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ECTOPARASITES AND ENDOPARASITES OF LOCALLY PRODUCED LABORATORY RATS

TUAN AJMAL BINTI TUAN KAMALUDDIN

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ECTOPARASITES AND ENDOPARASITES OF LOCALLY PRODUCED LABORATORY RATS

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It is hereby certified that we have read this project paper entitled "Ectoparasites and Endoparasites of Locally Produced Laboratory Rats", by Tuan Ajmal binti Tuan Kamaluddin and in our opinion it is satisfactory in terms of scope, quality, and presentation as partial fulfilment of the requirement for the course VPD 4999 – Project.

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ABSTRAK

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EKTOPARASIT DAN ENDOPARASIT DALAM TIKUS MAKMAL TEMPATAN

Oleh

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2015

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Tikus makmal, selain daripada mencit, marmut, arnab dan hamsters, seringkali digunakan di Malaysia dalam penyelidikan. Tikus makmal yang berkualiti dikategorikan sebagai haiwan bebas patogen tertentu (SPF) sementara tikus makmal yang kurang berkualiti dikategorikan sebagai haiwan konvensional. Haiwan konvensional biasanya dijangkiti organisma patogenik dan organisma berpotensi patogenik yang boleh membahayakan haiwan itu sendiri dan juga manusia. Lebih penting lagi, organisma patogenik tersebut boleh mengganggu penyelidikan di dalam pelbagai cara dan hasil penyelidikan yang diperoleh daripada haiwan tersebut mungkin tidak tepat. Oleh itu, objektif kajian ini adalah untuk melakukan pemeriksaan infestasi parasit di dalam tikus makmal tempatan. Lima ekor tikus makmal dari setiap tiga pembekal tempatan telah dipilih secara rawak dan digunakan

dalam kajian ini. Tikus-tikus tersebut telah dibunuh menggunakan gas karbon dioksida sebelum sampel-sampel diambil. Sampel yang diambil adalah air kencing, najis, dan bulu serta organ dalaman untuk mengenalpasti ektoparasit dan endoparasit daripada haiwan tersebut. Kajian ini menunjukkan bahawa kebanyakan tikus makmal dari tiga pembekal tersebut membawa ektoparasit dan endoparasit. Parasit yang dijumpai adalah *Ornithonyssus bacoti, Glycyphagus domesticus, Syphacia obvelata, Syphacia muris,* dan *Aspiculuris tetraptera*. Yang menjadi perhatian ialah *Ornithonyssus bacoti* yang merupakan parasit burung juga telah dikesan dalam tikus makmal. Bagaimana parasit tersebut boleh dijumpai di dalam tikus menjadi persoalan yang menarik. Parasit tersebut bagaimanapun boleh juga manjangkiti manusia. Kebanyakan parasit yang dijumpai tidak membahayakan kesihatan tikus makmal tersebut tetapi sesetengahnya akan membahayakan kesihatan mereka apabila beban parasit sangat tinggi terutamanya apabila tikus berada dalam keadaan tertekan seperti semasa eksperimen dijalankan. Ini dapat disimpulkan bahawa tikus-tikus makmal daripada tiga pembekal tempatan tersebut tidak berkualiti tinggi dan apabila digunakan untuk eksperimen, ianya akan mengganggu keputusan kajian.

Kata kunci: Haiwan bebas patogen tertentu (SPF), Haiwan konvensional, Infestasi parasit

ABSTRACT

An abstract of the project paper presented to the Faculty of Veterinary Medicine in partial fulfilment of the course VPD 4999 – Project.

ECTOPARASITES AND ENDOPARASITES OF LOCALLY PRODUCED LABORATORY RATS

By

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2015

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Laboratory rats, besides mice, guinea pigs and hamster, are commonly used in Malaysia in research studies. Good quality laboratory rats are categorized as specific-pathogenic-free (SPF) while others that are somewhat of lower quality are categorized as conventional animals. Conventional animals however, do carry pathogenic and potentially pathogenic organisms that can harm both the animals itself and also humans. More importantly the pathogenic organisms can interfere with research in many ways and results obtained from using such animals may not be valid. Therefore, objective of this study is to screen for parasitic infestation in laboratory rats that are produced locally. Five laboratory rats each from three different suppliers were selected randomly and used in this project. The rats were euthanized using CO_2 before samples were collected. Samples obtained were urine,

