



KEMENTERIAN
PENDIDIKAN
MALAYSIA

FINAL REPORT
EXPLORATORY RESEARCH GRANT SCHEME (ERGS)

Laporan Akhir Skim Geran Penyelidikan Eksploratori (ERGS) IPT
Pindaan 1/2015

A RESEARCH TITLE:

The role of fragmented habitat in the conservation of bat faunas: their implications in ecosystem conservation and management

PHASE & YEAR: PHASE 1/2013

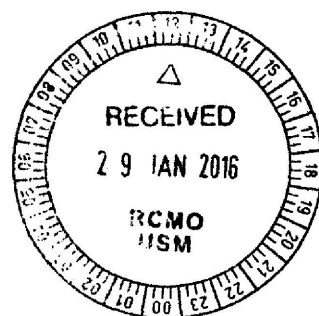
START DATE: 1 JUNE 2013

END DATE: 31 MAY 2015

EXTENSION PERIOD (DATE): RMC LEVEL: 30 NOVEMBER 2015
KPM LEVEL:

PROJECT LEADER: PROF. DR. SHAHRUL ANUAR MOHD SAH
I/C / PASSPORT NUMBER: 691106-06-5095

PROJECT MEMBERS: 1. DR ASYRAF MANSOR
(including GRA) 2. Nur Munira bt Azman



PROJECT ACHIEVEMENT (Prestasi Projek)

B

ACHIEVEMENT PERCENTAGE

Project progress according to milestones achieved up to this period	0 - 50%	51 - 75%	76 - 100%
Percentage			100%

RESEARCH OUTPUT

	Refereed Journal	Non-Refereed Publication
Number of articles/ manuscripts/ books (Please attach the First Page of Publication)	<p>Feeding Behaviour of Cynopterus sphinx (Pteropodidae) Under Captive Conditions. Tropical Life Sciences Research. 25: 53-59. 2014.</p> <p>A Checklist of the bats (Chiroptera) of Bukit Mertajam, Pulau Pinang, Malaysia. Malayan Nature Journal. 67: 15-23. 2014.</p> <p>Mammals of Gunung Ledang. In Biodiversity of Gunung Ledang: Mountaineering the Nature. Publisher : School of Biological Sciences & Johor National Parks Corporation. ISBN : 978-983-42850-4-3. No of Pages : 116-130</p>	
Conference Proceeding (Please attach the First Page of	International	National

Publication)

Intellectual Property

(Including Paten, Copyright, Industrial Design, layout Design of Integrated Circuit & Trademarks)

1

HUMAN CAPITAL DEVELOPMENT

Human Capital	Number				Others (please specify)
	On-going		Graduated		
Citizen	Malaysian	Non Malaysian	Malaysian	Non Malaysian	
No. PHD STUDENT					
Student Fullname: IC / Passport No: Student ID:					
No. MASTER STUDENT	1				
Student Fullname: IC / Passport No: Student ID:	Mohd Abdul Muin Md Akil 2013/14/15 801201- 06-5549				
No. UNDERGRADUATE STUDENT			2		
Student Fullname: IC / Passport No: Student ID:			Norhanani Hassim 2013/14 921006-02- 6014 Nur Fazrina JainulAbadeen 2014/15 930217-14- 6432		

Total	1	2		
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EXPENDITURE (Perbelanjaan)

C Budget Approved (Peruntukan diluluskan) : RM55,210.00
Amount Spent (Jumlah Perbelanjaan) : RM 55041.19
Balance (Baki) : RM 168.81
Percentage of Amount Spent : 99.7 %
(Peratusan Belanja)

ADDITIONAL RESEARCH ACTIVITIES THAT CONTRIBUTE TOWARDS DEVELOPING SOFT AND HARD SKILLS
(aktiviti Penyelidikan Sampingan yang menyumbang kepada pembangunan kemahiran insaniah)

D

International		
Activity	Date (Month, Year)	Organizer
(e.g : Course/ Seminar/ Symposium/ Conference/ Workshop/ Site Visit)	Conference: Acoustic lure enhances survey and research capacity for microbats in forest habitats. 16th Australasian Bat Society Conference ; Rydges Southbank, Townsville, QLD, Australia 22-25th April 2014	Australasian Bat Society Conference ; Rydges Southbank, Townsville, QLD, Australia 22-25th April 2014
	Conference: Acoustic Lure Gives Increased Efficiency For Short-Term Surveys Of Bat Diversity In Tropical Rainforest. 1-5 September 2014. XIIIth European Bat Research Symposium. Sibenik, Croatia.	XIIIth European Bat Research Symposium. Sibenik, Croatia.
	Conference: Chatting to bats: Applications of acoustic lures for	The 3rd International Workshop on Tropical Biodiversity and Conservation.

