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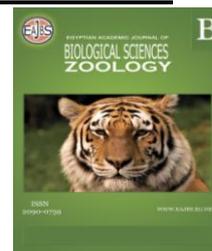


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Endoparasites of Dominant *Rattus rattus frugivorus* (Rafinesque, 1814) In Sohag Area, Egypt

Abd El-Aleem S. S. Desoky¹, Saudi, A.S. Baghdadi² and Tarek M. Abo-Elmaged³

1-Plant Protection Department (Agricultural Zoology), Faculty of Agriculture, Sohag University, Egypt

2-Agric. Zoology and Nematology Dept., Faculty of Agric., Al-Azhar University, Egypt

3-Plant Protection Department, Faculty of Agriculture, Assiut University, Egypt

E.mail*: tarek.adam@agr.au.edu.eg; abdelalem2011@gmail.com;
saudielkayal1@yahoo.com

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ABSTRACT

In this study, an inventory of the types of rodents in the study area was conducted, and a survey of internal parasites was done for the most important types of rodents prevalent in Sohag region during the year 2020. The results showed that four types of climbing rodents were present. Those rodents were the white-bellied rat (the most dominant in the region), the gray-bellied climber rat, field rat and brown Norwegian rat. The results showed the absence of many species.

By studying the internal parasites of the most common species in the study area. we found 3 trematodes (*Echinostoma liei* Jeyarasasingam & Heyneman, 1972, *Schistosoma mansoni* (Bilharzia), and *Fasciola hepatica* Linnaeus, 1758), two nematodes (*Angiostrongylus cantoniensis* Chen, 1935, and *Trichuris* sp.) and one cestode (*Hymenolepis* sp.) of the white-bellied climbing rat *Rattus rattus frugivorus*, which is the dominant species in this study.

INTRODUCTION

Rodent control is a problem endemic to many metropolitan areas, influencing hygienics via the spread of infectious diseases. The growth of rat numbers is primarily owing to bad hygiene habits. Vulnerability to the diseases carried by these wild rats and their organisms represents a looming menace to public health. Rodents are regarded as one of the most crucial orders of animals and have the biggest species number, which takes a big part in epidemiology (Nieri-Bastos *et al.*, 2004).

Rats are the most roaring group of gnawers since they have evolved to feat a wide range of behavior also acting as substantial pests in the agricultural and urban environment causing economic losses. Wild rats work as a resource host delivering a far-flung of diseases to humans and animals due to their highly versatile and irregular nature along with other factors most favorable for parasitic growth (Chuluun *et al.*, 2005).

As climate change, urbanization and agricultural intensification take place, global concern about communicable diseases is rising because it may cause some

zoonoses to spread and even appear in new areas or re-emerge in areas thought to be free of disease (Paramasvaran *et al.*, 2009). This study aims to identify the internal parasites in the most prevalent types of rodents in the houses of Sohag region.

MATERIALS AND METHODS

This study was conducted indoors in Sohag region in Egypt during the year 2020

Trapping:

Different rodent species were trapped alive from houses at Sohag Governorate, Egypt, using specially made wire traps (measuring 25 x 12 x 10 cm).

Each trap was lured by the attractant food and distributed twice every 15 days at 6 pm. Then the traps were exposed the next morning at 7 am, then were checked and the rodents were recorded for their classification.

Dominance degrees of the collected species were calculated following the formula of Facylate (1971).

Identification of Rodent Species:

Keys and drawings created by Harrison and Quah (1962), Medway (1983), Meehan (1984), Desoky (2007) and Abdel-Gawad (2010) were used for the identification of rodents to species.

Endoparasite Examination and Identification:

All caught individuals of *Rattus rattus frugivorus* were used in the examination. The examination was performed immediately after the autopsy and cutting the intestines and testicles with scissors to detect any visible parasites that were collected and preserved in 70% ethanol for identification (Soulsby, 1986).

Intestinal contents were subjected to a simple qualitative method for the detection of helminth eggs using a simple flotation technique according to the method described in the Manual of Veterinary Laboratory Techniques and Parasitology 1986.

