

RESEARCH ARTICLE

Survey of Ectoparasites Infesting the Gray-Bellied Rat, *Rattus rattus alexandrinus* Captured from the Houses at Sohag Region, Sohag Governorate, Upper Egypt

Abd El-Aleem S. S. Desoky¹, Hassan A. K. Abo-Elnaser², Mohamed M. Abd-Allah¹,
Ashraf Kamal Abu Zaid¹

¹Department of Plant Protection, Faculty of Agriculture, Sohag University, Sohag, Egypt, ²Agricultural Research Center, Plant Protection Institute, Dokki, Giza, Egypt

Received: 20-08-2022; Revised: 15-09-2022; Accepted: 25-10-2022

ABSTRACT

The aim of the study was to identify harmful external parasites on humans and animals infesting the gray-bellied rat, *Rattus rattus alexandrinus* captured from the houses at Sohag region, Sohag Governorate, Egypt. The results showed that found one ticks, *Amblyomma* spp., seven species of mites *Ornithonyssus bacoti* and *Hypoaspis smithii* and *Rhizoglyphus echinopus* and *Amerosieus* spp. and *Myocoptes* spp. and *Glycyphagus* spp., and *Tarsonemus* spp., infested the gray-bellied rat which captured from the study area. Furthermore, the study of ectoparasites from insects shows that three species of fleas were *Xenopsylla cheopis* and *Leptopsylla segnis* and *Pulex irritans* and one of lice was *Polyplax spinulosa* infested the captured rats. These parasites may transmit some common diseases to humans or animals. From these results, an integrated control program for the gray-bellied rat must be established inside the houses.

Key words: *Ornithonyssus bacoti*, *Pulex irritans*, *Rattus rattus alexandrinus*, *Rhizoglyphus echinopus*, *Xenopsylla cheopis*

INTRODUCTION

Rodents are an abundant and diversified order of mammals. Since the Middle Ages, it has been recognized that rodents can contribute to human disease. In modern times, rodents are also recognized as carriers of many pathogens with public health importance. Almost 10% of the global rodent population is either a carrier or reservoir of pathogens with public health importance (Zhang *et al.*, 2022). Domestic rodents are closely associated with man and his environment. Rodents can play both direct or indirect roles in the transmission of human diseases (Zahedi *et al.*, 1996). The role of house rats in the transmission of diseases of public health importance in urban and semi-urban

environment should not be underestimated. They are reservoir hosts for a number of parasites, plague, and other pathogens (Desoky, 2020). The aim of this study was to identify for external parasite species on *Rattus rattus alexandrinus* captured from the houses.^[1-10]

MATERIALS AND METHODS

Study Area

The present study was carried out to study ectoparasites infesting the gray-bellied rat, *R. rattus alexandrinus* captured from the houses at Sohag region, Sohag Governorate, Egypt, during 2021 year.

Rat Capturing and Classification

The method of (Soulsby, 1982) was adopted using locally made metal traps (live trap) to capture the

Address for correspondence:

Abd El-Aleem S. S. Desoky
E-mail: abdelaleem2011@gmail.com

rats. Traps were baited with Vegetables, bread. Traps were placed in rodent activity areas such as kitchens and corridors. The rats were transported to the laboratory in perforated metal boxes to provide good ventilation and allow conducive environment for the animals in transit. Rats were identified and classified to specie level using the method of (Meerburg *et al.*, 2009). The study was carried out using sixty rats (*R. rattus alexandrinus*) during 2021 from January to December.

Survey for Ectoparasites

The ectoparasites study was carried out using the method of (Soulsby, 1982). Captured rodents were subjected to euthanasia under diethyl ether anesthesia. The unconscious rats were placed on a clean white tile. Starting from the head to the neck, trunk and the tail, ectoparasites were dislodged from the rats body by brushing with the aid of hand brush onto cotton wool soaked in formalin. Visible ectoparasites such as ticks that could easily be removed without brushing were removed with a pair of forceps. The ectoparasites recovered were preserved in specimen bottles containing 70% alcohol, the parasites were sorted and transferred to the microscope slide for identification. Identification of mites and ticks was done using different keys constructed by Hoogstraal and Kaiser (1958), Zaher (1986a and b), and Evans (1992).^[11,12]

RESULTS AND DISCUSSION

Data, in Table 1, the results showed that found one ticks, *Amblyomma* spp., seven species of

Table 1: Types of external parasites identified on *Rattus rattus alexandrinus*

Rat ectoparasites	Species
Lice	<i>Polyplax spinulosa</i>
Fleas	<i>Xenopsylla cheopis</i> <i>Leptopsylla segnis</i> <i>Pulax irritans</i>
Mites	<i>Ornithonyssus bacoti</i> <i>Hypoaspis smithii</i> <i>Rhizoglyphus echinopus</i> <i>Amerosieus</i> spp. <i>Myocoptes</i> spp. <i>Glycyphagus</i> spp. <i>Tarsonemus</i> spp.
Ticks	<i>Amblyomma</i> spp.