faeces and fur as well as internal organs to identify any possible ectoparasites and endoparasites in those animals. From this study, it showed that most of the laboratory rats from the three suppliers do carried both ectoparasites and endoparasites. The parasites found are *Ornithonyssus bacoti, Glycyphagus domesticus, Syphacia oblevata, Syphacia muris,* and *Aspiculuris tetraptera*. It is interesting to note that *Ornithonyssus bacoti,* which is a bird parasite, was also found in the rat. How the parasite managed to be present on the rat is an interesting question. This parasite however, can also infect humans. Many of the parasites found do not seem to affect the health of the rats but some are known to have affected the health of the animals when the parasitic load is heavy especially when the rats undergo stressful conditions such as during an experiment. It can be concluded that the laboratory rats produced by the three suppliers are not of very high quality and when used for experiment may affect the results of the study.

Keywords: Specific-pathogen-free (SPF) animals, Conventional animals, Parasitic infestation.

1.0 INTRODUCTION

Rats are rodents that belong to the family Muridae and the members of genus Rattus. There are about 64 species of rats found worldwide and the most important species to humans are the black rat, *Rattus rattus*, and the brown rat, *Rattus norvegicus* which originated in Asia. Rats, other than mice are the most frequently used animal species in experimental research and about 75-100 million of them are used annually worldwide for many purposes (Baumans, 2010a).

Brown rat is also known as Norway rat which is an omnivorous and opportunistic terrestrial rodent. It is one of the most abundant and widespread of all mammals, and it is also one of the world's most serious mammalian pests. This group of rat is mostly grey or brown in colour, have a weight more than 500 g for adult with a body length of 190-265 mm and a tail length of 160-2015 mm. This species can be confused with closely related black rat but it differs from its larger size, smaller eyes, shorter ears and proportionately shorter tail. Its albino form is used in laboratories for research and some have been bred as a pet (Burton, M. and Burton, R., 2002).

Laboratory rats have been used worldwide including Malaysia for research studies. Rats of very good quality for research purposes are those that are Specific Pathogen Free (SPF). However, rats of a lower quality known as conventional animals are also commonly used. These conventional rats are sometimes infected with pathogens or potential pathogens that can cause disease. Besides, pathogens that cause diseases in rats can infect human as well because of the exposure or direct contact between the rats and humans during laboratory works.

Ectoparasites are a diverse and highly adapted group of animals that infest the external body surfaces of vertebrates (Hanafi-Bojd *et al.,* 2007). They are organism that lives on or burrow under the skin surface of its host. The host is important for the parasites as it provide suitable environment and act as the source of food for them. They are also considered a main vector of zoonotic diseases and play an important role in the transmission of a wide variety of diseases. These organisms can cause serious and sometimes a life-threatening illness in humans and animals (Chul-Min *et al.,* 2006). In laboratory rats, most common ectoparasites found are mites, which are *Ornithonyssus bacoti, Laelaps nuttali, Laelaps echidninus, Laelaps sculpturatus and Listrophorvides sp.*), lice (*Polyplax spinulosa* and *Hoplopleura pacifica*) and tick (*Ixodes granulatus*) (Syazana *et al.,* 2013).

Endoparasites are parasites that live inside its host body and usually invade into the tissues of the host. They include worms which are helminths, and also single-celled protozoa. The largest group of helminth parasites of endothermal laboratory animals is nematode (Flynn, 1973). Important within this group are the pinworms or oxyurids which are intestinal nematodes belonging to the family Oxyuridae (Taffs, 1976). Oxyurid nematodes are widespread and common infections of both specific pathogen-free (SPF) and conventional laboratory rodents (Pritchett and Johnston, 2002).

The health of the laboratory rats undergoing experiment will influence the outcome of a study. When laboratory rats harbour pathogenic organisms, there is a high chance that they can become sick during experiment since they would definitely undergo stress from many manipulations and procedures being performed on them.

Data collected from sick rats, not due to the experiment itself, are usually flawed and cannot be used in the final analysis. In a worst case scenario, this animal may die and as such the life of the animal is wasted without any benefit. Presently, there are a few local companies that produce laboratory animal but their quality is not defined.

The objective of this study is:

1. To detect the occurrence of ectoparasites and endoparasites in laboratory rats produced locally.

The hypothesis of this study is:

1. Laboratory rats produced locally harbour ectoparasites and endoparasites.

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