RESULTS AND DISCUSSION

The study of rodent Endoparasites was aimed to explain the role of these parasites in transmitting various diseases to the wild animals subsequently to domestic animals, production animals and poultry finally to humans. The 4 rodent species captured in this study included females and males. Data in Table 1 exhibit the species structure of rodents caught from houses in Sohag region, Sohag Governorate. during 2020. Captured species were *Rattus rattus frugivorus* (Rafinesque, 1814), *Rattus rattus alexandrinus* (Geoffroy,1803), *Arvicanthis niloticus* (Desmarest,1822) and *Rattus norvegicus* (BerKenhout,1769), while other species were absent.

The white-bellied rat, *R. r. frugivorus* was the more predominant species other than the *Rattus rattus alexandrines*. This might be due to food accessibility and housing as well as preferring trees for nesting in houses. Desoky (2007) and Abdel-gawad (2010) reported that the interspecific competition between this species and other species might cause a migration to certain species.

Azzam *et al.* (2016) showed that *R. r. frugivorus* was the most prevalent species of rodents with highly significant differences ($P > 0.02$) among other species, except *A. niloticus*. Kia *et al.* (2001) reported that the amplest rodent species, in-between 90 caught individuals in southeast Iran, was *R. norvegicus*, then *M. musculus*, while *R. rattus* was recorded only.

Table 1: List of rodent species collected in, Sohag Governorate in Upper Egypt.

Rodent species	Houses	Common name
<i>Rattus rattus frugivorus</i> (Rafinesque, 1814)	+++	white-bellied rat, date palm rat
<i>Rattus rattus alexandrinus</i> (Geoffroy, 1803)	++	the grey bellied rat
<i>Arvicanthis niloticus</i> (Desmarest, 1822)	+	Field rat, grass rat, Nile rat, Nile grass rat
<i>Rattus norvegicus</i> (Berkenhout, 1769)	+	street rat, sewer rat, Norway rat, brown Norway rat, Norwegian rat

+++ = High population ++ = Moderate population + = Slight population

The present work was conducted to survey the prevalence of endoparasites in wild rodents. Data in Table 2 and Plate 1 showed that three trematodes (*Echinostoma liei*, *Schistosoma mansoni*, and *Fasciola hepatica*), two nematodes (*Angiostrongylus cantoniensis*, *Trichuris* sp.) and one cestode (*Hymenolepis* sp) were recorded from *Rattus rattus frugivorus*, which was the dominant species in study.

The results also showed that *R. r. frugivorus* was infected with, *Echinostoma liei* trematode, which were recorded in a high population, while *Trichuris* sp nematode was in a high population in *R. r. frugivorus*.

It was also observed that the endoparasites of other species were in less population in *R. r. frugivorus* (Table 2). Sinniah (1979) found 18 species of helminth inhabiting rats from different habitats including an oil-palm estate and only eight species in Carey Island.

Mowlavi *et al.* (2014) found *Trichosomoides crassicauda* (Railliet 1895) and *Trichuris* sp. inhabiting rats in northwest Iran.

The endoparasites are considered zoonotic. So, there is a necessity for control programs to reduce the rodent population by safe methods such as the use of *E. liei* parasite, which was isolated from the rodents in this investigation (Azzam *et al.* 2016).

Table 2. Prevalence of endoparasites found in 60 *Rattus r frugivorus* rat.)

Rodent species	worms	Endoparasites	Prevalence
<i>Rattus rattus frugivorus</i>	Trematodes	<i>Echinostoma liei</i>	**
		<i>Schistosoma mansoni</i>	*
		<i>Fasciola hepatica</i>	*
	Nematodes	<i>Angiostrongylus cantoniensis</i>	*
		<i>Trichuris sp</i>	**
	Cestode	<i>Hymenolepis sp</i>	*

** = High population

* = Moderately population



Plate 1: Endoparasites in *Rattus rattus frugivorus*

Conclusion

As a result of this study, it can be assumed that regular survey of wild rats and integrated pest management via the co-operation among local organizations, people and pest management engineers is in a crucial need.

