Comparative Study Between Pinworms *Syphacia muris* & *S. obvelata* Infecting House Mouse & Laboratory Rat In Al-Diwaniyah City

Habeeb waseel kadhum shubber[1], Murtadha Nabeel Murtadha Al-Tameemi[1]

[1]Biology Department, Collage of science, University of Qadisiyah, ,Iraq.

Habeeb.shubber@qu.edu.iq

murtdha.nabeel@gmail.com

Abstract:

The study aimed at comparing infection of *S. obvelata* with that of *S. muris*, during the study period of 2016-2017, seeking pinworms was done through hunting 89 specimen of house mouse in Al-Diwaniyah city and surrounding countryside. Specimen of 46 of laboratory rat from the animal house were brought. Under anesthesia by chloroform, specimen were dissected, seeking parasitic helminths within digesting bowels. It was found that house mouse were infected by *S. obvelata* at 25.8% comparison with laboratory rat were infected by *S. muris* at 32.6%.

Introduction:

Nowadays, living rodents are rampant in the human environment and industrial cities, consequently constituting a global proplem (Oormazdi,1995) (1). *Mus musculus* (Linaeus, 1996) is considered a worldwide rampant rodents (Campos, 1996) (2) existing in the urban cities, semi-urban and country sides. Due to urbanizing and overcrowding in cities, in one hand, and unhealthy water and food in the other hand number of these animals increased, and consequently common transmitted diseases (Brasil, 2002) (3) as well as causing diseases through transfused parasites acting as pathogenesis (Sharma *et al*., 2014) (4), leading to economical losses due to buying medications for treating various diseases (Guimaraes *et al*., 2014) (5). Developing scientific research depends upon using laboratory animals, among those rats used in researches and tests (Clough, 1982) (6) as they are easy to get and deal with manually, grow rapidly and share human in many common attributes (Bronson *et al*., 1989) (7), wherein they are used in testing medicine, food and producing vaccines ad serums, in general health and veterinary as well (Tanideh *et al*., 2010) (8) wherein parasites affect immunity and host metabolic (Mahida, 2003) (9) affecting the host physiology and may destroy tissues and stimulate growth of tissues unnaturally and compete the host on

food reducing host blood and fluids (Hsu, 1980) (10), and eventually infections will cause loss of time, money and researching effort (Tanideh *et al*., 2010) (8). Rodents are infected with pinworms that belong to Oxyuridae family (Percy & Barthold, 1993) (11), causing severe infection of intestine, swelling of liver and irritation around ass hole (Paker,1998) (12).

Amongst the previous studies was Roberts (1991) (13) which was dealing with the biological geography of parasites of common rodents in Newsland, included *Mus musculus*, *Rattus rattus* and *Rattus norvegicus* finding that *Mus musculus* was infected with *S. obvelata*, while *Rattus rattus* and *Rattus norvegicus* were infected with *S. muris*. In Indonesia, Hasegawa & Syafruddin (1995) (14) made a study on nematodes of *Rattus rattus*, finding that it was infected with *S. muris* at a 34%. In Malaysia, exclusively in Kuala Lumpur, a study made on parasitic helminthes infecting rats including *Rattus rattus* and *Rattus norvegicus* that were infected with *S. muris* (Mohd *et al*., 2012) (15). In Iran, a study made by Yousefi *et al*.,(2014) (16) in Hamadan city on parasitic helminthes infecting rodents. *Mus musculus* was found infected with *S. obvelata* at 30.5%. Among the previous Iraqi studies was Al-Zahidi (2001) (17) seeking parasitic helminthes of a group of rodents in Baghdad city, wherein *Rattus rattus* was infected with *S. muris* at 8.3%. In Al-Diwaniyah city, there was Al-Zubaidi (2007) (18) study on the *Mus musculus* endo-parasites. It was infected with *S. obvelata* at 10.8%. Hasson (2010) (19) sought parasites infecting rodents. *Mus musculus* was infected with *S. obvelata* at 5.2%. Ahmed *et al.,* (2012) (20) study was made on intestinal parasites of laboratory rodents in Arbeel city, wherein that laboratory mice were found infected with *S. obvelata* at 40% while laboratory rats were found infected with *S. muris* at 32.6%.

Materials and Methods:

Mice have been collected by using live-traps with different sizes. Bread, cucumber, carrots, fats and meats have been used as bait. Laboratory rats have been brought from the animal house, then conveyed to insect lab. Syringes with chlorophorm have been used to anesthetize the samples by spraying chlorophorm onto the rodent's nose (Etemad, 1978) (21). Rodents are dissected by making a slit along the abdominal side starting from ass hole till down the head, using scissors, so as to show out bowels clearly. Nematodes have been washed up with a normal saline solution by a dropper in order to remove irrelevant substances and are fixed with hot ethanol 70% for 5-7 minutes, then samples are kept in plastic containers containing a mixture of ethanol 70% and glycerol so as to keep worms leanly. In order to make clear, they are put into lactophenol on a hotplate at 35-40 ◦c for 24 hours, so as to get appropriate transparency (Tylor and Muller, 1971) (22).

