

## STUDIES ON BATS OF GUJARAT

*By*

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(With one Text-Figure)

This paper is based on the collections made by the author during September-October, 1976 and deposited in the Desert Regional Station of Zoological Survey of India, Jodhpur, and earlier collections in Zoological Survey of India, Calcutta from Kutch, Junagadh, Rajkot, Banas Kantha, Ahmadabad, Sabar Kantha, Kaira, Baroda, Broach, Surat and the Dangs districts of Gujarat. Some collections from Dadra and Nagar Haveli collected by the author are also included here for the first time.

Although some stray information on taxonomy, distribution and ecology of bats of these areas is available in the work of Wroughton (1918*a, b*), Ellerman and Morrison Scott (1951), Brosset (1962*a, b, c*) and Sinha (1970, 1975 and 1980), a comprehensive account of the bats is not available. In the present account, a list of 22 species and subspecies found in Gujarat is given including one new record. As a result of this study range of several species has been considerably extended. Besides this, important measurements and ecological notes are also appended wherever desirable. All measurements are in millimetres and those in parentheses refer to the mean values. The material of Z. S. I. Calcutta is indicated by Z. S. I. in parentheses.

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### *Abbreviations*

$c-m^1$  or  $c-m^3$  length of upper tooth row;  $c-m_2$  or  $c-m_3$ , length of the lower tooth row;  $cw$ , width of braincase; D. R. St., Desert Regional Station;  $f.$ , length of forearm;  $ft.$ , length of foot including claw;  $l.$ , total length of skull;  $ml.$ , length of mandible;  $m^1-m^1$  or  $m^3-m^3$ , width of maxilla;

*t.*, length of tibia; *zw.*, zygomatic width; Z.S.I., Zoological Survey of India, Calcutta.

SYSTEMATIC ACCOUNT  
Order CHIROPTERA  
Suborder MEGACHIROPTERA  
Family PTEROPODIDAE

1. *Pteropus giganteus giganteus* (Brünnich)

1782. *Vespertilio gigantea* Brünnich, *Dyrenes Historie*, 1 : 45.

*Material* : Baroda Dist. : Baroda, 9.9.1976, 1 ♂, 1 ♀ ; Surat Dist. Sultanabad, 23.9.1976, 1 ♀ ; Dadra and Nagar Haveli.: Silvassa, 6.10.1976, 1 ♀ ; Sabar Kantha Dist. : Himatnagar, no date (Z.S.I.), 1 ♀ ; Rajkot Dist. : Rajkot, no date (Z.S.I.), 1 ♀ ;

*Measurements* : External : 1 ♂ : *f.*, 170; *t.*, 82; *ft.*, 55. 2 ♀ ♀ : *f.*, 160, 167; *t.*, 76, 77; *ft.*, 52, 55.

Skull: 1 ♂ : *l.*, 75.5; *zw.*, 41; *cw.*, 25.3; *m<sup>1</sup>-m<sup>1</sup>*, 21.6; *c-m<sup>1</sup>*, 28.1; *c-m<sub>2</sub>*, 32; *ml.*, 58.5. 1 ♀ : *l.*, 71.5; *zw.*, 37; *cw.*, 24.5; *m<sup>1</sup>-m<sup>1</sup>*, 20.3; *c-m<sup>1</sup>*, 27; *c-m<sub>2</sub>*, 31; *ml.*, 56.

*Remarks*: Hitherto known only from Kutch, Junagadh, Rajkot, Sabar-Kantha, Banas Kantha districts of Gujarat. Present material was collected from Baroda and Surat districts and Dadra and Nagal Haveli.

This large fruit bat is very common in Gujarat. It was collected from neem (*Azadirachta indica*) and tamarind (*Tamarindus indica*) trees. The size of colony was about 100-500 exs.

2. *Rousettus leschenaulti* (Desmarest)

1820. *Pteropus leschenaulti* Desmarest, *Encycl. Meth. Mammalia*, 1 : 110.

