

SUPERIOR IN TEKNOLOGI DAN KONSEP
UNIVERSITI SAINS DAN TEKNOLOGI MALAYSIA
PERENCANAAN DAN KONSEP

DATA DAN TEKNIK

PERENCANAAN DAN KONSEP
UNIVERSITI SAINS DAN TEKNOLOGI
NATIONAL UNIVERSITY OF SCIENCE AND TECHNOLOGY
MALAYSIA
2006

Ch. 4776

1100046086 Perpustakaan
Universiti Malaysia Terengganu (UMT)

Perpustakaan

Perpustakaan
Negeri Terengganu (UMT)

LP 14 FST 5 2006



1100046086

Chiripteran fauna at coastal area of KUSTEM Terengganu / Hazihani Safar.

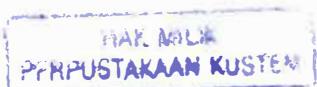


PERPUSTAKAAN

**KOLEJ UNIVERSITI SAINS & TEKNOLOGI MALAYSIA
21030 KUALA TERENGGANU**

~~1100046086~~

Lihat sebelah



**CHIROPTERAN FAUNA AT COASTAL AREA OF KOLEJ UNIVERSITI SAINS
DAN TEKNOLOGI MALAYSIA (KUSTEM) TERENGGANU**

By

Hazihani binti Safar

**Research Report submitted in partial fulfillment of
the requirement for the degree of
Bachelor of Applied Science (Biodiversity Conservation and Management)**

Department of Biological Sciences
Faculty of Science and Technology
KOLEJ UNIVERSITI SAINS DAN TEKNOLOGI MALAYSIA
2006

This project should be cited as:

Hazihani, S. 2006. Chiropteran fauna at coastal area of Kolej Universiti Sains dan Teknologi Malaysia (KUSTEM) Terengganu. Undergraduate thesis, Bachelor of Applied Science in Biodiversity Conservation and Management, Kolej Universiti Sains dan Teknologi Malaysia, Terengganu. 66p

No part of this project report may be produced by any mechanical, photographic, or electronic process, or in the form of phonographic recording, nor may it be stored in a retrieval system, transmitted, or otherwise copied for public or private use, without written permission from the author and the supervisor(s) of the project.

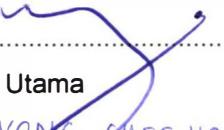


JABATAN SAINS BIOLOGI
FAKULTI SAINS DAN TEKNOLOGI
KOLEJ UNIVERSITI SAINS DAN TEKNOLOGI MALAYSIA

PENGAKUAN DAN PENGESAHAN LAPORAN
PROJEK PENYELIDIKAN I DAN II

Adalah ini diakui dan disahkan bahawa laporan penyelidikan bertajuk: CHIROPTERAN FAUNA AT COASTAL AREA OF KOLEJ UNIVERSITI SAINS DAN TEKNOLOGI MALAYSIA (KUSTEM) TERENGGANU oleh Hazihani binti Safar, no. Matrik UK 8144 telah diperiksa dan semua pembetulan yang disarankan telah dilakukan. Laporan ini dikemukakan kepada Jabatan Sains Biologi sebagai memenuhi sebahagian daripada keperluan memperolehi Ijazah Sarjana Muda Sains Gunaan - Pemuliharaan dan Pengurusan Biodiversiti, Fakulti Sains dan Teknologi, Kolej Universiti Sains dan Teknologi Malaysia.

Disahkan oleh:

.....


Penyelia Utama

Nama: WONG CHEE HO

Cop Rasmi:

Tarikh:

3/5/06

WONG CHEE HO
Pensyarah
Jabatan Sains Biologi
Fakulti Sains dan Teknologi
Kolej Universiti Sains dan Teknologi Malaysia
(KUSTEM)
21030 Kuala Terengganu.

.....


Ketua Jabatan Sains Biologi

Nama: PROF. MADYA DR. NAKISAH BT. MAT AMIN

Cop Rasmi:

Tarikh:

PROF. MADYA DR. NAKISAH BT. MAT AMIN
Ketua
Jabatan Sains Biologi
Fakulti Sains dan Teknologi
Kolej Universiti Sains dan Teknologi Malaysia
(KUSTEM)
21030 Kuala Terengganu.

