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Studies on The Helminth Parasites of Some Mammals in Egypt

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بسم الله الرحمن الرحيم

قالوا سبحانك لا علم لنا الا ما علمتنا

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ABSTRACT

The present investigation provides a helminthological study on some mammalian species from Delta and Nile Valley, Abu-Rwash and El-Mansuria lake in Giza province, caves and old houses in Cairo and El-Faium province in Egypt. A total of 320 samples were examined during the period from May 2006 to July 2008, they are belonging to four families; Muridae, Pteropodidae, Rhinopomatidae and Vespertilionidae.

Eleven species of helminths are identified and described using light microscope. Those species are: six species of trematodes, four species of cestodes and one species of nematode. The trematode species: *Anchitrema sanguineum* (Sonsino, 1894) Looss, 1899, *Lecithodendrium* (*Aegyptiacus*) *aegyptiacus* (Saoud and Ramadan, 1976), *Lecithodendrium* (*Lecithodendrium*) *linstowi* Dollfus, 1931, *Prosthodendrium* (*Paralecithodendrium*) *aegyptiacus* (Saoud and Ramadan, 1977), *Prosthodendrium* (*Paralecithodendrium*) *glandulosum* (Looss, 1896) Dollfus, 1937 and *Catatropis aegyptiacus* sp. n. The cestode species are: *Hymenolepis nana* Von siebold, 1851, *Hymenolepis diminuta* Rudolphi, 1819, *Cysticercus fasciolaris* Batsch (1786) and *Vampirolepis* sp. The nematode species is *Dentostomella kuntzi* Myers, 1961. Three species of the above mentioned are descriped using scanning electron microscope; *Lecithodendrium* (*Aegyptiacus*) *aegyptiacus, Catatropis aegyptiacus* sp. n. and *Cysticercus fasciolaris*. Some new host and geographical records were established in the present study.

The total prevalence of infection by helminths among the examined mammals was (45%). The highest incidence was recorded for trematodes (63%), followed by cestodes (33%) and the lowest was recorded for nematodes (20%). The incidence of

infection was markedly influenced by environmental and biological factors: seasonality, sex and age of host, the highest infection rate was recorded during spring (53%) and the lowest infection rate was recorded during summer (32.4%).

The histopathological and histochemical effects of helminths; *Hymenolepis nana, H. diminuta, Cysticercus fasciolaris* and *Catatropis aegyptiacus* sp. n. on the liver of rat *Rattus norvegicus* were studied. Also, the haematological and electrophoretic studies of the infected and noninfected rodents *R. norvegicus* and *Acomys cahirinus dimidiatus* were illustrated.

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Introduction

The helminth parasites of different species of mammals all over the world have been taken a special interest and much attention from parasitologists, these mammals include *Taphozous perforatus*, *Pipistrellus kuhli* (Heyneman and Macy, 1962), *Rousettus aegyptiacus aegyptiacus*, *Lavia frons*, *Rhinopoma hardwickei cystops*, *R. microphyllum microphyllum* (Heyneman and Macy, 1962) *Rattus norvegicus* (Seol et al. 1964) and *Acomys cahirinus dimidiatus* (Barnard et al. 2003) and Mahida, 2003 and Behnke et al. 2004).

In Egypt, worm burdens of many species of mammalian-rodents and bats have been studied. The studied species of rodents include *Rattus norvegicus*, *Rattus rattus Alexandrinus*, *Arvicanthis niloticus*, *Mus musculus* and *Acomys cahirinus dimidiatus* (Fahmy et al. 1969 and 1984; Ramadan et al. 1988; Wanas et al. 1993; Abdel-Aal and Abou-Eisha, 1997; Abd-El Wahed et al. 1999 and Abu-Madi et al. 2005). The helminthological incidence among some species of bats such as *Pipistrellus kuhli*, *Rousettus aegyptiacus aegyptiacus* and *Rhinopoma hardwickei cystops* (Saoud and Ramadan, 1977; Ramadan, 1986; Ramadan et al. 1988 and Ammar et al. 2003) have been studied.

The present study deals with parasitic fauna of five species of mammals belonging to orders Rodentia and Chiroptera, whereas rodents represent the largest mammalian order that includes approximately 43% of all mammals (Wilson and Reeder, 1993). They are cosmopolitan in distribution throughout the world. In the last years rodent populations have markedly increased in Egypt (Morsy et al. 1980).

The most important diseases are spreading among the common species of rodents such as *Rattus norvegicus* and *Mus musculus* because of their succces in colonizing in man's habitats. (Drummond, 1972; Brooks and Rows, 1979).

