



Title	Species Composition of Bats in Patheingyi Township
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## Species Composition of bats in Patheingyi Township

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### Abstract

This present study was conducted in Patheingyi Township from June 2010 to May 2011. Ten caves were surveyed and a total of 11 species, three Megabat species and eight Microbat species were identified and recorded. They belonged to five families and distributed among six genera. Out of the 11 species, *Rousettus leschenaulti*, *Cynopterus brachyotis* and *C. sphinx* are Megabats; and *Hipposideros larvatus*, *H. pomona*, *H. lylei*, *Rhinolophus coelophyllus*, *R. malayanus*, *R. pusillus*, *Megaderma spasma* and *Taphozous melanopogon* are Microbats. Of these, *H. lylei* and *R. coelophyllus*, are previously not recorded and they are new record in this study area. The result of survey revealed that bat population was large and the species diversity was large.

### Introduction

Bats are one of the most fascinating mammals in the world. Bats are among the most diverse and widely distributed group of mammals and it is known that ~~they are~~ found on all continents, except Antarctica (Hringham 1996). They are the second largest mammalian order, after the rodents. The most recent total of mammals recognized 1116 species of bats world wide (Achanya and Ruedas, 2007).

Taxonomic studies of Southeast Asian bats began modestly in the mid-eighteenth century, with nine species described by 1800. The nineteenth century, witnessed the most dramatic increase in species discoveries, leveling off somewhat during the first half of the twentieth century. Of note is the increase in rate of discovery in the last few decades, indicating that true species richness may be substantially higher than the currently recognized 330 species. The description of 14 species in the last 7 years reflects renewed survey effort in the region (Bats *et al.* 2000; Hendrichsen *et al.* 2001; Matveev 2005) and multifaceted survey approaches that employ a range of trapping techniques including mist nets harp traps, tunnel traps (Sedlock 2001; Kingston *et al.* 2003)

Bats spend over half their lives in roosts (Kunz 1982). Roosts provide shelter from the environment and predators, and secure place to mate, rear young, and interact with other individuals (Kunz 1982). Caves are particularly attractive roost sites for many species because of their size, permanency and the stable microclimates they provide, and many species are highly dependent upon caves for roosting and form large aggregations. Large complex cave system with an array of light and microclimate conditions and consequently harbor a great diversity of species. At least 12 species are known from Gomantong (Sabah),

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and Deer Cave (Mulu, Sarawak), and 19 from Niah Great Cave (Sarawak), (Abdullah *et al.* 2007). Although even small caves are likely to support a few bat species, it is the complex limestone karst systems that support the greatest diversity and abundance of bats (Racey 2007, cited in Kingston 2008).

## **Materials and Methods**

### **Study area**

This study was conducted at Patheingyi Township in the Mandalay Division (21°59'28.84" N and 96°10'22.14"E). It is situated at 86m above sea level and tropical climate (Fig. 1).

### **Study period**

The study on the species composition of bats in Patheingyi Township was conducted from June 2010 to May 2011.

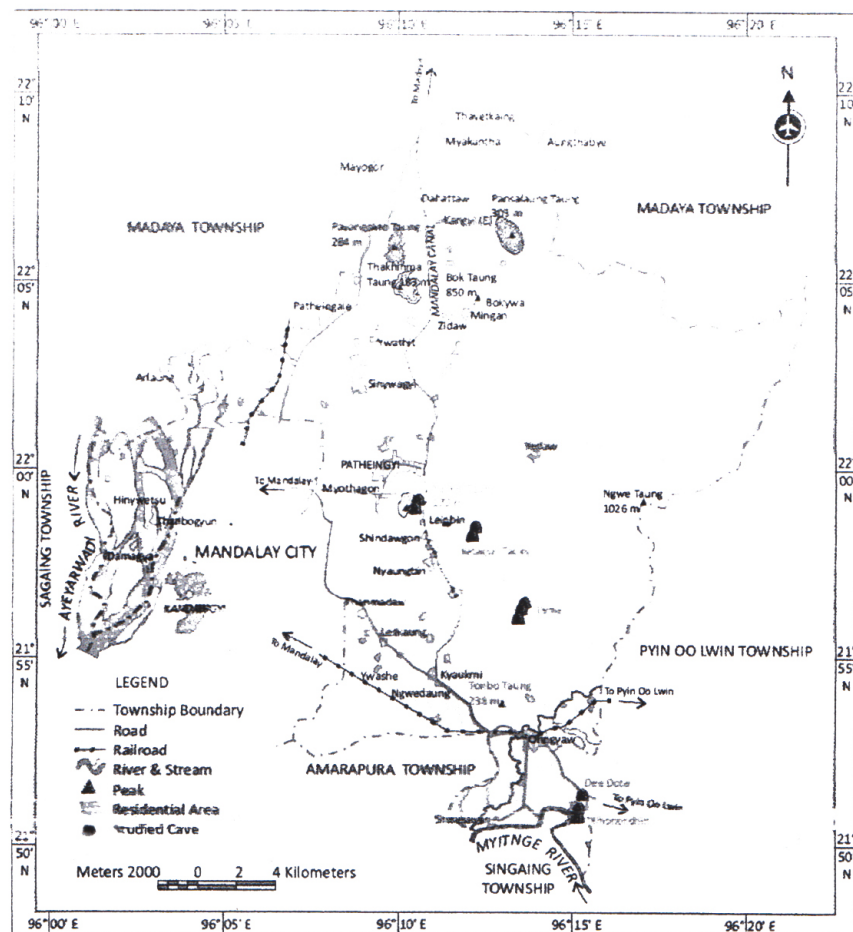
### **Capturing and measuring of the specimens**