ACKNOWLEDGEMENT

First of all, thanks to God the Almighty for giving me the strength to perform this study.

Without His permission I can't completed this project well.

I would like to express my gratefulness to Mr. Wong Chee Ho, as my supervisor for his good guidance, ideas, advices and comments on my project.

I also would like to say thank you to En. Mohammad b. Embong, the lab assistance who was also together helping us throughout the sampling period with guidance and assistance.

Special thank to my beloved mother Hjh. Katiyah bte. Abdul Manap and also to my family. Their continuous understanding, advices and encouragements gave me more confidence and motivate me to complete this project.

In addition, my appreciation and thank you to my friends Nursyazana bt. Zakaria. Aina Mutharah bt. Mohd Yusoff, Nurul Hanani bt. Abdul Halim and Mohd Azhamsah b. Mohd Zahar. Their assistance during the samplings period made this project possible and bearable. Finally, thank you to everyone who has lending a help to this project.

TABLE OF CONTENTS

	Page
TITLE PAGE	i
ACKNOWLEDGENT	ii
TABLE OF CONTENTS	iii
LIST OF TABLES	vii
LIST OF FIGURES	viii
LIST OF ABBREVIATIONS	ix
SYMBOLS	x
LIST OF APPENDICES	xi
ABSTRACT	xii
ABSTRAK	xiii
CHAPTER 1 INTRODUCTION	1
1.1 Introduction	1
1.2 Important of study	3
1.3 Objectives of study	3
CHAPTER 2 LITERATURE REVIEW	4
2.1 Bats introduction	4
2.2 Bats taxonomy and classification	5
2.3 Bats distribution	6
2.4 Morphology of bats	6
2.4.1 Adaptations	10
2.5 Biology of bats	11

2.5.1	Flight	11
2.5.2	Echolocation	12
2.5.3	Reproduction	12
2.5.4	Bat habitats	14
2.5.5	Bat habits	15
2.6	Important of bats	16
2.6.1	Pollinators and seed dispersers	16
2.6.2	Pest control	17
2.6.3	Guano	17
2.7	Threats	18
2.7.1	Lost of roosting sites	19
2.7.2	Bats hunting	20
2.8	Bat conservations	20
CHAPTER 3 METHODOLOGY		23
3.1	Sampling sites	23
3.2	Bats capturing device	23
3.3	Sampling	26
3.4	Removing and handling bats	26
3.5	Recording data	26
3.5.1	The bats sex, age and reproductive assessment	28
3.5.2	Body weight and forearm measurements	28
3.6	Identification, tagging and releasing of bats	28

3.7	Data analysis	29
3.7.1	Net effectiveness	29
3.7.2	Bats abundance	30
3.7.3	Relative abundance	30
3.7.4	Biomass	30
3.7.5	Percentage of recapture	30
3.7.6	Population estimate	31
3.8	Diversity index	32
3.8.1	Simpson index	32
3.8.2	Shannon-Weiner Index	33
CHAPTER 4 RESULTS		34
4.1	Sampling results	34
4.1.1	Reproductive status	37
4.2	Net effectiveness	40
4.3	Bats abundance	40
4.4	Relatives abundance	40
4.5	Biomass	42
4.6	Percentage of recapture	42
4.7	Population estimate	42
4.8	Species diversity	45
CHAPTER 5 DISCUSSION		48
5.1	Sampling results	48
5.1.1	Reproductive status	49

5.1	Net effectiveness	50
5.2	Relative abundance	50
5.3	Biomass	51
5.4	Percentage of recapture	51
5.5	Species diversity	52
5.6	New species cumulative curve	52
CHAPTER 6 CONCLUSION		54
REFERENCES		56
APPENDICES		60
CURRICULUM VITAE		66

LIST OF TABLE

	Page
3.1 The data sheet used for recording data captured bats of KUSTEM	27
4.1 Diversity index using Simpson index and Shannon-Weiner index	46
4.2 Summarized data analysis for the sampling results	47