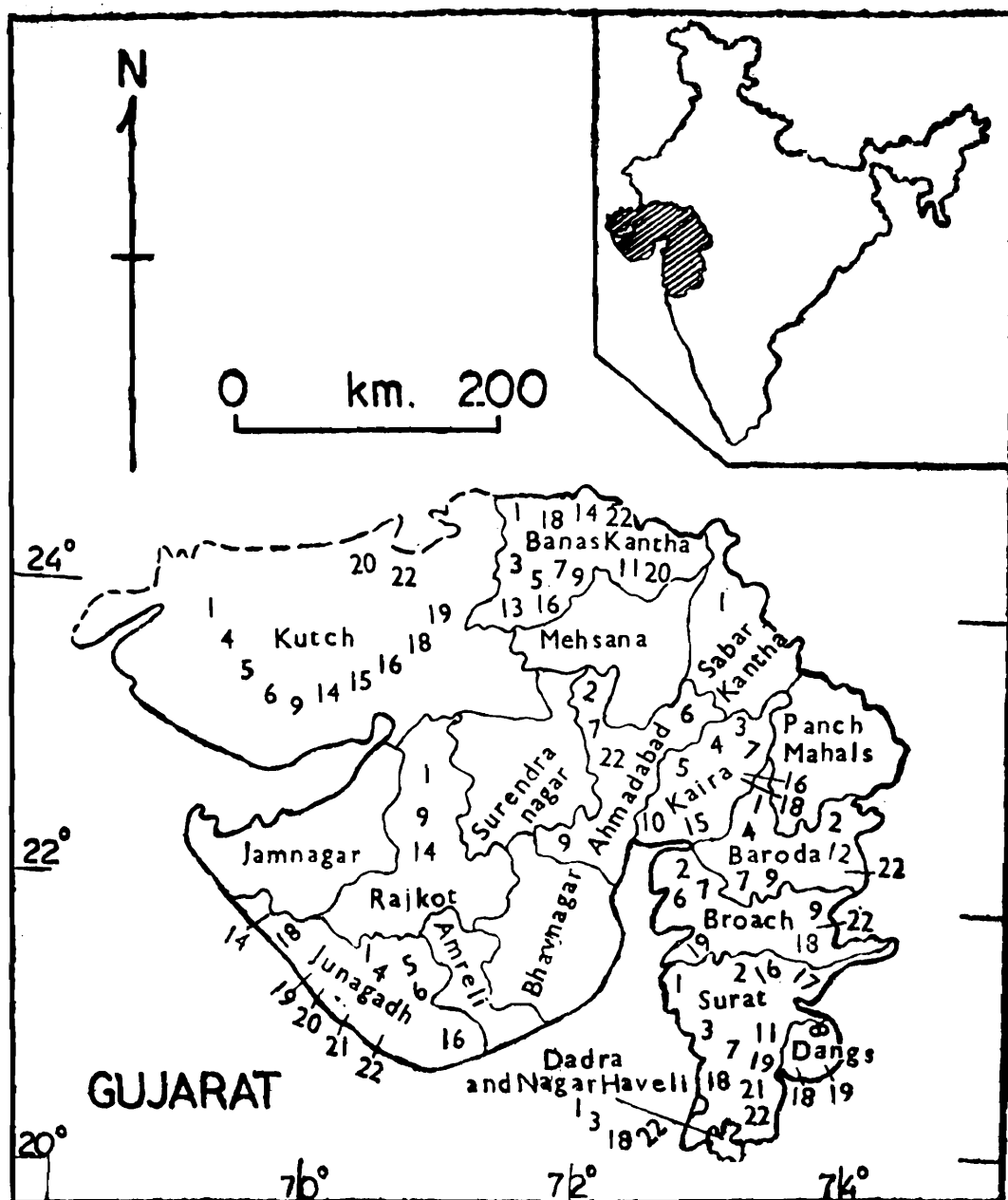
*Material*: Broach Dist. : Broach, 19.9.1976, 1 ♀

*Measurements* : External : 1 ♀ : *f.*, 80; *t.*, 37; *ft.*, 19.5.

Skull: 1 ♀ : *l.*, 36.5; *zw.*, 21.2; *cw.*, 15.5; *m<sup>1</sup>-m<sup>1</sup>*, 10.7; *c-m<sup>1</sup>*, 14; *c-m<sub>2</sub>*, 15.6; *ml.*, 28.5.

*Remarks* : Hitherto known only from Ahmadabad and Baroda districts. Present material was collected from Broach district.

