

**FIRST RECORDS OF BATS (Mammalia: Chiroptera) FROM SON LA CITY,
NORTHWESTERN VIETNAM, WITH REMARKS ON THEIR
CONSERVATION STATUS**

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Received 19 May 2019, accepted 20 August 2019

ABSTRACT

Son La is a well-known city in the Northwestern region of Vietnam for its outstanding landscapes. It contains a variety of ecosystems ranging from farming area, valleys, forests on hills and karst with cave systems. Natural habitats of the city would be suitable for many bat species. However, bats of the city were not included in any literature. Between March 2014 and June 2018, we conducted a series of bat surveys in this city using mist nets and harp traps. Results from our study indicated that Son La city is a home to at least 21 bat species belonging to 9 genera, 6 families. Of which, *Rhinolophus thomasi* was listed as “VU” (Vulnerable) in the 2007 Red Book of Vietnam and *Myotis annamiticus* was listed in the IUCN Redlist of the Threatened Species as “DD” (Data Deficient). This paper provides the first data on bats of Son La city with morphological measurements and conservation status of each recorded species.

Keywords: Biodiversity, conservation, mammal, northwestern Vietnam.

Citation: Dao Nhan Loi, 2019. First records of bats (Mammalia: Chiroptera) from Son La city, Northwestern Vietnam, with remarks on their conservation status. *Academia Journal of Biology*, 41(3): 123–127. <https://doi.org/10.15625/2615-0923/v41n3.13791>.

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INTRODUCTION

Son La city, the capital of Son La Province, is one of the most important sites within the northwestern region of Vietnam for both nature conservation and socio-economic development. The first assessment of mammal diversity from the province was published by Tran Hong Viet et al. (2007a) which included records of 35 bat species belonging to 18 genera, 8 families. However, taxonomic status of several species were recently changed while some species were unconfirmed. Dao Nhan Loi (2017) provided an assessment of bat diversity of Son La province with records of 43 bat species belonging to 19 genera, 5 families. This updated assessment comprises original data from field surveys and information from previously published records of bats from Thuan Chau district (13 species, 9 genera, 5 families), Quynh Nhai (13 species, 9 genera, 4 families), Moc Chau (10 species, 7 genera, 4 families), Yen Chau (13 species, 8 genera, 6 families), Muong Do and Phu Yen (37 species, 18 genera, 8 families) (Tran Hong Viet et al. 2006a, 2006b, 2006c, 2006d; Tran Hong Hai et al. 2010). The above results indicated that Son La province is a hotspot in Vietnam for bat research and conservation. However, the previous mammal surveys were only carried out in protected areas and districts of the province. Bats and other animals of many areas including the Son La city had not received attention from scientist by 2013. Between 2014 and 2018, the author conducted field surveys throughout the habitats of the city and obtained the first data of bats of the Son La city. Many species, which were nationally rare but commonly recorded in Son La city. It is likely that the city contains important remaining habitats for bat species. This paper provides current information regarding diversity, distribution and conservation status of each bat species at the city.

MATERIALS AND METHODS

Field surveys were carried out during 109 days at seven selected communes of the Son La city: Chieng Sinh, Chieng Coi, Quyet Tam, Chieng Ngan wards, Chieng Xom, Chieng

An, Hua La communes (Fig. 1). Bats were captured using mist nets in different sizes (10.0 m x 2.5 m; 12.0 m x 3.0 m; 7.0 m x 2.5 m) and harp traps. The nets and traps were set up under forest canopy, cave entrances, above the water bodies (streams and lakes) and other habitats. The nets were open from 5:30 pm to around 11:00 pm. The traps were often placed across trails in the forest, cave doors or trails under forest canopy. A total of 142 individuals were captured over the surveys. The following morphological measurements of every captured individuals were taken in the field for rapid identification: forearm length (FA), ear height (EH), Tibia length (TIB), hind foot length (HF), tail length (T). These measurements were illustrated in Bates & Harison (1997). Pregnant or lactating females were released immediately after quick taking of the above measurements. Selected individuals were kept as specimens which are preserved at Faculty of Agriculture and Forestry, Tay Bac University, Son La city, and the Institute of Ecology and Biological Resources, VAST, Ha Noi.