	<p>surveying and studying microchiroptera. 22-23 September 2014. The 3rd International Workshop on Tropical Biodiversity and Conservation. Impala Hotel, Arusha, Tanzania.</p> <p>The distribution and conservation of fruit bats in Penang Island, Malaysia. 3rd Regional Conference of the Society for Conservation Biology-Asia Section. Equatorial Hotel Melaka. 19-22 Aug 2014.</p> <p>Roost selection by bats in the Anthropogenic areas along the west coast of Peninsular Malaysia. 3rd International Southeast Asian Bat Conference. Grand Margherita, Kuching, Sarawak. 14 – 17 August 2015.</p>	<p>Impala Hotel, Arusha, Tanzania.</p> <p>3rd Regional Conference of the Society for Conservation Biology-Asia Section. Equatorial Hotel Melaka. 19-22 Aug 2014.</p> <p>Universiti Malaysia Sarawak and The Southeast Asian Bat Conservation Research Unit. 3rd International Southeast Asian Bat Conference. Grand Margherita, Kuching, Sarawak. 14 – 17 August 2015.</p>
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National		
Activity	Date (Month, Year)	Organizer
(e.g : Course/ Seminar/ Symposium/ Conference/ Workshop/ Site Visit)		

E PROBLEMS / CONSTRAINTS IF ANY (*Masalah/ Kekangan sekiranya ada*)

Major constraint is only the weather; rainy season hampered few sampling durations and dry months from Dec 2013 – March 2014, and dry months from end of December 2014 – mid March 2015 greatly reduced the capture success. Heavy rains from October – December 2014 also significantly reduced capture success of individual. Thus affected the study on bat assemblages during that period.

F RECOMMENDATION (*Cadangan Penambahbaikan*)

Extension of grant required to complete the study.

G RESEARCH ABSTRACT – Not More Than 200 Words (*Abstrak Penyelidikan – Tidak Melebihi 200 patah perkataan*)

Malaysia is one of the major global hotspots for bat diversity, with 118 species recorded, which is around 5% of all bat species in the world. While some species in the region are adapted to open areas and edge habitats the vast majority of Malaysian bats are dependent on forest. Bats perform several essential ecological functions in tropical forests. Fruit bats are important pollinators and seed dispersal agents, that maintain forest ecosystems and allow forest regeneration. Most other bats feed on insects and other arthropods, consuming huge quantities each night, and thereby controlling populations of herbivores and other insect pests. The current forest habitat consists of a series of patches, which vary in size and their degree of isolation (distance of separation from other forest patches). Patches also vary in aspects of habitat quality, as a result of differences in past logging regimes and other management history. Current management practices also vary between patches and these may further influence habitat quality. Bat species differ in their responses to habitat disturbance. In order to preserve fully-functioning forest ecosystems, it is important to establish which habitats are most valuable for bat diversity and which habitat are necessary good for bat assemblage.

Date : 25 JANUARY 2016
Tarikh

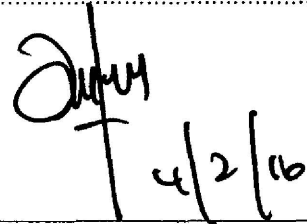
Project Leader's Signature:
Tandatangan Ketua Projek
Profesor Shahrul Anuar Mohd Sah
Pusat Pengajian Sains Kajihayat
Universiti Sains Malaysia
11800 Pulau Pinang



REMARKS, IF ANY/ ENDORSEMENT BY RESEARCH MANAGEMENT CENTER (RMC)
(Komen, sekiranya ada/ Pengesahan oleh Pusat Pengurusan Penyelidikan)

Name:
Nama:

Signature:
Tandatangan:



4/2/16

Date:
Tarikh:

UserCode: FARHAINI / USMPGLIVE / PBILOGI

Program Code: Votebook9100

Current Program : Votebook (Header)

Current Date : 28/01/2016 2:03:48 PM

Version: 15.120, Last Updated at 10/12/2014

DB: 13.02, 9/27/2010 VB: 13.01, 3/14/2011

Switch Language : English / Malay

Wildcard : eg. Like 100%, Like 10%, Like %1.

