HISTOLOGICAL DESCRIPTION OF THE BORNEAN HORNED FROG *MEGOPHRYS NASUTA* (AMPHIBIA: ANURA: MEGOPHRYIDAE) SKIN STRUCTURE FROM DIFFERENT BODY REGIONS

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INTRODUCTION

- amphibian skin properties related functional systems of frog skin
- have numerous glands found in frogs are mucous, serous and holocrine glands.
- habitat loss and fragmentation remain major threats to highly sensitive and permeable skin of frogs especially forest dweller species (Semlitsch and Alford, 2007)
- the interaction of their physiological characteristics with different environmental factors is poorly understood.
- Toledo and Jared (1993) reported that the frog skin structure varies among species.

RESEARCH QUESTION

Does *Megophrys nasuta* having differences of their skin structure in response to the changing environment?

HYPOTHESIS

It was hypothesized that pattern of the skin properties among different body regions of *M. nasuta* species varies in response to the function of the skin itself to their natural habitat.

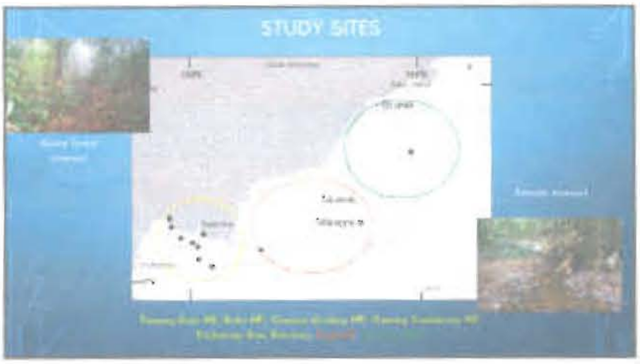
dorsal skin
consists of glands that helps in predator avoidance strategy (such as camouflage and poison secretion) or avoid exposure to sunlight

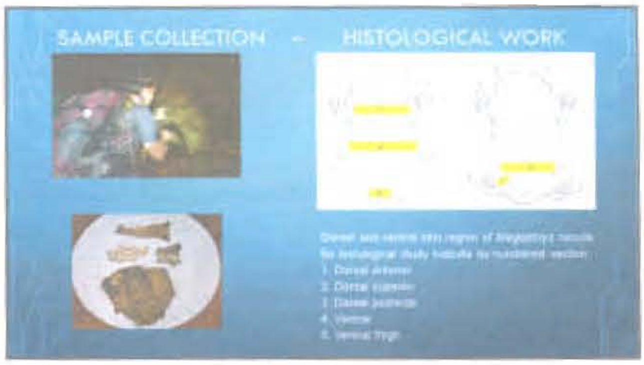
ventral skin
that is in contact with the ground might have more glands in related to defense mechanisms against bacteria or any pathogen

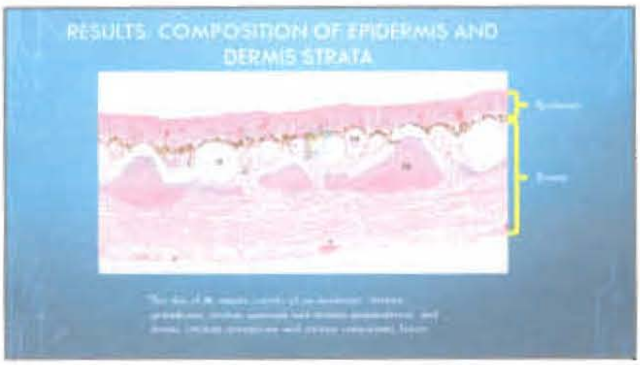
morphological attribute of the frog skin particularly from anterior of the dorsal, superior of the dorsal, posterior of the dorsal, ventral surface and ventral of the frog's thigh were not well documented

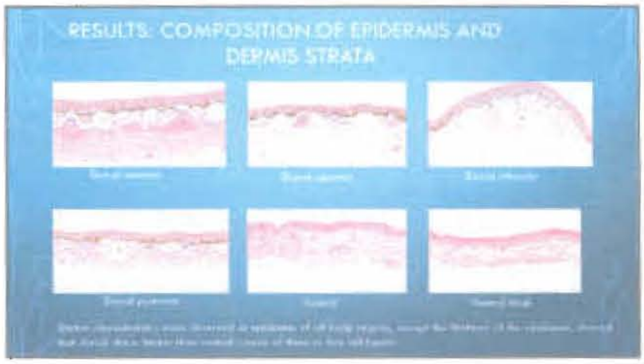
AIM OF STUDY...

