

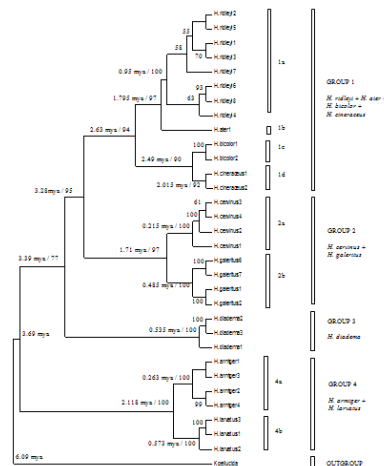
# Primates Ecology, Evolution & Genomics 2011-2016

Nur Aida Md Tamrin, Mohd Hanif Ridzuan  
& MT Abdullah  
Department of Zoology  
Universiti Malaysia Sarawak  
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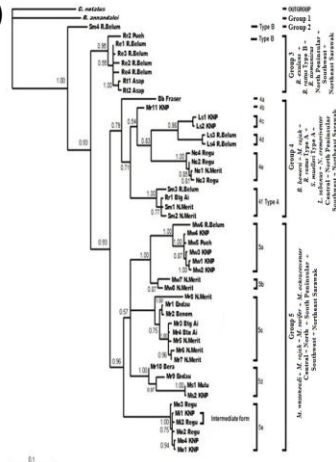
## Hanif: Diversity and Phylogenetics of *Hipposideros* (Chiroptera: Hipposideridae).

- A total of 1,278 individuals comprising of 47 species from seven families were recorded in 18 study sites in Malaysia. Regenerated forest is the most diversified with 633 individuals comprising of 42 species from six families.
- Phylogenetic relationship among *Hipposideros* were inferred from mtDNA cytochrome *b* and nuDNA Recombinant Activating Gene 2.
- Generally, phylogenetic relationship of genus *Hipposideros* inferred from *cyt b* was successfully reviewed. The interspecies and intraspecies relationship of this genus was supported with high bootstrap value and the group placement was stable in all tree analyses.

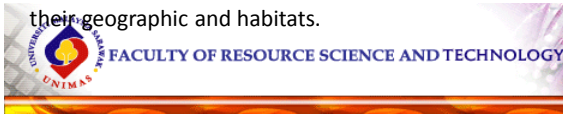


### Aida: Phylogenetics of Family Muridae (Rodent)

- Intermediate forms of *Maxomys* sp. (Mi) were identified within *Maxomys* division (cryptic species).
- genetic distance Mi to *M. ochraceiventer* = 0.32%; Mi to *M. whiteheadi* = 11.37%.
- Genetic Species Concept for mammalian species by Bradley and Baker (2006), they suggested the value of genetic distance < 2% indicated intraspecific variation whereas value > 11% signified a different lineage of different biological species.
- External morphology similar to *M. whiteheadi* rather than *M. ochraceiventer*. The craniodental also show some difference. (Skull A: *M. whiteheadi*; B: Mi; C: *M. ochraceiventer*)
- Speciation
- Phenotypic plasticity effects. Phenotypic plasticity is the ability of species to alter its phenotype in response to adapt in various environment and ecological habitats for their survival (Espinosa-Soto *et al.*, 2011).
- Motokawa *et al.* (2004) stated that there were significant variation in cranial features of *Rattus exulans* based on their geographic and habitats.



A Bayesian inference with 50% majority rule consensus tree of 476 bp partial mtDNA COI gene sequences. Values of Bayesian posterior probabilities (bpp) were shown in the branch nodes.



## Introduction

- The Order Primates in Malaysia consists of five families, nine genera and 17 species. The families Lorisiidae and Tarsiidae are nocturnal primates while Cercopithecidae (Old World monkeys), Hylobatidae (gibbons) and Hominidae (humans and orang hutan) are diurnal.
- The proboscis monkey, a Bornean endemic, is strictly inhabits coastal mangrove areas, in the lower reaches of mangrove-lined rivers, lowland forest including peat swamps and along the large river systems in the riverine forests prior to their diet and food preferences.
- Proboscis monkey lives in harem at about 3 to 32 individuals each with one dominant alpha male (leader) controlling the females and juveniles.
- Proboscis monkey is listed as endangered species on IUCN Red List of Threatened Species and Appendix I of CITES in recent reviews.