Bats were captured within the cave by hand net and mist net. Bats were caught inside the caves during day time when they were roosting. In addition two mist nets, set at the entrance of cave before sunset, were used to trap emerging bats up to one hour after sunset. The specimens ~~were identified~~ and measured ~~individually~~ using Pesola spring balance and ~~digital caliper~~. The voucher specimens were preserved in 70% alcohol.

### **Identification**

The captured bats were photographed, measured taken morphometric parameters and identified according to Bates and Harrison (1997), Lekagal and Mc Nelly (1988). Corbet and Hill (1992), Francis CM (2008).





**Figure 1** Location map of studied caves in Pathingyi Township

Source: Department of Geography, University of Mandalay

## Results

During the study which commenced from June 2010 to May 2011, a total of 11 species of bat were recorded. These bats are confined to six genera, and two suborders namely Megachiroptera and Microchiroptera.

### Systematic Position of Recorded Species

Phylum	-	Vertebrata
Class	-	Mammalia
Order	-	Chiroptera
Suborder	-	Mega-chiroptera
Family	-	Pteropodidae
Genus	-	<i>Rousettus</i> Gray, 1821
Species (1)	-	<i>R. leschenaulti</i> (Desmarest, 1820)
Genus	-	<i>Cynopterus</i> Cuvier, F, 1824



Species (2)	-	<i>C. brachyotic</i> (Muller, 1838)
Species (3)	-	<i>C. sphinx</i> (Vahl, 1797)
Sub-order	-	Micro-chiroptera
Family	-	Hipposideridae
Genus	-	<i>Hipposideros</i> (Gray, 1831)
Species (4)	-	<i>H. larvatus</i> (Horsfield, 1823)
Species (5)	-	<i>H. pomona</i> (Anderson, 1918)
Species (6)	-	<i>H. lylei</i> (Tamas, 1913)
Family	-	Rhinolophidae
Genus	-	<i>Rhinolophus</i> (Lacepede, 1799)
Species (7)	-	<i>R. coelophyllus</i> (Peters, 1867)
Species (8)	-	<i>R. malayanus</i> Bonhole, 1903
Species (9)	-	<i>R. pusillus</i> (Termink, 1834)
Family	-	Megadermatidae
Genus	-	<i>Megaderma</i> (E. Geoffroy, 1810)
Species (10)	-	<i>M. spasma</i> (Linnaeus, 1788)
Family	-	Emballonuridae
Genus	-	<i>Taphozous</i> (E. Geoffroy, 1818)
Species (11)	-	<i>T. melanopogon</i> (Temnick, 1841)

### **Brief description of recorded species**

*Rousettus leschenaulti* (Desmarest, 1820)

Common name - Leschenault's Rousette

### **External Characters**

This is a medium sized bat with forearm length of 80 mm (75-85 mm). The ears have a notch at the lower edge. Upperparts grey-brown to Buffy-brown. Fur short and sparse except for long pale hairs on chin and neck. Third lower molar elongate about twice as long as wide. The normal coloration is also a brighter color phase with brown shades.

