

Project Update: January 2019

Project Site

The scientific research on feeding activity of insectivorous bats has been taken intensively in the southern part of Bhutan in two districts, Dagana and Tsirang. The area is in 27.0323 latitude and 89.8879 longitude; 27.0322 latitude and 90.187 longitude respectively.

In this area, vegetation coverage is dominated by broadleaved forest and terrains of agricultural land such as cornfield in summer and paddy in autumn season with citrus orchards as the main cash crops. More importantly, patches of forests are found in and around the agricultural landscapes which can be classified as remnant forest and test the activity of bats to work towards the conservation.

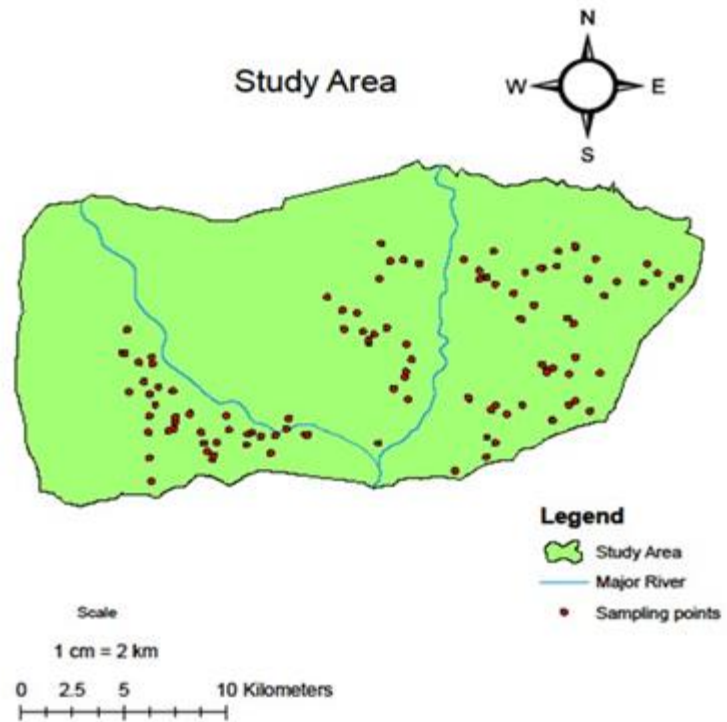


Figure 1: Study area.

Fieldwork.

The activity of the insectivorous bats was monitored acoustically by using Petterson D 240x detector with H2n microphone from sunset to sunrise. Bat detector was set at least of 1.5 – 2 m raised above the ground with the improvised materials and minimum of 50 m away from the edge of a sampling habitat. Intensive research was conducted after the stratification of micro-habitats from forest and the