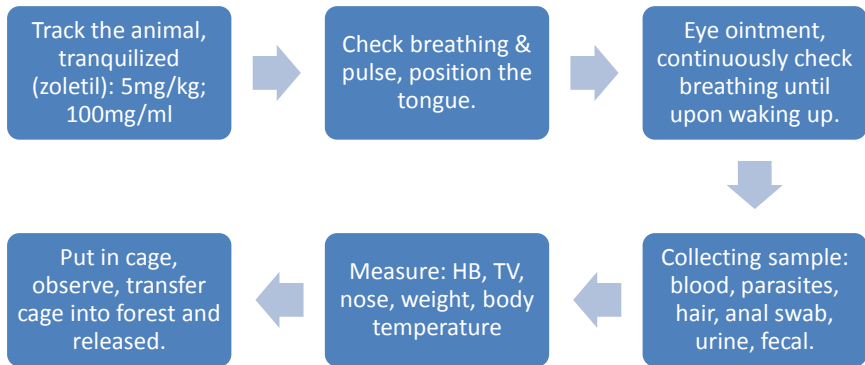
**Proboscis Monkey (*Nasalis larvatus*)**



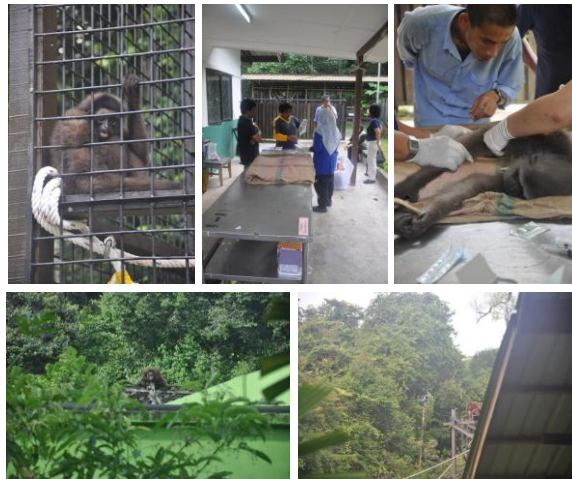
**1<sup>st</sup> survey of Proboscis Monkey with MGRC, March 2011**



### Working Procedure



### Restraining of Captive Animals at Matang Wildlife Centre, Sarawak



### Bako National Park, Sarawak



### Bako National Park, Sarawak



### Boat ride



### Unhealthy Mangrove in Bako National Park, Sarawak

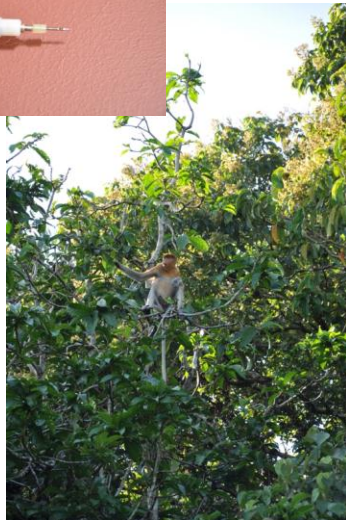


### Briefing Session in Bako National Park, Sarawak

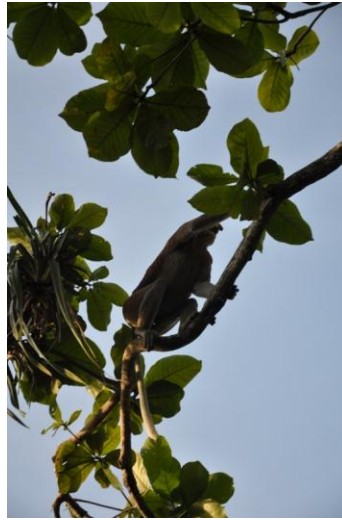
- Divide tasks and the strategy; animal tracking at dawn and evening (Prof Taj, Wahap, Ahmad, Nasron), rescue team (Hanif, Cheng, Madinah), drugging (Dr Sandie, Dr Sivaa, Aida).
- Sample collection: Blood (DNA, serum, blood count, slides for endoparasites, leptospirosis), fecal, urine, anal swab for microbiology studies.