### **Habit and Habitat**

A single male specimen was captured by mist net near plum trees and lichees trees from Yema village, Patheingyi Township. Its diurnal roost was located in cave, Their eyes strongly flect orange in torch light. It feeds on fruits and flowers. A colony of bats approximately 50-100 individuals was found.

*Cynopterus brachyotic* Muller, 1838

Common name - Dog-faced fruit bat

**External Characters**

This is a medium sized fruit bat with an average forearm length of 60 mm (56-63 mm). Ears and wing bones edged in white colour brown to yellowish-brown with a brighter collar dark orange brown a dull males more yellowish in female. Muzzle short.

**Habit and Habitat**

A single female specimen was captured by mist net near the plum tree in the Yema village, surrounded by mangoes, orchards, lichees, bamboo, palm tree and small forest. It roosts in small group in trees, under fronds of palms and occasionally in houses and caves. A colony of bats approximately 10-30 individuals was found this area.

*Cynopterus sphinx*, Vahl, 1797

Common name - Short-nosed fruit bat

**External Characters**

A medium sized fruit bat with an average forearm length of 65.5 mm (65–76 mm). Colour is orange brown. Ears are simple and have pale outer margins. The wings arise from the flanks. The membranes are dark brown throughout, but with pale fingers on the wing. The medial part of interfemoral membranes is hairy, above and below. The muzzle is short and broad.

**Habit and Habitat**

A single male specimen was captured by mist net near plum trees from Patheingyi Township. A colony of bats approximately 10 to 50 individuals was found in plants. They were captured together with *Rousettus leschenaulti* and *Cynopterus brachyotic* in this area.

*Hipposideros larvatus* (Horsfield, 1823)

Common name Horsfield's Leaf-nosed bat

**External Characters**

This species is a medium sized bat with an average forearm length of 61mm (60.0 - 67.0 mm). The head and back have dark brown hair tips with paler hair bases. The ventral surface is lighter. Ears are broad and pointed.

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The nose leaf has three leaflets on each side of the anterior nose leaf; the posterior leaf is divided into 4 compartments by 3 vertical septa. There are two color phases, dark brown and reddish brown; under parts are smoky-grey with brown tips.

#### **Habit and Habitat**

A male and a female specimen were collected in the Watalone cave. Its surrounding is occupied by bamboo, katit, thitmar and a small forest. A colony of species containing approximately 50 individuals was found in the cave.

#### ***Hipposideros pomona* (Anderson, 1918)**

Common name - Andersens leaf-nosed bat

#### **External Characters**

This is medium small species, with an average forearm length of 40 mm (37.9–40.0 mm). Ears are large, broadly rounded off and a nose leaf without supplementary leaflets. Fur is various shades. Colour is brown, ventral side lighter than dorsal side. Each nostril is small. The wing membranes are a uniform dark brown.

#### **Habit and Habitat**

This specimen is collected by mist net in the Danathaidhti, Kabanilay and Khonanshin caves (2). These caves were surrounded by dry-forest, pagoda and rock outcrop near the cave. A colony of bats containing 200 to 500 individuals was found in the Kabanilay cave. It coexisted with *R. coelophyllus* in the Danathaidhti cave.

#### ***Hipposideros lylei* (Tomas, 1913)**

Common name - Shield-faced rounded leaf bat

#### **External Characters**

It is a medium sized species with an average forearm length of 78.5 mm (73-84) mm. Ears large and triangular, fur of upper parts golden grey to light brown. Anterior noseleaf moderately broad, rounded, with a deep notch in the middle, two lateral leafs, posterior noseleaf similar in width to anterior leaf, joined on side to anterior leaf, posterior lobes of male enlarged, pointed at tip, jointed at base and extending around sides noseleaf.

### Habit and Habitat

Roosts in limestone caves have been found in Winkabar cave (1). Cave is surrounded by agricultural land, bamboo, katit and padauck. A stream was found near the cave in the rainy season. This specimen is collected by hand net as well as mist net. It emerges from the diurnal roost at about sunset. A colony of about the bats 50 individuals was found. It coexisted with *R. pusillus* and *H. larvatus* in Winkabar cave( 1). Pregnant females were found in May, 2011.

