



UNIVERSITI PUTRA MALAYSIA

**RANGING BEHAVIOUR OF *Rattus novergicus* USING RADIO-
TELEMETRY IN WET MARKET AT PETALING JAYA**

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FP 2016 53

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BACHELOR OF AGRICULTURAL SCIENCE

2015 / 2016

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SERDANG, SELANGOR DARUL EHSAN**

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IN WET MARKET AT PETALING JAYA**

BY

NURUL AWATIF BINTI MOHD SALIM

**A project report submitted to Faculty of Agriculture, University Putra Malaysia
in fulfillment of the requirement of PRT4999 (Final Year Project) for the award
degree of Bachelor of Agricultural Science**

Faculty of Agriculture

University Putra Malaysia

2015/2016

APPROVAL SHEET

This report project entitled “Ranging behaviour of *Rattus novergicus* using radio-telemetry in wet market at Petaling Jaya” prepared by Nurul Awatif Binti Mohd Salim and submitted to the Faculty of Agriculture in fulfillment of the requirement of PRT 4999 (Final Year Project) for the award of the degree of Bachelor of Agricultural Science.

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ACKNOWLEDGEMENT

Bismillahirrahmanirrahim,

Alhamdulillah, praised to the Almighty Allah SWT, because of His willingness to give me the opportunity of completing my final year project entitled “Ranging behaviour of *Rattus norvegicus* using radio-telemetry in wet market at Petaling Jaya”. First and foremost, I would like to express my deep and utmost gratitude to my supervisor Prof Madya Dr Hafidzi Mohd Noor for his constant guidance, assisting me by keeping my progress on schedule and providing me with very useful advices throughout this whole two semesters 2015/2016 session in order to complete this project. During my period to accomplish, I am very grateful for the opportunity to work with a hard working and very informative person.

I would like to extend my deepest gratitude too to postgraduate students of Prof Madya Dr Hafidzi Mohd Noor, Ms. Maisarah Binti Burhanuddin and Ms. Hafizah for their endless help in laboratory work, field work, assist me in completing my writing and continuous encouragements to complete my final year project. I am also grateful to have been giving the chance of using the Laboratory of Vertebrate in the Department of Plant Protection in doing my data analysis and such.

Last but not least, million thanks to both of my parents Mohd Salim Bin Taha and Rohani Binti Sulaiman also not to forget all of my family members and friends for their support and encouragement throughout my study.

TABLE OF CONTENTS

	PAGE
ACKNOWLEDGEMENT	i
TABLE OF CONTENTS	ii-iii
LIST OF TABLES	iv
LIST OF PLATES	v
LIST OF APPENDICES	vi
ABSTRAK	vii
ABSTRACT	viii
CHAPTER	
1 INTRODUCTION	
1.1 Background of Research	1 - 2
1.2 Problem statement	3
1.3 Objectives	3
2 LITERATURE REVIEW	
2.1 Subject background and description	4 – 5
2.2 Biology	5 – 6
2.3 Habitat	7
2.4 Foraging behaviour	7 – 9
2.5 Social behaviour	9 – 11

3	METHODOLOGY	
	3.1 Location and period of study	12
	3.2 Trapping and identification of rat species	12 – 13
	3.3 Radio tagging and tracking	13 – 14
	3.4 Analysis of data	15
4	RESULTS AND DISCUSSION	
	4.1 Rat identification	16
	4.2 Home range size	16 – 20
	4.3 Comparison of daily home range sizes between male and female rat	21 – 22
	4.4 Comparison of daily core area sizes between male and female rat	23 – 27
	4.5 Daily activity pattern	27 – 31
5	CONCLUSION	32
	REFERENCES	33 – 36
	APPENDICES	37 – 48

LIST OF TABLES

TABLES		PAGE
1	Rats identification	16
2	Home range size	17
3	Daily home range size of male rat	22
4	Daily home range size of female rat	22
5	Daily core area size of male (rat 2)	24
6	Percentage of male (rat 2) daily core area to home range size	24
7	Daily core area size of female (rat 3)	25
8	Percentage of female (rat 3) daily core area to home range size	25

LIST OF PLATES

PLATES		PAGE
1	<i>Rattus novergicus</i> captured using live trap cage	13
2	Radio-transmitter was harnessed on the neck of captured rat	14
3	Tracking rats using 3-element Yagi antenna and portable receiver	14
4	Home range size of female and male rat using HM method	18
5	Core area sizes for male and female rats using HM method	26
6	Daily activity pattern of male rat (rat 2)	29
7	Daily activity pattern of female rat (rat 3)	29

LIST OF APPENDICES

APPENDIX		PAGE
1	Tracking point of male (rat 2)	37 – 41
2	Tracking point of female (rat 3)	42 – 46
3	Triangulation point of male (rat 2)	47
4	Triangulation point of female (rat 3)	48



