

BUKTI PENYAKIT DAN PENYULUH
BAGI MAMBALELEODERIS
BELLIANA SPP

SITI RAHMATI S.P.T. RAHMATI

FACULTY OF VETERINARY MEDICINE
UNIVERSITY OF ANIMALS AND VETERINARY MEDICINE

2006

411: 4757

1100046058

LP 57 FST 3 2006



1100046058
Environmental biology and ecology of butterfly lizard (Leiolep
Belliana gray) / Siti Rahimah Abd Rahim.



PERPUSTAKAAN
KOLEJ UNIVERSITI SAINS & TEKNOLOGI MALAYSIA
21030 KUALA TERENGGANU

1100046058		

Lihat sebelah

HAK MILIK
PERPUSTAKAAN KUSTEM

ENVIRONMENTAL BIOLOGY AND ECOLOGY OF BUTTERFLY LIZARD
(*LEIOLEPIS BELLIANA* Gray)

By

Siti Rahimah binti Abd Rahim

Research Report submitted in partial fulfillment of
the requirements of the degree of
Bachelor of Science (Biological Sciences)

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

This project report should be cited as

Siti Rahimah, A.R. 2006. Environmental biology and ecology of butterfly lizard (*Leiolepis belliana* Gray). Undergraduate thesis, Bachelor of Science in Biological Science, Faculty of Science and Technology, Kolej Universiti Sains dan Teknologi Malaysia, Terengganu, 58p.

No part of this project report may be reproduced 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 supervisor(s) of the project.

1100046058



**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:

ENVIRONMENTAL BIOLOGY AND ECOLOGY OF BUTTERFLY LIZARD (*LEIOLEPIS BELLIANA* GRAY).

Oleh Siti Rahimah binti Abd Rahim, no. matrik: UK 7689 telah diperiksa dan semua pembetulan yang disarankan telah dilakukan. Laporan ini dikemukakan kepada Jabatan Sains Biologi sebagai memenuhi sebahagian daripada keperluan memperoleh Ijazah Sarjana Muda Sains (Sains Biologi), Fakulti Sains dan Teknologi, Kolej Universiti Sains dan Teknologi Malaysia.

Disahkan oleh:

Penyelia Utama

AMIRRUDIN AHMAD

Lecturer

Nama:

Faculty of Science and Technology

Cop Rasmi:

Kolej Universiti Sains dan Teknologi Malaysia
21030 Kuala Terengganu.

30 APR 2006

Tarikh:

Penyelia Kedua (jika ada)

Nama:

AMIRRUDIN AHMAD

Lecturer

Cop Rasmi

Faculty of Science and Technology
Kolej Universiti Sains dan Teknologi Malaysia
21030 Kuala Terengganu.

Tarikh:

Ketua Jabatan Sains Biologi

Nama:

Cop Rasmi:

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.

Tarikh:

ACKNOWLEDGEMENT

This project has been completed successfully on time, I am especially grateful to the following people who have provided the suggestions, advices and reviews those have helped me to prepare this project. They are

- i. My supervisor En. Amirrudin bin Ahmad. I cannot thank him enough for their acumen and helpful advice from start to finish.
- ii. All lab assistants especially En. Syed Ahmad Rizal, they have helped me a lot to complete this project.
- iii. The computer laboratory and library which steady source of help particularly I can surf the relevant websites on internet.
- iv. My family members who are giving encouragement supporting and understanding during this endeavor.
- v. My lovely housemate G-ja, Nida, T-nie, Kechik, Kak Ct and Sarah they have helped me a lot to complete this project.

Lastly would be to own great thank to KUSTEM that had offered the chance to me to do this project. Thank you again to all the above name and those who are not mentioned for helping me and completing this project.

TABLE OF CONTENTS

	Page
ACKNOWLEDGEMENT	iii
LIST OF TABLES	vi
LIST OF FIGURES	vii
LIST OF ABBREVIATIONS/SYMBOLS	ix
LIST OF APPENDICES	x
ABSTRACT	xi
ABSTRAK	xii
CHAPTER 1 INTRODUCTION	
1.1 Introduction	1
1.2 Objectives	6
CHAPTER 2 LITERATURE REVIEW	
2.1 Taxonomy and species description	7
2.2 Daily activity	9
2.3 Diet and foraging	15
2.4 Preferred burrow size	17
2.5 Lizard burrows distribution in soil crusts	18
2.6 Body size	19