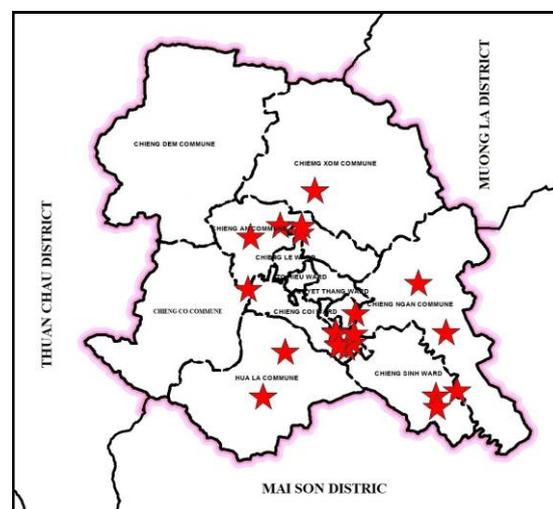


Figure 1. Study sites within the Son La city

Representatives of each species was kept as voucher specimen for craniodental characteristics to confirm their taxonomic status. All voucher specimens were identified with reference to the publications related to

the bat fauna of Vietnam (Corbet & Hill 1992; Brissenko & Kruskov 2003; Csorba et al. 2003; Kruskop 2013).

RESULTS AND DISCUSSION

Results from the surveys suggested that the Son La city is home to at least 21 bat species belonging to 9 genera, 6 families (table 1). Of which, 2 species are listed in the

2007 Red Data Book of Vietnam: *Rhulophus thomasi* and *Myotis siligorensis*. Almost all remaining species are listed as LC (Least concern) in the current IUCN Red List of the Threatened Species except *Myotis annamiticus* which is listed as DD (data deficient) and an unassessed species (*Tylonycteris fulvida*).

Table 1. Diversity and conservation status of bat species recorded from Son La city

Scientific name	English name	Vietnamese name	Conservation status	
			IUCN	VNRB
Pteropodidae	Old World fruit bats	Họ dơi quả		
<i>Megaerops niphanae</i>	Ratanaworabhan's Fruit Bat	Dơi quả không đuôi lớn	LC	
Emballonuridae	Emballonurids	Họ dơi bao đuôi		
<i>Taphozous melanopogon</i>	Black - bearded tomb bat	Dơi bao đuôi nâu đen	LC	
Hipposideridae	Old - World leaf-nosed bats	Họ dơi nếp mũi		
<i>Asellicus stoliczkanus</i>	Stoliczka's trident bat	Dơi mũi ba lá		
<i>Hipposideros larvatus</i>	Horsfield's leaf-nosed bat	Dơi mũi xám	LC	
<i>Hipposideros pomona</i>	Andersen's leaf-nosed bat	Dơi nếp mũi xinh	LC	
Miniopteridae	Bent-winged bats	Họ dơi cánh dài		
<i>Miniopterus fuliginosus</i>	Eastern bent-winged bat	Dơi gập cánh dài		
Rhinolophidae	Horseshoe bats	Họ dơi lá mũi		
<i>Rhinolophus affinis</i>	Intermediate horseshoe bat	Dơi lá đuôi	LC	
<i>Rhinolophus siamensis</i>	Thai Horseshoe Bat	Dơi lá mũi thái lan		
<i>Rhinolophus malayanus</i>	Malayan horseshoe bat	Dơi lá mã lai	LC	
<i>Rhinolophus marshalli</i>	Marshall's horseshoe bat	Dơi lá rẽ quạt	LC	
<i>Rhinolophus microglobosus</i>	Indo-Chinese brown horseshoe bat	Dơi lá mũi bắc	LC	
<i>Rhinolophus pearsonii</i>	Pearson's horseshoe bat	Dơi lá pec-xôn	LC	
<i>Rhinolophus pusillus</i>	Least horseshoe bat	Dơi lá muỗi	LC	
<i>Rhinolophus thomasi</i>	Thomas's horseshoe bat	Dơi lá tô - ma	LC	VU
Vespertilionidae	Vesper bat	Họ dơi muỗi		
<i>Myotis annamiticus</i>	Annamite myotis	Dơi tai việt nam	DD	
<i>Myotis hasseltii</i>	Lesser Large-footed Myotis	Dơi tai hat-xen	LC	
<i>Myotis horsfieldii</i>	Horsfield's Myotis	Dơi tai cánh ngắn	LC	
<i>Myotis laniger</i>	Chinese Water Myotis	Dơi tai trung hoa	LC	
<i>Myotis siligorensis</i>	Himalayan whiskered bat	Dơi tai sọ cao	LC	LR
<i>Pipistrellus abramus</i>	Japanese pipistrelle	Dơi muỗi sọ dẹt	LC	
<i>Tylonycteris fulvida</i>	Amber Bamboo Bat	Dơi ống tre	N/A	