To assess skin structure variation within individual frogs of *Megophrys nasuta* from different body regions


STUDY SITES


SAMPLE COLLECTION
HISTOLOGICAL WORK


RESULTS: COMPOSITION OF EPIDERMIS AND DERMIS STRATA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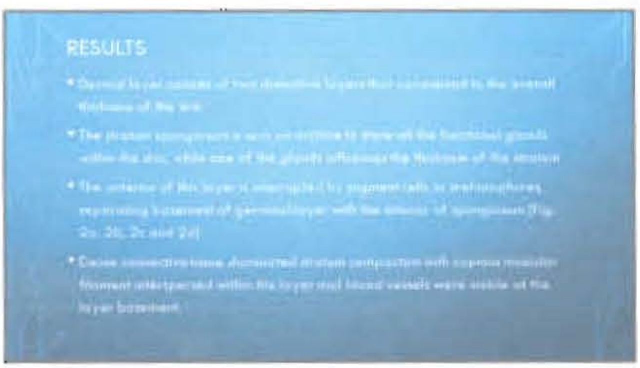
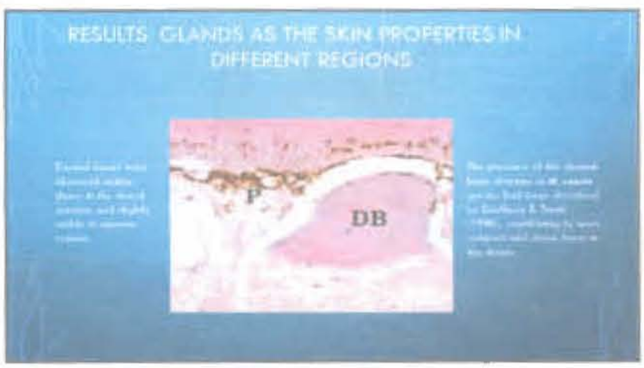

RESULTS


RESULTS: GLANDS AS THE SKIN PROPERTIES IN DIFFERENT REGIONS
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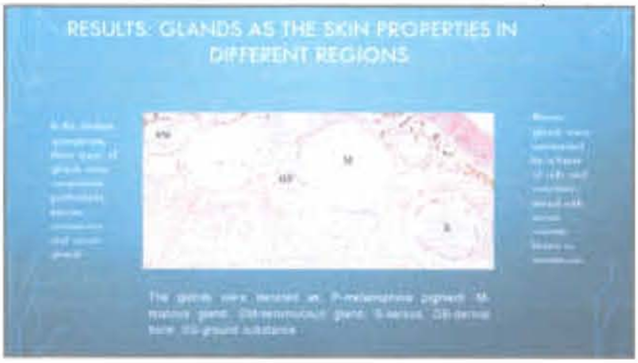
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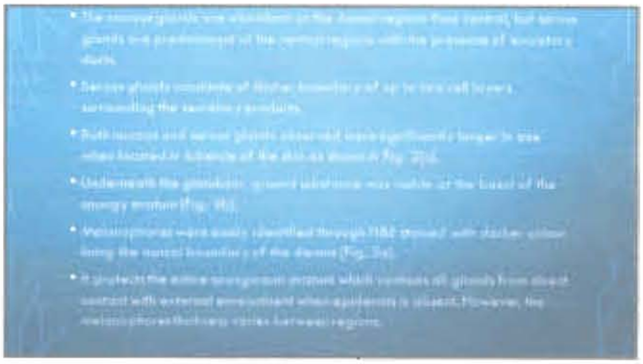