From parasitological point of view, rodents are involved in the transmission of a variety of diseases. They may serve as intermediate or reservoir hosts for many parasitic diseases that ultimately infect man (El-Shazly et al. 1991). Economically, rats cause numerous losses in food and agricultural products as well as in industrial plants (Abd El-Wahed et al. 1999). The world wide distribution and the importance of parasitic diseases infesting rodents for the public health have been attracted the attention of several investigators in Egypt (Monib, 1980; El-Azzazy, 1981; El-Sokkary and Heikel, 1986; Samaha and Otify, 1990; Fayek and El-Gwady, 1991 and Abdel-Salam et al. 1994).

Muridae is one of the families of rodents belonging to order Rodentia. It includes about 66% of the living species of rodents and they are world wide in distribution. Its members occupy environments ranging from high arctic tundra, tropical forests to desert and dunes. (Vaughan et al. 2000). Two different species were chosen for the present study, *Rattus norvegicus* Berkenhout, 1769 or the Norway rat and *Acomys cahirinus dimidiatus* Desmarest, 1819 or the Cairo spiny mouse representing to that family.

The Norway rat has a high ability to transmit diseases either directly by biting people and contaminating food or indirectly by carrying lices and fleas (Maust, 2002), in addition to that it costs primary industry, hundreds of millions of dollars per year and economic damage by chewing through power cables and spreading diseases (McClelland, 2006).

Cairo spiny mouse considered as endemic animal from health point of view, it has a great role in transmitting many serious zoonotic diseases as they harbouring zoonotic parasites owing to their association with man (Drummond, 1972; Brooks & Rowe, 1979).

The helminths of wild rodents in any geographical region are influenced by both extrinsic (year, season, site) and intrinsic (host, sex, age) factors. (Haukisalmi et al. 1988; Boggs et al. 1991; Abu- Mady et al. 1998, 2000 and Abu-Madi et al. 2005).

The second order chosen for the present study is Chiroptera, that constituts the second largest mammalian one. Approximately 925 species of living bats make up around 20% of all known living mammals (Hill and Smith, 1984; Nowak, 1991; Vaughan et al. 2000). Bats are among the most beneficial animal species on earth, they play a crucial role in the health and survival of rainforests (McLamb, 2001).

Studing the helminthic fauna of bats is very important for many reasons as they have the highest benefits to the human being. They eat harm insects and important pollinators of flowering plants so they contribute to the enviromental balance and in the terrestrial ecosystems. Bats can help farmers by eating harmful insects and worms which can damage crops, for instance, a colony of just 150 big brown bats can eat up to 18 millions or more rootworms each summer (Mclamb, 2001).

Bats are known to be susceptible to many infections of animals and humans whereas, they are sheltered close to man dwellings, this provides a good apportunity for the transmission of certain parasites between different species of bats (Saoud and Ramadan, 1976). Also bats may represent as reservoirs of many parasitic diseases which can be transmitted to man with direct or indirect way through their life cycle (Edungbola, 1981).

The bats belonging to sub order megachiroptera (Family: Pteropodidae) include fruit eating bats which are abundant and occure widely in tropical and subtropical regions. They often large in size and up to 1.5 kilograms in weight but some are small and weight about 13 grams.

Fruit bats occasionally are causing damage fruit crops and garden flowers in the old world tropics where they live. On the other hand, several tropical species of flowering plants such as the African baobab tree and the Australian ironwood rely on fruit bats to pollinate them (Grzimek, 1975).

Rousettus aegyptiacus aegyptiacus E.Geoffroy, 1810 or the Egyptian fruit bat was selected to be one of the studing species in the present survey.

Bats species belonging to suborder microchiroptera are widely distributed and characterized by their small size and light weight reaching from 2 to 196 Gms, most of them are insectivorous bats. The chewing teeth have W-Shaped cusps for cutting and crushing insects. This suborder includes 17 recent families that reflects the great structural diversity and widely spreading of these mammals all over the world (Vaughan et al. 2000).

In the present work two families were selected to represent this suborder: Family Rhinopomatidae (Mouse tailed bats) and family vespertilionidae (vespertilionoid bats). *Rhinopoma hardwickei cystops* Gray, 1831 or (Lesser Mouse-Tailed bat) chosen from the former family to be examined for helminth parasites in the present study.

The second family, Vespertilionidae, is the largest family and the most widely distributed one. The bat *Pipistrellus kuhli* Kuhl,

1819 or Khuli bat is a member of this family that was selected for the present study.

So the present study, exposed the prevalence and intensity of different helminth parasites that infected the selected mammalian species. Also the relationship between the ecological factors and host distribution have been illustrated and discussed.

In the present work, descriptions of 11 species of helminths were recorded and identified using light microscopy. The topography of three identified species were examined by scanning electron microscopy. The haematological studies of infected and noninfected rodents; *Rattus norvegicus* and *Acomys cahirinus dimidiatus* have been done. Morever, histopathological and histochemical studies of rat *Rattus norvegicus* have also been carried out. The changes in the contents of plasma protein of infected rodents were introduced by electrophoresis technique.