Notes: VNRB: The 2007 Red Data Book of Vietnam; IUCN: IUCN Red List of the Threatened Species (<http://www.iucnredlist.org>).

Of the recorded bat families, Rhinolophidae comprises the highest species number which accounts for 38.10% of the

total known species (table 2). Four species were commonly recorded at almost all study sites (*Rhinolophus thomasi*, *R. siamensis*, *R.*

affinis) while four remaining ones were locally rare (*R. malayanus*, *R. marshalli*, *R. pearsonii*, *R. pusillus*). Vespertilionidae consists of 7 species, accounting for 33.3% of all known species from the study area (table 2). Of which, *Myotis hordfieldii*, *Pipistrellus abramus* were quite common throughout the city while three species (*Tylonycteris fulvida*, *Myotis siligorensis*, *M. hasseltii*) were rarely recorded.

Among the remaining families, Hipposideridae consists of quite common species but three other families (Pteropodidae, Emballonuridae, and Miniopteridae) were uncommon and less diverse (table 2).

Morphological measurements of every captured species are given in the table 3.

Table 2. Bat species composition from the study area

Family name	Genera		Species	
	n	%	n	%
Pteropodidae	1	11.11	1	4.76
Emballonuridae	1	11.11	1	4.76
Hipposideridae	2	22.22	3	14.29
Miniopteridae	1	11.11	1	4.76
Rhinolophidae	1	11.11	8	38.10
Vespertilionidae	3	33.33	7	33.33
Total	9	100.00	21	100.00