### *Rhinolophus coelophyllus* (Peters, 1867)

Common name . - Corslet Horseshoe bat

### External Characters

It is a medium sized horseshoe bat with an average forearm length of 43.87 mm (41-45 mm). Fur typically mid-brown above Buffy-white below. Nose leaf has relatively short lancet. At sides and top to form lobes that produce forwards and enclose base of connecting process tall and broadly arched from lancet to tip of sella. Sella is roughly ~~parallel-sided~~ with a triangular tip; the connecting process begins at the upper edge of the sella and rounds backward into cavity formed by large and hood-shaped lancet.

### Habit and Habitat

This specimen is collected by hand net in Danathaidhti cave, surrounded by dry forest. A colony of about 10-30 individuals was found. It coexisted with *H. pomona*. This cave is near the Kabanilay and Winkabar caves (1).

### *Rhinolophus malayanus* (Andersen, 1905)

Common name . - Malayan Horseshoe bat

### External Characters

It is a medium small sized with an average forearm length of 38 mm ( 38-44mm). Medium small horseshoe bat with moderately large horseshoe. Connecting process rounded, joining sella just below tip to form a slight notch. Sella is moderately broad, parallel sided and squared off at top. Lancet tall and triangular upperparts usually brown with contrasting pale buff or whitish underparts; sometime overall colour is more orange brown.

### Habit and Habitat.

One individual was caught in the Dee Dode cave .A colony of about 5 to 10 individuals was found. This cave is surrounded by mixed katit, thitmar, bamboo and padauk plants. It coexisted with *Taphozous melanopogon*.



*Rhinolophus pusillus* (Terminck, 1834)

Common name - Least Horseshoe bat

**External Characters**

It is small sized with an average forearm length of 38 mm (33-40 mm). Simple noseleaf and triangular, pointed connecting process. Noseleaf small, Lancet broadly pointed, slightly concave on sides. Sella parallel sided. Colour pale brown. Ears are quite extending beyond the muzzle when laid flat.

**Habit and Habitat**

One specimen was collected from Winkabar cave (1) mixed colony of *H. lylei* in this cave. A colony of about 10 to 30 individuals was found. This area is dry forest and seasonal vegetation garden and bamboo.

*Megaderma spasma* (Linnaeus, 1758)

Common name - Lesser False Vampire bat

**External Characters**

This is a medium sized with an average forearm length of 58.2 mm (56-63 mm). Fur grey to grey-brown. Ears are very large, joined at bases. Anterior noseleaf broad, largely covering muzzle, which is not lacking fur. Tragus long, forked into two branches. No visible tail, although interfemoral membrane is very developed. The ventral surface is brownish grey.

**Habit and Habitat**

Two individuals were collected in Khunithuti cave, surrounded by small forest. A colony of about 5 to 20 individuals was observed without coexisting with in the species.

*Taphozous melanopogon* (Temminck, 1841)

Common name - Black-Bearded Tomb bat

**External Characters**

It is a medium sized species with an average forearm length of 65.57 mm (60.0- 68.0 mm). Colour of the fur dark brown to grayish brown. There is no difference between the upper and lower surfaces in colour. In males there is sometimes a large patch of long black hairs on the throat. Ears are moderate with a club shaped tragus. Tail tapering gradually to the tip and wing membrane attached at the ankle. The wings are attached to the tibiae.



### Habit and Habitat

This specimen is collected by mist net in the Khonanshin cave (1), Winkabar cave (2) and Dee Dode cave. There are located in the green forest of bamboos, Kathi, Padauk, Thitmar and other. A colony of bats that contains 20 to 30 individuals in Khonanshin (1), (20-30) individuals in Winkabar (2) and (30-50) individuals in Dee Dode cave respectively. This species is insectivorous.

**Table 1. Number of species recorded from Patheingyi Township  
(June 2010 - May 2011)**

No.	Order	Suborder	Family	Species
	Chiroptera	Megachiroptera	1 Pteropodidae	1 <i>Rousettus leschenaulti</i>
				2 <i>Cynopterus brachyotic</i>
				3 <i>Cynopterus sphinx</i>
		Microchiroptera	2 Rhinolophidae	4 <i>Rhinolophus coelophyllus</i>
				5 <i>Rhinolophus malayanus</i>
				6 <i>Rhinolophus pussillus</i>
			3 Emballonuridae	7 <i>Taphozous melanopogon</i>
			4 Megadermatidae	8 <i>Megaderma spasma</i>
			5 Hipposideridae	9 <i>Hipposideros pomona</i>
				10 <i>Hipposideros larvatus</i>
				11 <i>Hipposideros lylei</i>