RESULTS: MICROHABITAT SELECTION OF MEGOPHRYS NASUTA


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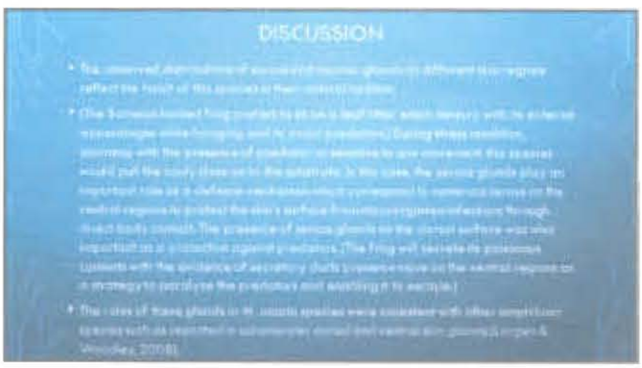
DISCUSSION

CONCLUSION

REFERENCES

ACKNOWLEDGMENTS

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THANK YOU

MARIUS JOSCHA

THE ADVANCEMENT OF CAMERA TRAPPING TECHNIQUE IN UNDERSTANDING WILDLIFE ECOLOGY IN SARAWAK

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INTRODUCTION

- Pioneered by George Shiras who started before 1896 (Brower 2008), Frank Chapman (1903) and Frederick Walter Champion (1927) to photograph rare and elusive animals with
- Camera trapping (CT) proven to be one of the strongest tools for researchers while posing little to no disturbance to the animals (Ancrenaz et al. 2012).

Credit: Champion Family Archive

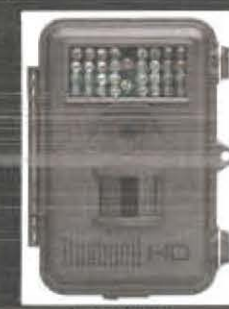
EARLY TIMES (1890)

- Image often grainy, sometimes surprisingly sharp
- Film roll
- Flashpowder
- Elaborate trigger mechanism

Shiras 1906

MODERN (1990)

- Up to 12 Megapixel digital images
- Can take up to 3 photos at once, video mode
- Large memory
- Infrared-, Motion-, or Light-sensor
- Records parameters



Source: Bushnell

PHOTOS – WHAT ARE THEY GOOD FOR?

- Recreation
- Scouting for game animals

- Local abundance analysis (Royle 2004)
- Corridor analysis (McRae & Kavanagh 2011; Brodie et al., 2014)
- Occurrence and occupancy analysis (MacKenzie et al. 2006)
- Spatial partial identity model (Augustine et al., 2016)
- Activity patterns (Mohd-Azlan & Sharma, 2006)

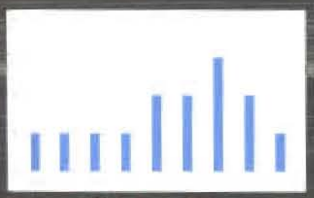
MATERIALS AND METHODS

- Data was collected from 1) published studies and unpublished reports that includes 2) news paper articles, 3) thesis and 4) government reports that involved camera trapping as at least one of their methods of data collection.

- Information were obtained from Google Scholar® and web of science, ISI, etc.

RESULTS

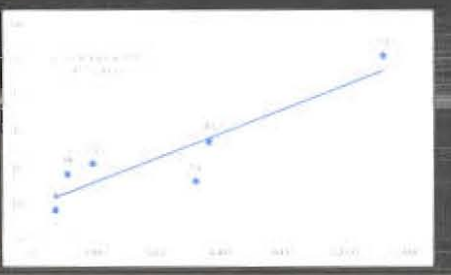
- 15 Journals + 2 reports ~ 10 years (2006 to 2016)



Number of CT-studies published per year

Evaluating Multispecies Landscape Connectivity in a Threatened Tropical Mammal Community

NUMBER OF DETECTED SPECIES CORRELATING WITH CAMERA TRAP DAY EFFORT



SATELLITE IMAGE OF SARAWAK SHOWING LOCATIONS OF THE REVIEWED STUDIES THAT INVOLVED CAMERA TRAPPING

- TPA: 8
- Non-TPA: 10

VIDEO MODE CAN PROVIDE DATA ON INTER- AND INTRASPECIFIC BEHAVIOUR, ACTIVITY PATTERN AND ECOLOGICAL INFORMATION OF UNDISTURBED ANIMALS

DISCUSSION & CONCLUSION

- Sophisticated software enables thorough insight into wildlife ecology
- Superior to human observation
- Revolutionized wildlife research

WHERE DO WE GO FROM NOW?