Municipal agencies can enhance hygiene and limit refuges, while pest control engineers can use lures to directly affect the richness of rodents. Citizens should be educated and show more responsibility to change the environment that leads to infestation. This kind of study or survey is necessary to be carried out for a longer period to build up a further extensive wealth of information on various aspects such as host-parasite relationship, biology and ecology.

Furthermore, the benefits of rodent management are well established such that populated areas will not be resources of zoonotic diseases transmitted by rodents. This is particularly essential in this era when farm animals, pests, humans, and wildlife are encroaching into each other's territories thereby promoting the spread of diseases.

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REFERENCES

- Abdel-Gawad K.H. (2010). Rodent species composition in the present compared with past, the 5 Scientific Conferences for Agric. Assiut Univ. Oct. 16-17, 2010 (159-167).
- Karima M. Azzam, N. M. El-Abd and Eman A. Abd El-Hady(2016). Survey of Endoparasites of Different Rodent Species in Egypt, *Egyptian Journal of Biological Pest Control*, 26(4), 2016, 815-820
- Chuluun B., Mariana A., Ho T.M. and Mohd Kulaimi, B. (2005). A preliminary survey of ectoparasites of small mammals in Kuala Selangor Nature Park.. *Tropical Biomedicine*, 22(2): 243-247.
- Desoky ASS (2007). Management strategies for rodents within different ecosystems. M. Sc. Thesis, Fac. Agric. Assiut Univ. 124.
- Facylate, R.K.(1971). Field studies of soil invertebrate. 2nd ed. Vishia Shkoola Press, Moscow.

- Harrison, J.L. and Quah. (1962). The house and field rats of Malaysia. *Bulletin Institute for Medical Research. Federation of Malaya* ,12: 38 pp.
- Kia E.B., Homayouni M.M., Farahnak A., Mohe-bali M. and Shojai S.(2001). Study of Endoparasites of rodents and their zoonotic importance in Ahvaz, south west Iran. *Iranian Journal Public Health*, 30(1-2):49-52.
- Medway, L. (1983). The wild mammals of Malaya (Peninsula Malaysia) and Singapore . Second Edition, Oxford London Glassgow , 131 pp.
- Meehan A.P. (1984). Rats and Mice: Their Biology and Control. Tonbridge, Kent: The Rentokil library, Rentokil Ltd. Brown Knight and Truscott Ltd.
- Mowlavi ,G.; Makki, M.; Mobedi, I.; Araujo, A.; Aali, A.; Stollner, T.; Rezaeian, M.; Boenke, N.; Hassanpour, G. and Masoumian, M. (2014). Paleoparasitological findings from rodent coprolites dated at 500 CE sassanid era in Archeological site of Chehrabad (Douzlakh), Salt Mine northwestern Iran. *Iranian Journal Parasitology*, 9(2):188-193.
- Nieri-Bastos F.A., Barros-Battesti D.M., Linardi P.M., Amaku M., Marcili A., Favorito S.E. and Pinto-DaRocha R. (2004). Ectoparasites of wild rodents from Parque Estadual da Cantareira (Pedra Grande Nuclei), Sao Paulo, Brazil. *Revista Brasileira de Parasitologis Veterinaria*, 13(1): 29-35.
- Paramasvaran S., Sani R.A., Hassan L., Hanjeet K., Krishnasamy M., John J., Santhana R., Sumarni M.G. and Lim K.H. (2009). Endo-parasite fauna of rodents caught in five wet markets in Kuala Lumpur and its potential zoonotic implications. *Tropical Biomedicine*, 26(1): 67-72.
- Sinniah, B. (1979). Parasites of some rodents in Malaysia. *Southeast Asian Journal Tropical Medicine Public Health*, 10(1): 115.
- Soulsby, E.J. (1986). Helminths, Arthropods & Protozoa of Domesticated Animals,” 7th Edition, Bailliere Tindall, London. 367 – 703 Pp.