Table 3. External measurements of bat species from the study area

Species	n	External measurements				
		FA	EH	TIB	HF	T
<i>Megaerops niphanae</i>	3	59,27 ± 2,53 56,43 – 61,28	17,07 ± 0,76 16,47 – 17,92	23,69 ± 1,25 22,27 – 24,63	10,00 ± 0,37 9,73 – 10,42	
<i>Taphozous melanopogon</i>	21	66,33 ± 1,38 64,15 – 68,40	14,23 ± 0,91 13,00 – 17,51	25,31 ± 0,66 24,20 – 26,71	12,50 ± 0,30 12,02 – 13,07	27,14 ± 1,81 22,24 – 30,10
<i>Aselliscus stoliczkanus</i>	12	43,21 ± 0,93 41,52 – 44,73	11,88 ± 0,71 11,14 – 13,66	19,83 ± 0,85 18,45 – 21,24	7,27 ± 0,39 6,69 – 7,97	36,20 – 3,10 29,94 – 40,38
<i>Hipposideros lavatus</i>	15	59,22 ± 1,77 54,92 – 61,78	22,25 ± 2,42 18,38 – 27,55	24,64 ± 1,20 22,58 – 26,78	10,28 ± 0,86 9,35 – 11,63	35,63 ± 2,33 31,67 – 39,66
<i>H. pomona</i>	18	42,51 ± 1,08 40,82 – 45,51	21,94 ± 2,47 15,10 – 25,83	19,70 ± 1,66 18,03 – 24,73	7,66 ± 0,59 6,67 – 8,89	31,36 ± 4,93 17,67 – 35,89
<i>Miniopterus fuliginosus</i>	7	49,99 ± 0,83 49,07 – 51,37	12,13 ± 1,24 10,18 – 13,35	20,89 ± 0,51 20,21 – 21,54	10,40 ± 0,54 9,22 – 10,69	57,68 ± 3,24 53,18 – 61,13
<i>Rhinolophus affinis</i>	5	53,39 ± 0,56 52,91 – 53,84	19,69 – 2,84 16,65 – 23,43	25,40 ± 0,69 24,59 – 26,17	11,31 ± 0,35 11,03 – 11,89	26,15 ± 2,15 22,56 – 28,30
<i>R. siamensis</i>	11	39,40 ± 0,99 37,52 – 40,43	22,35 ± 2,54 20,18 – 29,69	15,63 ± 1,61 11,00 – 17,01	7,25 ± 0,39 6,80 – 7,93	17,53 ± 3,41 11,02 – 21,53
<i>R. malayanus</i>	1	45,89	15,14	17,42	7,42	22,83
<i>R. marshalli</i>	1	46,51	25,88	20,00	8,19	22,15
<i>R. microglobosus</i>	4	45,60 ± 1,33 43,66 – 46,70	16,90 ± 2,19 14,16 – 19,36	2,18 ± 1,41 20,95 – 23,72	9,91 ± 1,44 8,24 – 10,78	18,75 ± 1,10 17,73 – 19,91
<i>R. pearsonii</i>	1	53,95	27,66	25,84	11,30	18,95
<i>R. pusillus</i>	1	37,76	16,38	16,62	5,77	18,19
<i>R. thomasi</i>	7	44,44 ± 1,64 41,13 – 46,08	17,37 ± 2,31 14,49 – 20,34	18,60 ± 0,56 17,90 – 19,52	7,86 ± 0,71 7,05 – 8,05	22,31 ± 2,02 20,04 – 25,86
<i>Myotis annamiticus</i>	3	35,55 ± 1,63 33,76 – 36,95	12,76 ± 1,13 11,70 – 13,95	13,97 ± 1,16 12,98 – 15,25	7,59 ± 1,44 6,68 – 9,25	35,52 ± 1,02 34,67 – 36,65
<i>M. hasseltii</i>	1	35,55	12,7	13,82	7,48	38,72
<i>M. hordfieldii</i>	16	35,02 ± 1,43 31,62 – 37,75	13,88 ± 1,72 10,54 – 15,83	13,98 ± 1,48 10,91 – 15,95	8,54 ± 1,29 6,05 – 10,42	36,98 ± 3,13 27,60 – 39,98
<i>M. laniger</i>	4	35,04 ± 0,63 34,36 – 35,67	14,40 ± 0,87 13,30 – 15,16	15,06 ± 0,43 14,49 – 15,51	8,17 ± 0,48 7,58 – 8,69	
<i>M. siligorensis</i>	2	33,98 – 34,43	8,94 – 11,68	13,50 – 13,68	6,03 – 7,23	31,85 – 41,43
<i>Pipistrellus abramus</i>	7	31,86 ± 1,07 30,41 – 33,07	9,69 ± 0,98 8,50 – 11,13	12,20 ± 0,90 10,60 – 12,97	6,36 ± 0,43 5,74 – 7,13	32,46 ± 2,80 30,10 – 37,60
<i>Tylonycteris fulvida</i>	2	25,15 – 25,68	7,86 – 7,91	11,28 – 11,90	5,65 – 5,77	26,67 – 26,69

Notes: Values are given as mean ± SD, minimum-maximum. Abbreviations are defined in the “Material and Methods”; n = sample size.

CONCLUSION

The Son La city is home to at least 21 bat species belonging to 9 genera, 6 families. Of which, two species (*Rhinolophus thomasi* and *Myotis siligorensis*) are listed in the 2007 Red Data Book of Vietnam; 16 species are listed as “Least Concern” in the current IUCN Red List of the Threatened Species (IUCN). *Myotis annamiticus*, which is listed as DD in IUCN, was also recorded from different study sites of Son La city.

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