- Shift to less studied areas
- Arboreal camera traps

Credit: Nature TTL

REFERENCES

THAQIFAH SYAZA BT. JAIL

INFLUENCES OF HUMAN ACTIVITIES ON MALAY CIVET'S (*Viverra tangalunga*) OCCUPANCY IN SARAWAK

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INTRODUCTION

- Increasing demands for land, agriculture and resources has caused depletion of virgin forests in Borneo (Gaveau et al., 2014)
- In 2015, intact forest areas plunged to approximately 1.7 mil. ha compared to logged forests of approximately 5 mil. ha (Gaveau et al., 2016).
- In attempt to thwart the shrinkage of forested landscape, gazettements of protected areas has increased over the years (Mathai et al., 2010).
- Protected areas were then publicize as tourism attractions for country's socio-economic growths though species existence remains scarce within these areas.

SPECIES BACKGROUND

- Ground-dwelling Carnivora species.
- Classified as least concern by IUCN.
- Wide geographic distribution and occurs in many protected areas.
- Past studies suggests high densities, large and stable population.
- Among the most recorded terrestrial carnivore using camera traps (Duckworth et al., 2016).

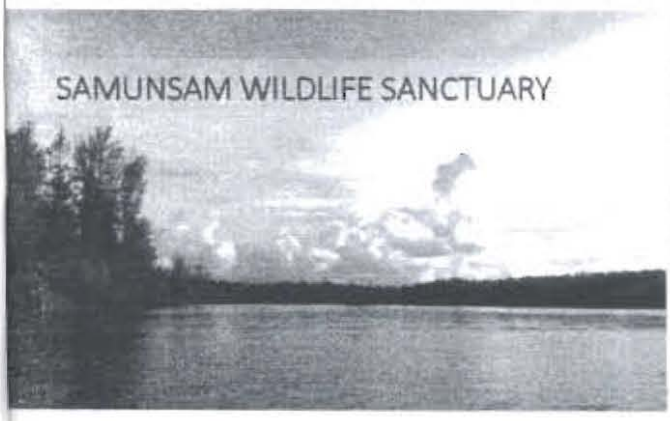
MATERIALS AND METHODS

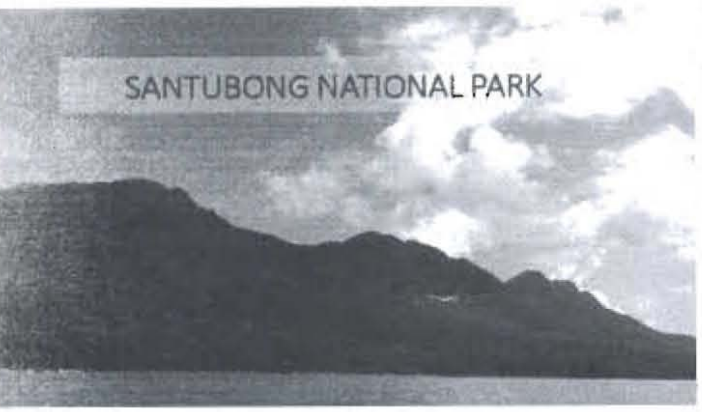
Field Techniques

- Camera trapping (Camtrakker & Bushnell Trophy Cam) in Samunsam Wildlife Sanctuary, Gunung Gading National Park, Santubong National Park, Lanjak Entimau Wildlife Sanctuary, Pelagus National Park & Sungai Maliuang National Park.
- Mounted approximately 30-40cm above ground.
- GPS coordinates for each camera sites recorded.

