure (2) showed that the highest population density of rat ectoparasites was recorded during spring and summer months, followed by autumn, whereas the lowest density was recorded during winter months. Regardless of months, the results showed also, the highest average number of lice was in spring 18, followed by summer 15, followed by autumn 14, and the lowest of them was winter 4, where it was recorded. While the highest average number of fleas was in spring 5, followed by summer and winter 4, and the lowest of them were autumn 3.

The results also showed that the numerical density of lice was higher than that of fleas on the body of a gray-bellied rat. Regardless of months, lice exhibited the highest population density, whereas, fleas showed the least population density, this may be attributed to that fleas visit rats for feeding only, but lice are permanent parasites on hosts. The results similar with **Embarak (1997); Kia *et al*. (2009) & Desoky *et al*. (2010).**

Table 3. Density numerical of external parasites on *Ratttus rattus alexandrinus* at Esna area, Luxor Governorate, during 2020 year.

Rodent ectoparasites / Months	**Lice/ 5 rat**	**Fleas/ 5 rat**
December	2	1
January	0	1
February	2	2
Winter	**4**	**4**
March	7	2
April	6	2
May	5	1
Spring	**18**	**5**
June	6	2
July	5	1
August	4	1
Summer	**15**	**4**
September	4	1
October	5	1
November	5	1
Autumn	**14**	**3**
G. Total	**51**	**16**

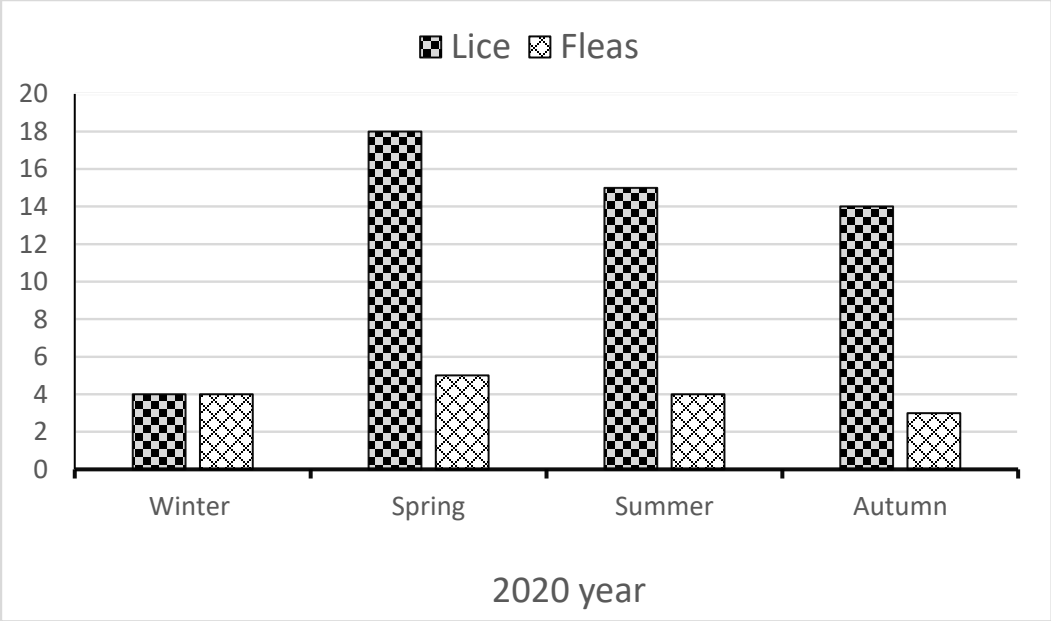

Figure 2. Seasonal numbers of ectoparasites for the gray-bellied rat at Esna area, Luxor Governorate, during 2020 year.

Conclusion

The results are useful in identifying the types of rodents and their external parasites that may transmit many diseases to humans or animals. It also helps in the future to increase the research study on this topic with attention to the participation of society as a whole to get rid of rodents and their external parasites.

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