**Table 2. External measurements (mm) of bat species recorded in Patheingyi Township**

No.	Species	n	Sex	FA	HB	T	TIB	HF	E	3MT	4MT	5MT
1	<i>Rousettus leschenaulti</i>	1	♀	80 (75-85)	110	0.9	37	20	18	56	52	51
2	<i>Cynopterus brachyotic</i>	1	♀	60 (56-63)	84	0.6	24	11	12	46	43	43
3	<i>Cynopterus sphinx</i>	1	♀	65.5 (65-76)	84	0.7	23	12	18	48	46	45.5
4	<i>Rhinolophus coelophyllus</i>	1	♀	43.87 (41-45)	41.9	19.72	15.5	3	15	38	37	37
5	<i>Rhinolophus malayanus</i>	1	♀	37.5 (38-44)	41.8	19.71	15.6	3.1	14	27.1	25.1	22.1
6	<i>Rhinolophus pussillus</i>	1	♀	38 (33-40)	57	19	16	0.7	16	30	30	28
7	<i>Taphozous melanopogon</i>	2 5	♀ ♂	63 (60-63)	78	18	24	9.5	19	57.5	48	37
8	<i>Megaderma spasma</i>	1	♀	58.3 (56-63)	58	-	35	15	35	43	42.5	42
9	<i>Hipposideros pomona</i>	6 3	♀ ♂	40 (38-43)	48	26	19	7	19	31	33	30
10	<i>Hipposideros larvatus</i>	3 3 1	♀ ♂ ♀	61 (51-67) 78	65	35	26	11	23	45	44	43
11	<i>Hipposideros lylei</i>	2	♂ ♀	73-84	76	48	30	16	30	58	58	54

HB = Head and body, T = Tail, HF = Hind foot, TIB = Tibia, FA = Forearm, range in prenttheses, E = Ear,

3MT = Third metacarpals, 4MT = Forth metacarpals, 5MT = Fifth metacarpals

### Discussion

In the present study a total of 11 species, three species of Megabats and eight species of Microbats, were identified and recorded. They belong to five families and distribute to six genera. Out of the 11 species, three belong to the family Pteropodidae, three to Rhinolophidae, one to Megadermatidae, one to Emballonuridae and three to Hipposideridae.

According to Bates *et al.* (2005) *Rousettus leschenaulti* was found in Mandalay. They reported that breeding period of Thailand occurred in March and August. Phillips, 1980 reported its diurnal roosts are located in caves, deserted building and disused tunnels, although occasionally, solitary males may be found in the dense foliage of large tree or palm. In this study single male *R. leschenaulti* was captured near plum tree from Yema village.

In the present study, survey on 10 caves revealed three species of megachiroptera, namely *R.leschenaulti*, *Cynopterus sphinx* and *C. brachyotic*, among these *Cynopterus sphinx* and *C. brachyotic* were from Yema village. These areas were surrounded by orchard and most of them are captured near plum trees. A colony of bats was found to be approximately 10-50 individuals. Francis (2008) recorded *C.sphinx* was found under palm, under leaves of larges epiphytic fans and occasionally near the entrance of caves, in rock crevices of under roofs. They feed on nectar and fruits. Medway (1969) cited in Bates and Harrison (1997) recorded *C.brachyotic* rooted in small groups under fronds of palms and twilight zone of caves.

Hipposideridae was recorded from the five caves under survey at Patheingyi township *H.pomona* was found in Danathaidhti Kabanilay and Khonanshin cave (2). It coexisted with *Rhinolophus coelophyllus* in the Danathaidhti cave.

*H. larvatus* was apparently abundant in Myanmar. During the present study, *H. larvatus* was found roosting by day in Watalone cave approximately 50 individuals. *H. lylei* used the Winkabar cave (1) a breeding place in May. A colony of about 50 individuals was found to be coexisted with *R.pusillus* and *H.larvatus*.

*Rhinolophus coelophyllus* was found a colony of about 10-30 individuals in Danathidhti cave. *R. pusillus* was found in Winkabar cave (1). *R. malayanus* was found in Dee Dode cave. A colony of about 10-30 individuals was found. *Tapozous melanopogon* roosts solitarily or gregariously in the wall and roof of the Winkabar cave (2). Brosset, (1962) a cited in Bates and Harrison (1997) stated that it is a highly gregarious species living in diurnal roosts which are usually located in ruins, temples and caves.