Data Analysis

- ReNamer, DataOrganize, DataAnalyze
- PRESENCE software (ver. 11.8)
- RStudio (ver. 1.0.143)
- QGIS (ver. 2.18.7)

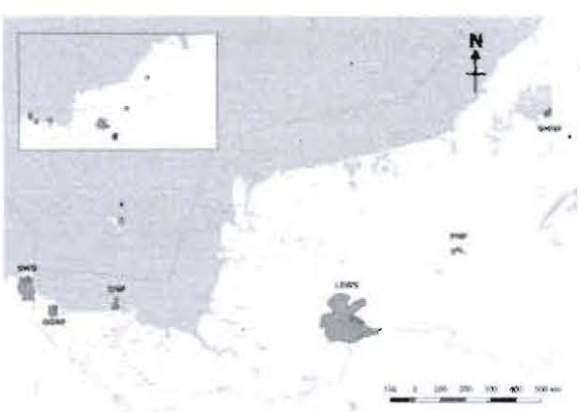




MATERIALS AND METHODS

Protected Areas Classifications Based On Human Activities

LEVELS	PROTECTED AREAS	DESCRIPTIONS
LOW	Samunsam Wildlife Sanctuary	Locations that are restricted and inaccessible to the public.
	Lanjak Entimau Wildlife Sanctuary	
MEDIUM	Pelagus National Park	Open yet difficult to access by the public due to the remoteness of the location with no facilities or infrastructures available.
	Sungai Meluang National Park	
HIGH	Gunung Gading National Park	Locations that are open and easily accessed by the public for tourism and recreation.
	Santubong National Park	



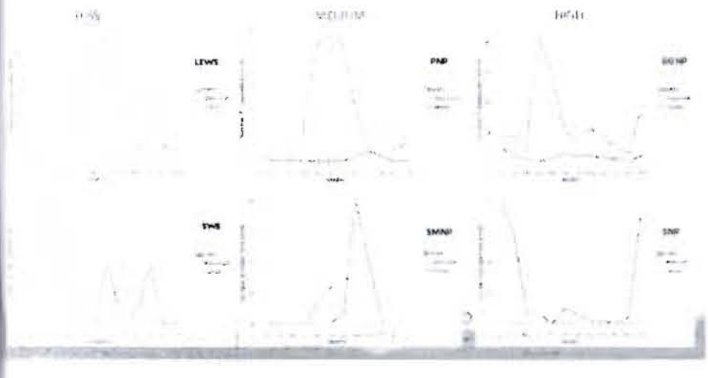
CAMERA TRAPS DISTRIBUTION WITHIN PROTECTED AREAS IN SARAWAK

RESULTS & DISCUSSION

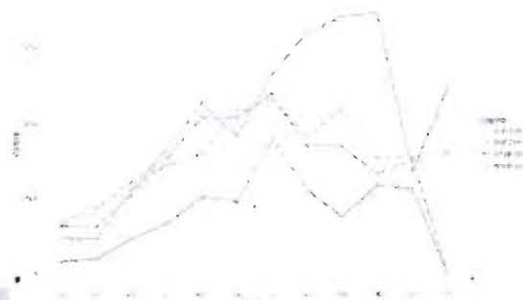
RESULTS & DISCUSSION

Protected areas	Occupancy estimate (ψ)	Detection estimate (p)
LEWS (n= 27)	0.684	0.093
SWS (n= 7)	0.604	0.069
PNP (n= 98)	0.748	0.242
SMNP (n= 24)	0.863	0.123
GGNP (n= 156)	0.685	0.262
SNP (n= 0)	NA	NA

Viverra tangalunga vs *Homo sapiens*



Visitors Records In SNP and GGNP (2015 & 2016)



CONCLUSION

- Malay Civet occurrences decreased with the increased of human activities
- Absence in SNP may due to the intensity of human activities dated back to the 5th century and insular nature of the Mount Santubong landscape.
- Environmental risks resulted from human activities should be assessed and minimized to ensure the health of the forest ecosystem.
- The carrying capacity of a protected area in Sarawak needs to be identified and properly managed in order to ensure the protection and sustenance of species survival.

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