CHAPTER 3 METHODOLOGY

3.1	Sampling area	20
3.2	Microhabitat use in the field	22
3.3	Morphological measurements	22
3.4	Data analysis	23

CHAPTER 4 RESULT

4.1	Sampling result	24
4.2	Morphological measurements	28
4.3	Daily and seasonal activity	33
4.4	Burrow entrance diameter	33
4.5	Plot distribution	34

CHAPTER 5 DISCUSSION

5.1	Sampling distribution	46
5.2	Morphological measurements	47
5.3	Daily and seasonal activity	48
5.4	Burrow entrance diameter	49
5.5	Main habitat types	50

CHAPTER 6 CONCLUSION

51

REFERENCES

52

APPENDICES

CURRICULUM VITAE

LIST OF TABLES

Table		Page
Table 1.1	Relationship between morphology and ecology in squamate reptiles.	5
Table 4.1	Total number captured of butterfly lizard (<i>Leiolepis belliana</i> Gray) in different sex at KUSTEM from September through December 2005.	27
Table 4.2	Number captured of butterfly lizard (<i>Leiolepis belliana</i> Gray) in different sex at KUSTEM from Plot 1 through Plot 5.	27
Table 4.3	Descriptive statistics for butterfly lizard (<i>Leiolepis belliana</i> Gray) captured at KUSTEM.	29
Table 4.4	Measurements in mm (average \pm SD) for five different plots of butterfly lizard (<i>Leiolepis belliana</i> Gray) at KUSTEM.	35
Table 4.5	Measurements in mm (average \pm SD) for four different months of butterfly lizard (<i>Leiolepis belliana</i> Gray) at KUSTEM.	36
Table 4.6	Number captured of butterfly lizard (<i>Leiolepis belliana</i> Gray) per hour class per month and per sex per month at KUSTEM.	37
Table 4.7	Number captured of butterfly lizard (<i>Leiolepis belliana</i> Gray) per hour class per plot and per sex per plot at KUSTEM.	37
Table 4.8	The burrow and environment temperature and depth of burrow.	47

LIST OF FIGURES

Figure		Page
Figure 3.1	Map of Kolej Universiti Sains dan Teknologi Malaysia (KUSTEM) showing the study area sampling sites.	21
Figure 4.1	Total numbers captured of butterfly lizard (<i>Leiolepis belliana</i> Gray) in different sex at KUSTEM for four month.	24
Figure 4.2	Number captured of butterfly lizard (<i>Leiolepis belliana</i> Gray) in different sex at KUSTEM from September through December 2005.	25
Figure 4.3	Number captured of butterfly lizard (<i>Leiolepis belliana</i> Gray) in different sex at KUSTEM from Plot 1 through Plot 5.	26
Figure 4.4	Size frequency distributions of butterfly lizard (<i>Leiolepis belliana</i> Gray) captured at KUSTEM.	30
Figure 4.5	Differences in sex among forelimb range for butterfly lizard (<i>Leiolepis belliana</i> Gray) at KUSTEM.	30
Figure 4.6	Differences in sex among hindlimb range for butterfly lizard (<i>Leiolepis belliana</i> Gray) at KUSTEM.	31
Figure 4.7	Differences in sex among head width range for butterfly lizard (<i>Leiolepis belliana</i> Gray) at KUSTEM.	31
Figure 4.8	Differences in sex among tail length range for butterfly lizard (<i>Leiolepis belliana</i> Gray) at KUSTEM.	32
Figure 4.9	Differences in sex among total length range for butterfly lizard (<i>Leiolepis belliana</i> Gray) at KUSTEM.	32
Figure 4.10	The relationship between butterfly lizard (<i>Leiolepis belliana</i> Gray) head width and burrow entrance diameter for occupied burrows.	38
Figure 4.11	The relationship between butterfly lizard (<i>Leiolepis belliana</i> Gray) SVL and head width at KUSTEM.	38

Figure 4.12	The relationship between butterfly lizard (<i>Leiolepis belliana</i> Gray) burrow diameter and SVL at KUSTEM ($R_{sq} = R^2$).	39
Figure 4.13	Burrows distribution in plot 1 (x and * indicate burrow before and after rain).	40
Figure 4.14	Burrows distribution in plot 2 (x and * indicate burrow before and after rain).	41
Figure 4.15	Burrows distribution in plot 3 (x and * indicate burrow before and after rain).	42
Figure 4.16	Burrows distribution in plot 4 (x and * indicate burrow before and after rain).	43
Figure 4.17	Burrows distribution in plot 5 (x and * indicate burrow before and after rain).	44