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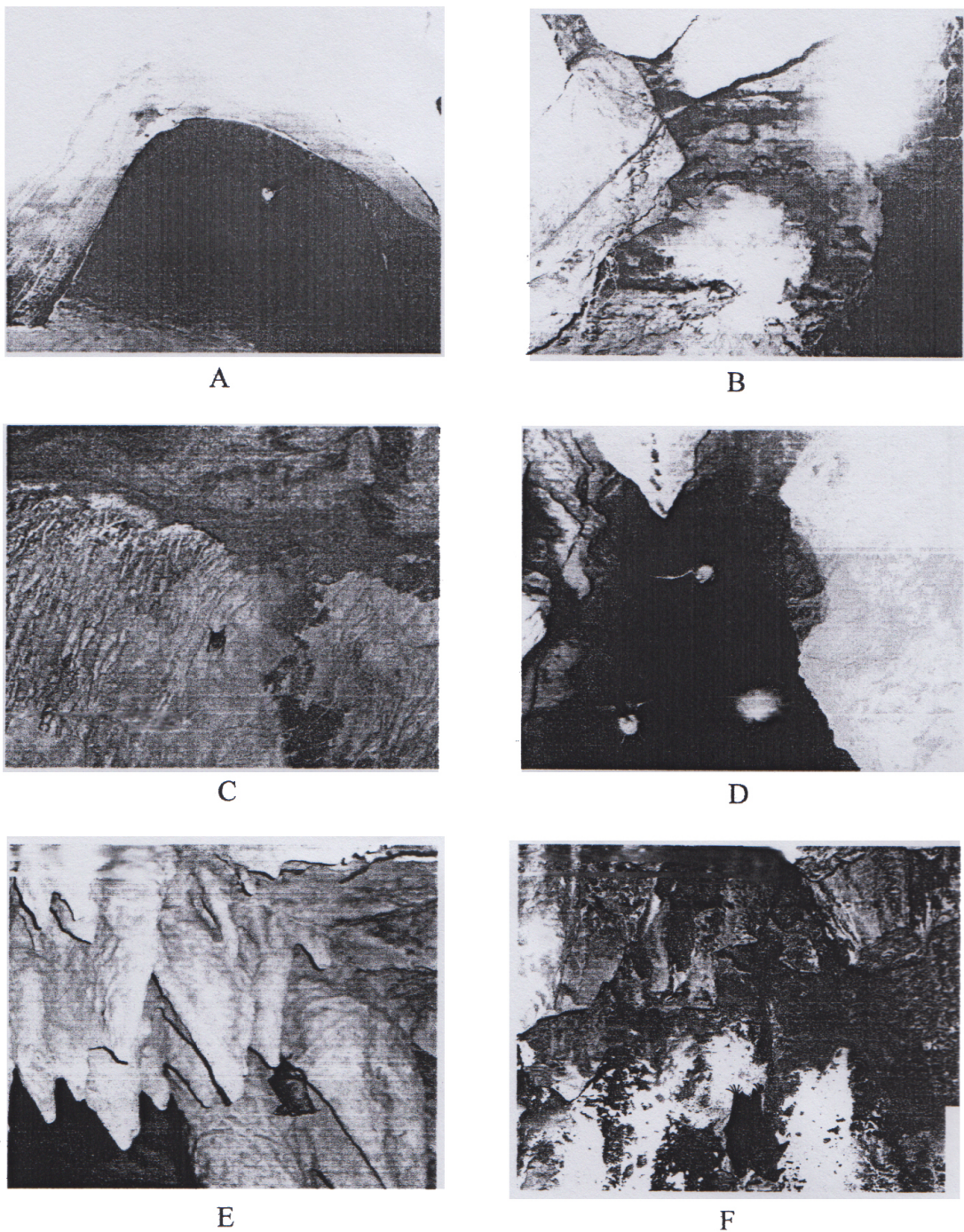


Figure 2. Flying, and roosting of bat species at Study Sites (June 2010 – May 2011)

- A. *Hipposideros lylei* (flying) at Winkabar cave (1)
- B. *Tophozous melanopogon* (roosting) at Winkabar cave (2)
- C. *Hipposideros larvatus* (roosting) at Winkabar cave (1)
- D. *Hipposideros pomona* (flying) at Kabanilay cave
- E. *Hipposideros lylei* (roosting) at Winkabar cave (1)
- F. *Megaderma spasma* (roosting) at Kaunithuti cave