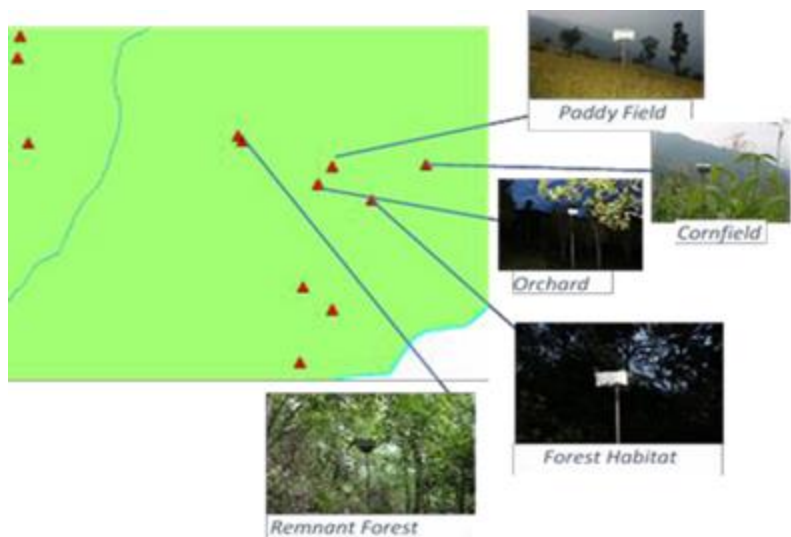


Figure2: Classification of Micro-Habitats

agricultural landscapes. However, acoustic sampling was avoided in unfavorable weather conditions and full moon nights to overcome biases. Overall, 120 sampling points were covered successfully, though some were resampled due to technical problems and sudden changes in weather conditions, especially in summer season. Thus, from my acoustic samplings, I have predicted not less than 15 different species ranging from the family of Emballonuridae, Rhinolophidae, Hipposideridae, and Vespertilionidae (details in final publication). However, I have some unknown species due to the lack of library calls for the identification of species.

Prey Availability.

Prey availability was monitored by using light and suction trapping methods. The collected insects were classified to order level of taxonomy and estimated relative abundance based on total biomass from each sampled micro-habitat following Wheeler, et al. 2001. The phylogeny of the extended hexapod orders, Cladistics 17:113-113, (details in the publication). The insect trapping was set at least for 3-4 hrs from sunset in the sampling nights from different micro-habitats.



Figure 3: Light and suction trapping

Call reference establishment.

For the establishment of my own call references, I used both mist nets and harp traps across trails or rivers for capturing. Bat species were identified using external morphological characteristics following Bates and Harrison (1997) 'Indian Subcontinent Horizon Zoological Museum'. After the morphological examination and measurement, the captured species were recorded their calls by using the bat detectors in the mode of heterodyne with the time expansion of 1.7sec. The calls were further analyzed using Bat Sound Pro 4.2.1 (Petterson Electronics and Acoustic AB) in laptop computer by following Kalko and Schnitzler, 1989; Ahlen (1981, 1989, 1990), Limpens and Roschen, 1995. However, the frequency measurement of different parameters will be reported in the final publication in details.

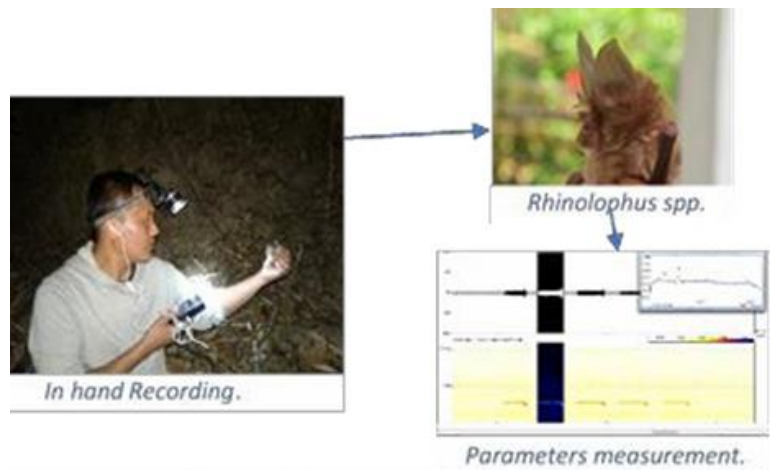


Figure 4: Recording and analysis of the calls

Future Plan

Data analysis.

Based on my raw data, statistical analysis will be carried out by using RStudio programme with an appropriate model (GLM) to compare variables such as micro-habitats, bat passes, seasonal activities of insectivorous bats, and many more.

In conclusion, with findings of my research work, I am going to write a manuscript for the publication and the thesis to be submitted in fulfillment of the requirements for the degree of Master of Science in Biology (International program).

Acknowledgement.

I have successfully completed my data collection with due support and guidance from my advisor, Asst. Professor, Dr. Sara Bumrungsri, PSU, Thailand, and referees Dr. Pipat Soisook, Researcher, Curator of mammals, Prince of Maha Chakri Sirindhorn Natural History Museum, PSU, Thailand; Associate Lecturer, Mr. Sangay Tshering, College of Natural Resources, MoE, and Program Director of UWICER, Mr. Kuenzang Dorji, Bhutan. Moreover, I would like to extend my heartfelt gratitude for financial support from Rufford Small Grant (www.rufford.org), without which I would not have been achieved my research work as per the scheduled framework.