LIST OF ABBREVIATIONS/SYMBOLS

g	-	Gram
mm	-	Milimeter
a.m	-	<i>ante meridian</i> (Latin); between midnight and noon
p.m	-	<i>post meridian</i> (Latin); between noon and midnight
FST	-	Faculty Science and Technology
KUSTEM	-	Kolej Universiti Sains dan Teknologi Malaysia
SVL	-	Snout- vent length
FL	-	Forelimb
HL	-	Hindlimb
HW	-	Head width
TL	-	Tail length
BD	-	Burrow diameter

LIST OF APPENDICES

Appendix

- Appendix 1 Calculation of mean, maximum, minimum and standard deviation on eight measurements in males and females butterfly lizard (*Leiolepis belliana* Gray).
- Appendix 2 Calculation of mean, maximum, minimum and standard deviation on eight measurements for four months in males and females butterfly lizard (*Leiolepis belliana* Gray).
- Appendix 3 Calculation of mean, maximum, minimum and standard deviation on eight measurements for five plots in males and females butterfly lizard (*Leiolepis belliana* Gray).
- Appendix 4 Data for one way ANOVA.
- Appendix 5 Result t – test (Mann-Whitney U) for eight measurements in males and females butterfly lizard (*Leiolepis belliana* Gray).
- Appendix 6 Result for one way ANOVA.
- Appendix 7 Result for two ways ANOVA.
- Appendix 8 Equipments.
- Appendix 9 Study sites.
- Appendix 10 The measurements of butterfly lizards (*Leiolepis belliana* Gray) morphology.
- Appendix 11 Data for burrow temperature.
- Appendix 12 Data for burrow depth.

ABSTRACT

A study on some aspect of environmental ecology and biology of butterfly lizard (*Leiolepis* sp.) was carried out in September to December 2005 at Kolej Universiti Sains dan Teknologi Malaysia (KUSTEM), Terengganu. The objectives of this study is to confirm the identity of butterfly lizard at the campus and to study the basic environmental biology and ecology of butterfly lizard. This study was conducted for four months starting in September until December 2005. Eight samplings have been done in five different plots. A total of 40 individual butterfly lizards were captured, and identified as *Leiolepis belliana* Gray composed of 31 females and nine males. The highest captured was September with 21 individual (18 females and three males). Plot 1 shown the highest captured with 16 individual (15 females and one male). The t-test result showed those males and females butterfly lizards are not significantly different in all morphological measurements ($P > 0.05$). Butterfly lizard showed the highest level of activity between 1000h to 1200h and lowest between 0100h to 0200h but two ways ANOVA did not showed significantly different between months and plots ($P > 0.05$). Population before rain are higher than after rain based on individual captured but number of burrows after rain are higher than before rain.

PERSEKITARAN BIOLOGI DAN EKOLOGI BIAWAK PASIR
(*LEIOLEPIS BELLIANA* Gray)

ABSTRAK

Kajian ke atas persekitaran biologi dan ekologi biawak pasir telah dijalankan di kawasan Kolej Universiti Sains dan Teknologi Malaysia (KUSTEM). Objektif utama kajian ini adalah untuk mengesahkan identiti spesies biawak pasir dan mempelajari persekitaran biologi dan ekologi spesies ini. Kajian ini dijalankan selama empat bulan bermula dari bulan September hingga bulan Disember 2005. Sebanyak lapan kali persampelan telah dijalankan di lima plot yang berbeza. Setiap biawak pasir yang ditangkap akan diukur sebelum dilepaskan. Sejumlah 40 ekor biawak pasir berjaya ditangkap. Hasil tangkapan merekodkan 31 ekor betina dan sembilan ekor jantan. Tangkapan tertinggi dicatatkan pada bulan September melalui 21 ekor tangkapan (18 ekor betina dan tiga ekor jantan). Plot 1 mencatatkan hasil tangkapan yang tertinggi iaitu sebanyak 16 ekor (15 ekor betina dan seekor jantan). Ujian t-test menunjukkan tidak terdapat perbezaan morfologi di antara biawak pasir jantan dan betina ($P > 0.05$). Biawak pasir aktif pada waktu 1000h hingga 1200h dan kurang aktif pada waktu 0100h hingga 0200h. Ujian ANOVA dua hala menunjukkan tidak terdapat perbezaan antara bulan dan plot ($P > 0.05$). Populasi biawak pasir sebelum hujan adalah lebih tinggi daripada selepas hujan berdasarkan tangkapan individu tetapi bilangan bagi lubang selepas hujan adalah lebih tinggi daripada sebelum hujan.