ABSTRAK

Tikus boleh ditemui di mana-mana dan mereka merangkumi dua per lima daripada semua spesies mamalia yang diketahui (Tweedie, 1978). Ciri-ciri utama tikus adalah bentuk dan susunan gigi. Gigi dan kaki hadapan tikus berguna dalam memberi mereka kecekapan yang menyebabkan kerosakan yang besar. *Rattus norvegicus* telah merebak sejak beberapa dekad yang lalu dan telah membiak di sepanjang laluan penghijrahan manusia dan kini ia terdapat di mana-mana (Yoshida, 1980). Mereka boleh menjadi sumber utama bagi beberapa patogen zoonotik yang menjadi ancaman kepada kesihatan awam dan yang terbaru merupakan leptospirosis. Objektif kajian ini adalah untuk memahami tingkah laku *R. norvegicus*. Aspek pertama kajian merupakan tingkah laku mencari makanan dan corak penggunaan habitat. Radio-telemetry digunakan untuk memetakan 'home range' dan untuk mengkaji corak aktiviti *R. norvegicus*. Tiga tikus (seekor jantan dan dua ekor betina) telah ditangkap dengan menggunakan perangkap dan dipengsankan untuk tujuan pengecaman. Frekuensi radio tertentu telah dipancarkan dan dipasang pada 3 tikus tersebut. Tikus yang sudah dipasang dengan radio telah diikuti dari 1830 ke 2230 atau 6-7 jam selama tujuh hari untuk menandakan lokasi dan keluasan kawasan. Saiz 'home range' dan kawasan teras telah dianggarkan dengan menggunakan MCP (Minimum Convex Polygon) dan kaedah HM (Harmonic Mean). 'Home range' telah dikira menggunakan Biotas Ecology Software Solutions Inc. Kajian ini telah menunjukkan bahawa tikus jantan mempunyai keluasan 'Home range' yang lebih besar daripada tikus betina. Keadaan ini dipengaruhi oleh sebab-sebab makanan yang berlebihan di beberapa tempat dan kepadatan populasi tikus yang tinggi. Dan sepanjang kajian ini juga menunjukkan bahawa kedua-dua tikus jantan dan betina *R.novergicus* lebih aktif pada awal malam selepas matahari terbenam.

ABSTRACT

Rodents are found everywhere and they make up two fifths of all known mammal species (Tweedie, 1978). Their characteristic feature is the dental form and arrangements. Their teeth and their handy fore feet give them great efficiency in causing damage. *Rattus norvegicus* has spread over the past decades and established themselves along routes of human migration and now can be found everywhere (Yoshida, 1980). They can be the main sources of several zoonotic pathogens which constitute a menace to public health, and recently, rising cases of leptospirosis. The objective of this study is to understand the behavior of *R. norvegicus*. The first aspect of behavioral study is the foraging behavior and pattern of habitat use. Radio telemetry is used to map the home range and to investigate the activity pattern of *R. norvegicus*. Three rats (one male and two females) in and around the wet market at Jalan Othman were captured using cage trap and anaesthetized for identification purpose. Radio transmitters of specific frequencies were attached to the rats. Radio tagged rats were then followed from 1930 hrs to 2230 hrs or 6-7 hours over seven days to mark the locations and extension of the area covered. The home range size and the core area were estimated using MCP (Minimum Convex polygon) and HM (Harmonic Mean) method. While the home ranges analysis of the captured rats were calculated using the Biotas of the Ecological Software Solutions Inc software. This study showed that male rat has bigger home range size than female rat. This condition is being influenced due to reasons of food abundance in several spots and high population density. And throughout this study also display that both male and female *R.novergicus* are more active on the early night after sunsets.

CHAPTER 1

INTRODUCTION

1.1 Background Of Research

Rodents, mammals from the order of Rodentia, are found all over the world in great numbers of variety. According to Tweedie (1978), rodents make up about two-fifths of all the known mammal species. A massive number of animals derived from the same group. In Malaysia, the most common rodents found can be conveniently divided into three groups; squirrels, porcupines, rat and mice.

Rats are known as small mammals and belonged to Muridae family. Rats have extensive range of food sources. This is due to their traits which are omnivores which also allow them to consume almost anything such as seed, tree, dry fruits, chicken dung and stored food.

Rats are considered as a serious pest because they bring a lot of damages in a wide range of aspects from household to agricultural crops to urban areas and endless destructions as they can consume almost everything because they have been sharing one similar common trait which is a generalist omnivore. The damages caused are more profound in areas which have abundant of food sources. In urban areas, places like restaurants, house residences and wet market have always been the ideal choices for rats to be infested in.

One of the most common rats found in urban areas are *Rattus norvegicus* which also known by its common name as Norway rat. This species has caused huge damages and destructions over the past decades. *R.norvegicus* and *R.rattus* are undeniably the most successful invasive species on Earth (Lack *et al.* 2012).

Rats not only feed but they tend to destroy what they are unable to consume. Other than that, rats have been a source of a number of zoonotic pathogens that can trigger diseases to human and caused mortality as explained by Himsforth *et.al* (2013). They are the potential caused of diseases such as Hanta virus (Haemorrhagic fever), Bubonic plague (*Yersinia pestis*) and Leptospirosis (*Leptospira icterohemorrhagiae*).

Rats live in colony and more or less forage in fixed area. By doing and understanding the behavioural studies of rats, the area used by an individual animal can be mapped using radio-telemetry. According to Hooker and Innes (1995), behavioural data obtainable by the radio-telemetry which comprise of the amount of time the rats spend in hiding places, the distances they move, their home range areas, and social organisation, are essential requirements for a successful management strategy and may facilitate the design to be more efficient in control operations.

1.2 Problem statement

Rattus norvegicus is a major pest and a crucial concern in urban areas. This is due to the fact that urban areas are packed with house residences and this will bring closer proximity that human will be in contact with rats. In addition, knowledge on behaviour and ecology of *R. norvegicus* is lacking. This is important especially during this critical moment where leptospirosis cases are increasing.

1.3 Objectives

There are several objectives involve in this research. The main objective of this study is to understand the behavior of *Rattus norvegicus* Specific objectives of this study includes:

1. To investigate the foraging behaviour of *R. norvegicus* using radio-telemetry.
2. To investigate the pattern of home range use
3. To determine the actogram (daily activity pattern) of *R. norvegicus*.

CHAPTER 6

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