LIST OF FIGURES

Figure	Page
2.1 Bat body structure	7
2.2 Types of ears among bats	9
3.1 Map of sampling sites	24
3.2 Mist net component and dimension	25
4.1 Number of individuals captured according to families of KUSTEM	35
4.2 Number of individuals captured according to species of KUSTEM	36
4.3 Number of individuals and species captured according to the sampling months of KUSTEM (September 2005 – January 2006)	38
4.4 Schematic representations of the periods of reproductive organ activity in the females of captured bats	39
4.5 Percentage of relatives abundance according to the species	41
4.6 Mean weight of captured bats according to species of KUSTEM	43
4.7 The percentage of recaptured bats according to the species	44
5.1 Cumulative number of new species captured per night at coastal area of KUSTEM in September 2005 to January 2006 (25 nights).	53

LIST OF ABBREVIATIONS

ABBREVIATIONS	MEANING
A	Adult
BCI	Bat Conservation International
F	Female
FA	Forearm
IUCN	International Union for the Conservation of Nature and Natural Resources
J	Juvenile
L	Lactating
M	Male
MBCRU	Malaysia Bat Conservation Research Unit
NR	Non-reproductive
PL	Post lactating
R	Recaptured
Rep	Reproduction
SSC	Species Survival Commission

LIST OF SYMBOLS

SYMBOLS	MEANS
%	Percentage
g	gram
m	meter
cm	centimeter
mm	milimeter
kg	kilogram
Σ	sum

LIST OF APPENDICES

APPENDICES	Page
1.0 Sampling site	61
2.0 Sampling site	61
3.0 Forearm measurement of the captured bats	62
4.0 <i>Cynopterus brachyotis</i> (Lesser dog-faced fruit bat)	62
5.0 <i>Eonycteris spelaea</i> (Long-tongued fruit bat)	63
6.0 Data for the captured bats of KUSTEM (September 2005-January 2006)	64

ABSTRACT

The study on the diversity of chiropteran fauna was conducted at the coastal area of Kolej Universiti Sains dan Teknologi Malaysia (KUSTEM). The main objectives are to study the diversity of bats at the coastal area and to enrich the checklist of bat of KUSTEM. The samplings were carried out in five months starting from September 2005 until January 2006. The bats were captured by using eight mist nets. Measurement of forearm and weight, the determination of sex, maturity status and their reproduction were taken. Bats were released after banding. A total of 42 individuals of bat were captured comprising of two families which is Pteropodidae and Vespertilionidae. The three species from the family of Pteropodidae includes *Cynopterus brachyotis*, *C. horsfieldii* and *Eonycteris spelaea*. Only one species was from the family of Vespertilionidae was captured which was *Kerivoula papillosa*. *C. brachyotis* was most dominant species. The Simpson and Shannon-Weiner index showed that the diversity of bats at this area were very low with 0.4274 and 0.8474 respectively.

**KEPELBAGAIAN HAIWAN CHIROPTERA DI KAWASAN PANTAI KOLEJ
UNIVERSITI SAINS DAN TEKNOLOGI MALAYSIA (KUSTEM)
TERENGGANU**

ABSTRAK

Kajian ke atas kepelbagaian haiwan Chiroptera telah dijalankan di kawasan pantai di Kolej Universiti Sains dan Teknologi Malaysia (KUSTEM). Objektif utama kajian ini adalah untuk mengkaji kepelbagaian spesies kelawar di kawasan pantai dan untuk memperbanyakkan senarai semak kelawar di KUSTEM. Persampelan telah dijalankan di dalam tempoh lima bulan dari September 2005 sehingga Januari 2006. Kelawar telah ditangkap menggunakan lapan jaring kabus. Pengukuran lengan dan berat, penentuan jantina, status kematangan dan pembiakkannya telah diambil. Kelawar telah dilepaskan selepas ditanda. Sejumlah 42 ekor kelawar telah ditangkap terdiri daripada dua famili iaitu Pteropodidae dan Vespertilionidae. Tiga spesies dari famili Pteropodidae termasuklah *Cynopterus brachyotis*, *C. horsfieldii* dan *Eonycteris spelaea*. Hanya seekor kelawar dari famili Vespertilionidae telah ditangkap iaitu *Kerivoula papillosa*. *C. brachyotis* adalah spesies yang dominan. Indeks Simpson dan Shannon-Weiner telah menunjukkan bahawa kepelbagaian kelawar di kawasan ini adalah sangat rendah dengan masing-masing mencatatkan 0.4274 dan 0.8474.