Results:

During the period 2016-2017, inspection for nematodes from 135 rodents, including: 89 *Mus musculus* and 46 Swiss Albino, the infection percentage was (25.3%, 32.6%) respectively, wherein mice were infected with *S. obvelata* in comparison with Swiss Albino which were found infected with *S. muris*, and both belong to oxyuridea order, oxyuridae family.

Table 1: Infection percentage of pinworms isolated from rodents:

Rodent species	Number examined	Parasite species	Males infected	Prevalence %	Females infected	Prevalence %	Both Sexes	Prevalence %
Mus musculus	89	*S. obvelata*	13	14.6	10	11.2	23	25.8
Swiss Albino	46	*S. muris*	5	10.8	13	28.2	15	32.6

Fig. 1: The Pinworm *S. obvelata* X40

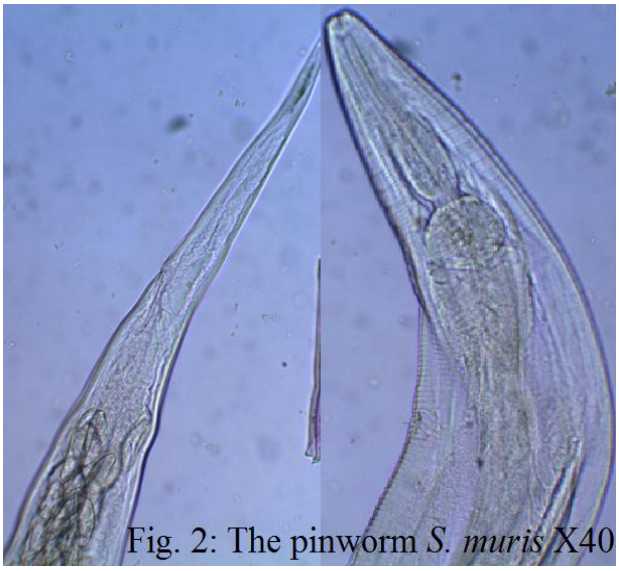

Fig. 2: The pinworm *S. muris* X40

Discution:

S. obvelata infects rodents and mainly infects *Mus musculus* (Mehlhorn,2008) (23). Infection percentage with this worm emerges (25.8%) in *Mus musculus* only in this study, this result is higher than recorded Al-Murshidi (2001) (24) in *Mus musculus* and *Rattus rattus* (11%, 6.3%) respectively, and Al-Zubaidi (2007) (18) in *Mus musculus* (10.8%) and Hasson (2010) (19) in *Mus musculus*, *Rattus norvegicus* and *Rattus rattus* (5.2%, 1.7%, 5%) respectively. It is less than recorded by Ahmed *et al.*, (2012) (20) in the Swiss Albino (40%). This difference might be due to the difference in the samples ages and numbers, in addition to the regions of their living, their feeding along with the circumstances leading to infection among rodents. Infection usually take place in many ways such as having contagious eggs when an animal licks the anus of another infected one, or having water and food contaminated with contagious eggs, or through the retro-infection that happens when eggs hatch around anus where larva leave the infected animal ass hole going back to the colon (Flynn, 1973) (25).

S. muris infects rodents, rats in particular (Kellogy & Wagner, 1982) (26). Infection percentage of this worm was 32.6% only in Swiss Albino in this study, this percentage came higher than that recorded by Al-Zahidi (2001) (17) in *Rattus rattus* (8.3%) and was nearer to the one recorded in the one recorded in the laboratory rats (30%) by Ahmed *et al.*,(2012) (20). Differences are due to the differences in circumstances of living and feeding of rodents. Infection happens in the same ways the *S. obvelata* does, when an animal licks anus of one another already infection, or through contaminated food or by retro-infection (Flynn, 1973) (25).

S. obvelata is expressed as mouse pinworm compared with *S. muris* which prescribed as rat pinworm (Baker,1998) (12), wherein *S. obvelata* infects mice, laboratory mice, field mice, hamsters and gerbils, in comparison with *S. muris* infecting rats, laboratory rats, gerbils and hamsters. *S. obvelata* infects human particularly people dealing with the rodents already infected, compared with *S. muris* (Baker, 2007) (27). Length of *S. obvelata* male is (1-1.5ml), while than of the female is (3.4-6ml) in comparison with length of male of *S. muris* (1.2-1.3ml) and that of the female (2.8-4ml) (Foreyt, 2001) (28). Fore of *S. obvelata* body has three observable lips around its mouth, where swelled oesophagus comes next to, oversized in front and spherical from back side, in comparison with that of the *S. muris*, which is usually spherical (Taylor *et al*., 2007) (29).

References:

1-Oormazdi H (1995) Medical Parasitology. Tehran. Tehran University.

2-Campos H. Mamíferos terrestres de Chile. Guía de reconocimiento. Marisa Cúneo Ediciones 1996. Valdivia, Chile.