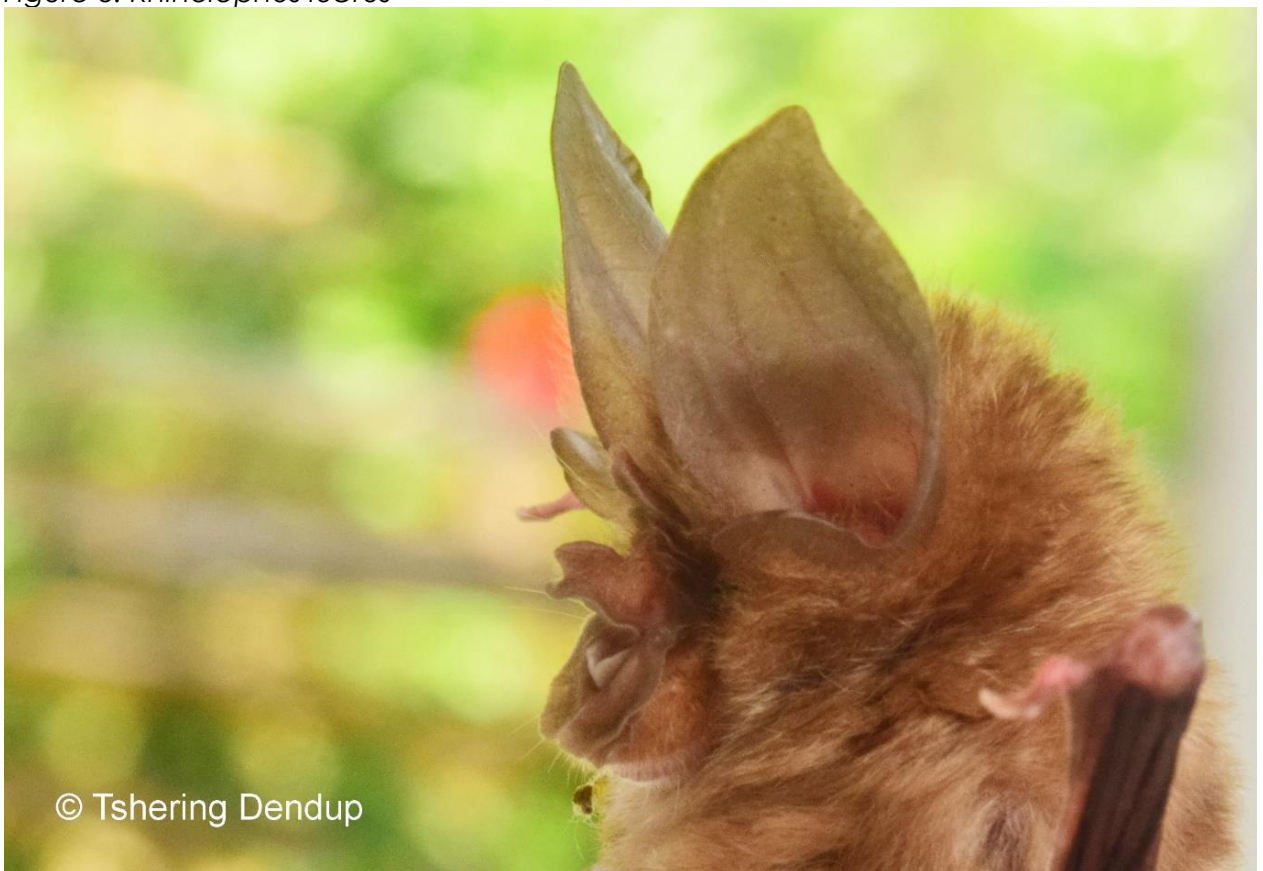


Figure 5: Roosting place of *Hipposideros* spp.



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Figure 6: *Rhinolophus luctus*



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Figure 7: *Rhinolophus macrotis*