This bat was collected from an old mosque. The colony size was about 40 exs. It was found in association with *Taphozous k. kachhensis*. In Surat and Baroda solitary example was seen hanging from roof of an old building but these could not be collected. A female (Broach, 19.9.1976) had single young in her arm. Brosset (1962a) found females with newly born young in March, August and October.



Text Fig. 1. Distribution of bats in Gujarat. 1. *Pteropus giganteus giganteus*. 2. *Rousettus leschenaulti*. 3. *Cynopterus sphinx sphinx*. 4. *Rhinopoma microphyllumkinneari*. 5. *Rhinopoma hardwickei hardwickei*. 6. *Taphozous perforatus perforatus*. 7. *Taphozous longimanus longimanus*. 8. *Taphozous melanopogon*. 9. *Taphozous kachhensis kachhensis*. 10. *Taphozous saecolatmus*. 11. *Megaderma lyra lyra*. 12. *Hipposideros speoris speoris*. 13. *Hipposideros galeritus brachyotus*. 14. *Hipposideros fulvus pallidus*. 15. *Tadarida aegyptiaca thomasi*. 16. *Pipistrellus mimus mimus*. 17. *Pipistrellus oromandra coromandra*. 18. *Pipistrellus dormeri dormeri*. 19. *Pipistrellus ceylonicus chrysothrix*. 20. *Pipistrellus ceylonicus subcanus*. 21. *Scotophilus kuhlii kuhlii*. 22. *Scotophilus heathi heathi*.

### 3. *Cynopterus sphinx sphinx* (Vahl)

1797. *Vespertilio sphinx* Vahl, *Skr. nat. selsk. Copenhagen.* 4(1) : 123.

1912. *Cynopterus sphinx gangeticus* Andersen, *Ann. Mag. nat. Hist.*, 6 : 623.

**Material :** Surat Dist.: Surat, 23.9.1976, 1♂; Dadra and Nagar Haveli: Silvassa, 4.10.1976, 1♂, 3♀♀, 1♀ (Young); Banas Kantha Dist.: Danta, no date (Z.S.I.), 1♂.

*Measurements* : External: 2♂♂: *f.*, 70, 74; *t.*, 28, 28; *ft.*, 16, 16.  
2♀♀: *f.*, 73, 75; *t.*, 26.5, 30; *ft.*, 15, 16.5.

Skull : 1♂: *l.*, 35; *zw.*, 22.5; *cw.*, 15; *m<sup>1</sup>-m<sup>1</sup>*, 11; *c-m<sup>1</sup>*, 12; *c-m<sub>2</sub>*, 13.5; *ml.*, 27. 1♀: *l.*, 34; *zw.*, 20.9; *cw.*, 14; *m<sup>1</sup>-m<sup>1</sup>*, 10.7; *c-m<sup>1</sup>*, 11.7; *c-m<sub>2</sub>*, 13; *ml.*, 25.5.

*Remarks* : Hitherto known only from Kaira and Banas Kantha districts. Present material was collected from Surat district and Dadra and Nagar Haveli.

The bat was found hanging solitarily from the roof of an old building in Surat; and from crown of palm tree in Silvassa concealed at the base of leaves. Brosset (1962a) states that in Gujarat it used banyan (*Ficus bengalensis*) and other *Ficus* tree where palms are not available. The colony size varies from 8-10 exs.

#### Suborder MICROCHIROPTERA

#### Family RHINOPOMATIDAE

#### 4. *Rhinopoma microphyllum kinneari* Wroughton

1912. *Rhinopoma kinneari* Wroughton, *J. Bombay nat Hist. Soc.*, 21 : 767.

*Material* : Baroda Dist.: Baroda, 13.9.1976, 40♂♂, 1; ♀ Junagadh Dist.: Junagadh, no date, (Z.S.I.), 4♂♂, 1♀

*Measurements* : External: 40♂♂: *f.*, 67-74 (70.3); *t.*, 25-30 (26.6); *ft.*, 17-19 (17.7); 1♀: *f.*, 73; *t.*, 28; *ft.*, 17.2.