3-Brasil Manual de controle de roedores (2002). Brasilia, Ministerio da saude, Fundacao Nacional de Saude, 132p

4-Sharma, D.; Joshi, S.: Vatsya, S. & Yadav, C. (2013). Prevalence of gastrointestinal helminth infections in rodents of Tarai region of Uttarakhand. J. Parasit. Dis. 37 (2): 181-184.

5-Guimaraes, A.; Valenca, F.; Sousa, J.; Madi, R. & Melo, C. (2014). Parasitic and fungal infections in synanthropic rodents in an area of urban expansion, Aracaju, Sergipe State, Brazil. Act scie. Biol Scie 36 (1): 113-120.

6-Clough G. 1982. Environmental effects on animals used in biomedical research. *Biology Research* 57:487–523.

7-Bronson, F.; Dagg, H.; Charles, P. & Snell, G. (1989). Reproduction. In EL Green, (eds.) Biology of the Laboratory Mouse. Maine, USA. Consultado el 10 Marzo de 2014.

8-Tanideh N, Sadjjadi SM, Mohammadzadeh T, Mehrabani D (2010). Helminthic Infections of Laboratory Animals in Animal House of Shiraz University of Medical Sciences and the Potential Risks of Zoonotic Infections for Researchers. Transgenic. Iranian Red Crescent Med. J., 12(2): 151-157.

9-Mahida, Y.R. (2003) Host-parasite interactions in rodent nematode infections. J. Helminthol., 77, pp. 125-131.

10-Hsu C.K. 1980. Parasitic diseases: how to monitorthem and their effects on research. *LaboratoryAnimals* 14: 48–53.

11-Percy D.H. & Barthold S.W. 1993. Pathology of Laboratory Rodents and Rabbits. *Iowa State University Press*.

12-Baker D.G. 1998. Natural pathogens of laboratory mice, rats, and rabbits and their effects on research. *Clinical Microbiology Reviews* 11: 231–266.

13-Roberts, M. (1991). The parasites of the Polynesian rat: Biogeography and origins of the New Zealand parasite fauna. Int. J. Parasitol. , 21(7) : 785-793.

14-Hasegawa, H. & Syafruddin (1995). Nematode fauna of the two sympatric rats *Rattus rattus* and *R. exulans*, in Kao District, Hamahera Island, Indonesia. J. Helminthol. Soc. Wash., 62 (1) : 27-31.

15-Mohd S. N.; Behnke J. M. & Lewis J. W.(2012). Helminth communities from two urban rat populations in Kuala Lumpur, Malaysia. Parasites & Vectors.

16-Yousefi A.; Eslami A.; Mobedi I.; Rahbari S. & Ronaghi H. (2014). Helminth Infections of House Mouse (Mus musulus) and Wood Mouse (Apodemus sylvaticus) from the Suburban Areas of Hamadan City, Western Iran. Iranian J Parasitol. 9 (4) : 511-518

17-Al-Zahidi, S. F. (2001). Prevalence of *Mus musculus*, *Rattus norvegicus* and *Rattus rattus* infection in helminthes and ectoparasites in Baghdad city. M.Sc. thesis, Ibn Al-Haytham, coll. Edu., Univ. Baghdad: 96 pp.

18-Al-Zubaidi, I. A. (2007). Parasitic infections of House Mice *Mus musculus domesticus* in Al-Diwaniya Province. M. Sc. Thesis, coll. Edu., Univ. Al-Qadisiya.

19-Hasson, R. H. (2010). Zoonotic &Nonzoonotic Endoparasites of Rodents from Some Districts in Baghdad.

20-Ahmed, R. K.; Koyee, Q. M. & Rahemo, Z. I.(2012). Intestinal Parasites of Experimental Rodents with Testing the Efficacy of Diagnostic Methods.

21-Etemad A (1978) Mammals of Iran, Rodents and Identification Key, Tehran, Natural Resource Protection and Human Environment Association Press.

22-Tylor, E. R. & Muller, R. (1971). Isolation and Maintenance of parasite *in vivo*. Symp. Birt. Soc. Parasitol. Blackwell Sci. Publ. Oxford., pp: 109-121.

23-Mehlhorn, H. (2008). Encyclopedia of Parasitology. Springer.

24-Al-Murshidi, Q. A. (2001). Parasitic infections of *Mus musculus* and *Rattus rattus* in Al-Hila Province. M. Sc. Thesis, coll. Sci., Univ. Babylon : 69 pp.

25-Flynn, R. J. (1973). Nematodes, in parasites of laboratory animals. J. Exp. Sci., 77: 4971-4974.

26-Kellogy, H. S. & Wagner, J. E. (1982). Experimental transmission of *Syphacia obvelata* among mice, rats, hamsters and gerbils. Lab. Anim. Sci., 32: 500-501.

27-Baker, D. G. (2007). Flynn's Parasites Of Laboratory Animals. Blackwell publ. 2nd ed. American College of Laboratory Animal Medicine, Blackwell Publishing, USA.

28-Foreyt, W. J. (2001). Veterinary Parasitology: Reference Manual. 5th ed. Blackwell Publ.

29-Taylor, M. A.; Coop, R. L. & Wall, R. L. (2007). Veterinary Parasitology. Blackwell publ.