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Element 2: %

Element 4: PBILOGI

Element 5: 6730138

Year: 2016

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		402	T	SubTotal		2,794.45	0.00	0.00	0.00	0.00	0.00	2,794.45	0.00%
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Detail	Excel	403	T	ERGS	203.223.0.PBIOLOGI.6730138	-3.50	0.00	0.00	0.00	0.00	0.00	-3.50	0.00%
Detail	Excel	403	T	ERGS	203.224.0.PBIOLOGI.6730138	36.00	0.00	0.00	0.00	0.00	0.00	36.00	0.00%
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		9999		GrandTotal		10,636.21	0.00	0.00	0.00	10,467.40	0.00	168.81	0.00%

Feeding Behaviour of *Cynopterus sphinx* (Pteropodidae) Under Captive Conditions

Nur Juliani Shafie*, Nor Amira Rahman, Shahrul Anuar Mohd Sah, Nik Fadzly Nik Rosely and Maryam Sufian

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Abstrak: Kajian terhadap kebolehan deria bau dan visual kelawar megachiroptera, *Cynopterus sphinx* telah dijalankan dengan mendiskriminasi bau dan bentuk pisang, *Musa sp.* Eksperimen telah dijalankan di dalam kurungan dengan memberikan beberapa pilihan makanan iaitu pisang masak, pisang yang dikisar dan pisang tiruan. Kelakuan kelawar-kelawar itu diperhatikan secara visual dan peratusan aktiviti dan rehat, tempoh percubaan pertama mencari makanan, bilangan percubaan untuk makan dan juga purata tempoh percubaan yang berjaya telah direkodkan bagi setiap kelawar. Kelawar-kelawar tersebut mempamerkan peningkatan pada bilangan kunjungan ke atas pisang masak dan juga pisang yang dikisar. Walau bagaimanapun, pisang tiruan tidak mengakibatkan sebarang tindakbalas. Kajian ini mencadangkan isyarat bau adalah lebih penting daripada isyarat visual untuk penentuan lokasi buah bagi *C. sphinx*.

Kata kunci: Kelawar Pemakan Buah, *Cynopterus sphinx*, Deria Bau, Penglihatan, Dalam Kurungan

Abstract: We examined the olfactory and visual abilities of megachiropteran bats, *Cynopterus sphinx*, for discrimination of the odour and shape of the banana fruit, *Musa sp.* We conducted the experiments in captive conditions by offering a selection of ripe bananas, blended bananas and artificial bananas. The behaviour of the bats was observed visually, and the percentage of activity and rest, duration of the first foraging bout, number of feeding attempts and the average duration of successful attempts was recorded for each bat. The bats exhibited an increased number of visits to ripe bananas and blended banana fruits. However, the artificial fruit did not evoke any response. Our study suggests that odour cues are more important than visual cues for the location of fruits by *C. sphinx*.

Keywords: Fruit-eating Bat, *Cynopterus sphinx*, Olfaction, Vision, Captive Condition

INTRODUCTION

Bats mainly depend on three important cues in the search for food: vision, olfaction and echolocation. Insect-eating bats, also known as microchiroptera, mostly depend on echolocation cues when searching for food (Swift & Racey 2002). With the exception of *Eonycteris* spp. and *Rousettus* spp., olfaction and vision are more important for fruit bats or megachiropterans during foraging. The Greater short-nosed fruit bat, *Cynopterus sphinx*, can learn to differentiate between olfactory cues and certain non-olfactory factors (Acharya *et al.* 1998).

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A Checklist of the bats (Chiroptera) of Bukit Mertajam, Pulau Pinang, Malaysia

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M. FATIM SYAKIRAH¹, EVAN S. H. QUAH¹ and M. A. MUIN¹

Abstract: A study was conducted at Bukit Mertajam Recreational Park, Penang between October and December 2010 to survey the diversity of Chiroptera in this area. A total of 379 individuals representing 13 species were captured over a period of nine trapping nights and the deployment of 23 harp traps. The most abundant bat species found at Bukit Mertajam is *Hipposideros bicolor* with 145 individuals. A preliminary checklist of the chiropteran fauna for Bukit Mertajam is presented.

Keywords: Chiropteran, Diversity, Bats, Bukit Mertajam, Penang, Harp trap

INTRODUCTION

With more than 125 species, Malaysia is at the centre of the Old World bat diversity and is considered the most important country for international bat conservation (Kingston et al., 2009). Bats are a crucial part of the ecosystem as the insectivorous bats eat insects and help to control an array of insect pests while fruit bats are important seed dispersers and known pollinators of many commercially important plant species in the tropics such as durian (*Durio* sp.) and petai (*Parkia speciosa*) (Kingston et al., 2009). Sadly, despite being vital components of global biodiversity, more than a quarter of Malaysia's bats are red-listed by IUCN as being at risk of extinction (Kingston et al., 2009).

There are seven families in Microchiroptera which include 26 genera and a total of 109 species in Peninsular Malaysia. The family Emballonuridae has a total of four species in three genera while Nycteridae, represented by a single genus with only one species. There are two species in Megadermatidae that can be found in Peninsular Malaysia which is represented by a single genus. For Rhinolophidae, there is only one genus with at least 18 species recorded in Peninsular Malaysia. The Hipposideridae, represented by three genera with 21 species while the Molossidae has three genera with four species. The

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