mites *Ornithonyssus bacoti* and *Hypoaspis smithii*, *Rhizoglyphus echinopus*, *Amerosieus* spp., *Myocoptes* spp., *Glycyphagus* spp., and *Tarsonemus* spp., infested the gray-bellied rat which captured from the study area. Furthermore, the study of ectoparasites from insects shows that three species of fleas were *Xenopsylla cheopis*, *Leptopsylla segnis*, and *Pulex irritans* and one of lice was *Polyplax spinulosa* infested the captured rats. Results similar with Vatandoost *et al.* (2003) and 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 *X. cheopis* and Weil's disease, a severe form of leptospirosis transmitted through infected rat urine. Dada (2016) showed that this study has shown that infestation of rodents by ectoparasites is of serious zoonotic importance. Rodent and rodent-borne parasites may become more serious in human population, zoonotic transmission of these rat-borne parasites is exacerbated in communities, where standards of environmental and personal hygiene are not maintained. Desoky (2020) found two species of mites *O. bacoti* and *Dermanyssus* spp., infested the white bellied rat which captured from the study area. Furthermore, the study of ectoparasites from insect's shows that two species of fleas were *X. cheopis* and *P. irritans* and two of lice was *P. spinulosa* and *Haplopleura oenonydis* infested the captured rats. Infestation of the gray-bellied rat, *R. rattus alexandrinus* with various types of external parasites (lice, fleas, and mites). From these results, it is necessary to make an integrated control program for household rodents, because they carry many parasites that may transmit diseases to humans and animals because they carry dangerous microbes or viruses, as happened previously because they carried plague-causing bacteria and others, as well as infecting animals such as *Babesia* and others.

CONCLISION

It is conclude that the study of ectoparasites from insects shows that three species of fleas were *Xenopsylla cheopis* and *Leptopsylla segnis* and *Pulex irritans* and one of lice was *Polyplax spinulosa* infested the captured rats. These parasites may transmit some common diseases to humans or

animals. From these results, an integrated control program for the gray-bellied rat must be established inside the houses.

REFERENCES

1. Dada EO. Study on the Ectoparasites and Haemoparasites of domestic rats in parts of Akure South local government area of Ondo State. *Int J Clin Chem Lab Med (IJCCLM)* 2016;2:1-5.
2. Desoky AE. A Study on Ectoparasites associated on the white bellied rat, *Rattus rattus frugivorus* captured from the houses at Sohag region, Sohag Governorate, Egypt. *Open Access J Biogenic Sci Res*2020;1:25.
3. Evans GO. Principles of Acarology. Walling Ford: Centre for Agriculture and Bioscience International; 1992. p. 522.
4. Hoogstraal H, Kaiser MN. The ticks (*Ixodidae*) of Egypt. A brief review and keys. *J Egypt Public Health Assoc* 1958;33:52-85.
5. Meerburg BG, Singleton GR, Kijlstra A. Rodent-borne diseases and their risks for public health. *Crit Rev Microbiol* 2009;35:221-70.
6. Soulsby EJ. Helminthes, Arthropods and *Protozoa* of Domesticated Animals. 7th ed. London: Bailliere Tindal; 1982. p. 367-703.
7. Telmadarraiy Z, Bahrami A, Vatandoost H. A survey on fauna of ticks in west Azer-Baijan Province, Iran. *Iran J Public Health* 2004;33:65-9.
8. Vatandoost H, Ghaderi A, Javadian E, Zahirnia AH, Rassi Y, Piazak N, *et al.* Distribution of soft ticks and their infection with *Borrelia* in Hamadan Province, Iran. *Iran J Public Health* 2003;32:22-4.
9. Zahedi M, Jeffery J, Krishnasamy K, Bharat VK. Ectoparasites of *Rattus rattus diardii* from Kuala Lumpur City Malaysia. In: Proceedings of the Second International Conference on Urban Pests; 1996. p. 437-39.
10. Zaher MA. Survey and ecological studies on phytophagous, predaceous and soil mites in Egypt. II-A. In: Predaceous and Non Predaceous Mites in Egypt (Nile Vally and Delta). Egypt: Faculty of Agriculture Cairo University; 1986a. p. 567.
11. Zaher MA. Survey and Ecological Studies on Phytophagous, Predaceous and Soil Mites in Egypt. III: Mites of Sinai. Egypt: Faculty of Agriculture Cairo University; 1986b. p. 36.
12. Zhang K, Fu Y, Li J, Zhang L. Public health and ecological significance of rodents in *Cryptosporidium* infections. *One Health* 2021;14:100364.