### 2<sup>nd</sup> attempt



3<sup>rd</sup> attempt



5<sup>th</sup> attempt







### Observing, measuring and collecting samples of Proboscis Monkey



### Raw Morphological Data

Bil	Date	Species	Field No.	Chest Girth (cm)	HB (cm)	TV (cm)	SL (cm)	Nose (cm)	Ear (cm)
1	16.7.2011	<i>Macaca nemestrina</i>	PRP0001	33.5	51.0	0.0	40.0	-	-
2	16.7.2011	<i>Hylobates muelleri</i>	PRP0002	37.0	47.0	21.0	53.0	-	-
3	16.7.2011	<i>Macaca fascicularis</i>	PRP0003	27.0	42.0	56.5	26.0	-	-
4	17.7.2011	<i>Presbytis cristata</i>	PRP0004	44.0	51.0	65.0	29.0	-	-
5	18.7.2011	<i>Nasalis larvatus</i>	PRP0005	57.0	61.4	70.0	46.4	6.0	3.0

Bil	Date	Species	Forepaw (cm)		Hindpaw (cm)		WT (Kg)	Temp. (°C)	Age	Sex
			Left	Right	Left	Right				
1	16.7.2011	<i>Macaca nemestrina</i>	12.5	13.0	18.0	18.0	6.0	-	Adult	Male
2	16.7.2011	<i>Hylobates muelleri</i>	16.8	15.0	14.0	14.0	5.5	-	Adult	Male
3	16.7.2011	<i>Macaca fascicularis</i>	9.2	9.0	13.0	13.2	2.5	-	Subadult	Male
4	17.7.2011	<i>Presbytis cristata</i>	10.0	10.0	13.7	13.0	5.4	38.0	Adult	Female
5	18.7.2011	<i>Nasalis larvatus</i>	17.0	16.8	21.0	21.0	18.4	37.4	Adult	Male



## Releasing the Proboscis Monkey



## Recovering time

Date: 18 July 2011

Location: Bako National Park

Code	Species Name	Time			Dosage (mgIM)
		Injection	Shock off	Recovery	
PRP0005	Proboscis Monkey <i>Nasalis larvatus</i>	7:04am	7:11am	12:55pm	200



## Post-mortem Session



## Results of post-mortem

- Five attempt drugging Proboscis Monkey, one succeeded and four failed. Two darts not found. One dart approximately RM300 (needle, drug, syringe).
- Samples taken: blood (approx. 8ml), anal swab, hair, feces, no ectoparasites.
- Many new orders for insufficient equipments and drugs.
- Estimated expenses right from the beginning is 20k.
- Next fieldtrip; end of July or early August, depending on the drug supply and work force.



### Popular animals in Bako National Park, Sarawak



## Team Members

- Supervisors : Prof Taj, Dr Yuzine & Dr Ramlah – UNIMAS; Dr Stephen & Dr Joan - MGRC
- 5 Potential PhD candidates;
  - Nur Aida, Hanif Ridzuan & Fong Pui Har on genomics, phylogenetics, population genetics and evolution of PM and primates
  - Siali Aban on PM bio-economic modeling and economic assessment
  - Madinah on ecology of primates in Bako and urban areas
- 8 Potential MSc
  - Sarina + 1 on phylogenetics & population genetics of PM/primates
  - Wahap – ecology and distribution of PM & primates in Bako
  - Besar on population ecology of PM & primates in Bako
  - Leo on foraging ecology of PM & primates in Bako
  - Mohamad Kombi on behaviour of PM & primates in Bako
  - 2 Dr Siti Akhmar's students on mangrove habitat characterisation
- 10-15 BSc FYP
  - Smaller parts of the DNA, phylogenetic ecology and habitat of PM & primate of Bako



## Future Task & Challenges

- Organise 23-28 systematic studies at PhD, MSc & BSc
- Proper equipment for tracking & tagging of PM
- Fund raising for this project to sustain until 2016
- Public awareness on the importance to protect PM as umbrella species in order to protect the high biodiversity [ecosystem, species, genetics & culture] of Bako NP
- Park management willing to provide a small hut for 3-4 research students while in Bako.
- Habitat improvement for the unhealthy mangrove at Telok Assam



## PhD proposed objectives

- 1) to determine the diversity and distribution of *N. larvatus*.
- 2) to provide the complete references of the mitochondrial genome.
- 3) to review and conclude the population genetic structure and gene flow within and between populations and subpopulations.
- 4) to locate which gene that contributes to the feeding behaviour and diurnal-nocturnal behaviour.
- 4) to compare the effectiveness and efficiency of mitochondrial and nuclear genes.
- 5) to provide information for conservation plan in conserving *N. larvatus*.



### Acknowledgments

- MGRC for financial and laboratory support & facilities
- SFD & SFC for permits to conduct research, collect samples & enter protected areas
- UNIMAS for administrative support, logistics & facilities
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Thank you