Skull: 3♂♂: *l.*, 20.5-21.6 (21); *zw.*, 12.5-13 (12.2); *cw.*, 8.9-9.4 (9.2); *m<sup>3</sup>-m<sup>3</sup>*, 9.5-10 (9.7); *c-m<sup>3</sup>*, 7.7-8 (7.9); *c-m<sub>3</sub>*, 8.4-8.7 (8.5); *ml.*, 15.2-15.5 (15.3). 1♀: *l.*, 21; *zw.*, 12; *cw.*, 9; *m<sup>3</sup>-m<sup>3</sup>*, 9.1; *c-m<sup>3</sup>*, 7.5; *c-m<sub>3</sub>*, 8.5; *ml.*, 15.

*Remarks* : Hitherto known only from Kutch, Junagadh and Kaira districts. Present material was collected from Baroda.

This bat was collected from a semidark room of an old building. The size of colony was about 200 exs.

#### 5. *Rhinopoma hardwickei hardwickei* Gray

1831. *Rhinopoma hardwickei* Gray, *Zool. Misc.* (1831) : 37.

*Material* : Banas Kantha Dist.: Palanpur, no date, (Z.S.I.), 3♂♂, 5♀♀; Junagadh Dist.: Junagadh, no date, (Z.S.I.), 7♀♀.

*Measurements* : External: 10♂♂: *f.*, 57-64(61); *t.*, 26-33 (30); *ft.*, 13-17(15). 5♀♀: *f.*, 57-63(60); *t.*, 26-30 (28); *ft.*, 14-17 (16).

Skull : 10♂♂: *l.*, 17.7-20 (19); *zw.*, 11-12 (11.5); *cw.*, 8-9 (8.5);

$m^3-m^3$ , 8-9 (8.7);  $c-m^3$ , 6.1-7 (6.8);  $c-m_3$ , 7-7.9 (7.5);  $ml.$ , 12.5-14.4 (13.5).  
 2 ♀ ♀ :  $l.$ , 18, 19.5;  $zw.$ , 11, 12;  $cw.$ , 8, 9;  $m^3-m^3$ , 8, 9;  $c-m^3$ , 6.2, 7;  $c-m_3$ ,  
 7, 7.7;  $ml.$ , 12.4, 14.

*Remarks* : Hitherto known only from Kutch, Banas Kantha, Junagadh and Kaira districts of Gujarat.

I have not seen colony of this bat in Gujarat but in Rajasthan it lives in dark, deserted houses and temples and in caves and tunnel. Compared with *R. m. kinneari*, its colonies are small, not exceeding 50 exs.

### Family EMBALLONURIDAE

#### 6. *Taphozous perforatus perforatus* E. Geoffroy

1818. *Taphozous perforatus* Geoffroy, *Description de l' Egypte*, 221:6.

*Material* : Broach Dist.: Rajpipla, 17.9.1976, 1 ♂, 2 ♀ ♀ ; Rajkot Dist.: Rajkot, no date (Z.S.I.) 2 ♂ ♂, 4 ♀ ♀

*Measurements* : External: 1 ♂ :  $f.$ , 63;  $t.$ , 22.5;  $ft.$ , 12. 2 ♀ ♀ :  $f.$ , 63.2, 64.3;  $t.$ , 22.4, 22.5;  $ft.$ , 12.7, 13.2.

Skull: 1 ♂ :  $l.$ , 19.5;  $zw.$ , 12.4;  $cw.$ , 9.6;  $m^3-m^3$ , 8.7;  $c-m^3$ , 8.3;  $c-m_3$ , 9.2;  $ml.$ , 15.4; 2 ♀ ♀ :  $l.$ , 19.5, 20.2;  $zw.$ , 12.3, 12.4;  $cw.$ , 9.5, 9.6;  $m^3-m^3$ , 8.5, 8.9;  $c-m^3$ , 8.6, 9.1;  $c-m_3$ , 9.5, 9.7;  $ml.$ , 15.3, 15.3.

*Remarks* : Hitherto known only from Kutch, Junagadh and Ahmadabad districts. Present material was collected from Broach district.

In Rajpipla, Broach district, it was found in large numbers (colonies of 100-150 exs.) in ruined buildings hanging head down from roofs and walls.

#### 7. *Taphozous longimanus longimanus* Hardwicke

1835. *Taphozous longimanus* Hardwicke, *Trans. Linn. Soc.*, 14 : 525.

*Material* : Baroda Dist.: Karaili Bag, Baroda, 11.9.1976, 1 ♂, 2 ♀ ♀ ; Broach Dist.: Kariya Street, Broach, 15.9.1976, 2 ♂ ♂, 2 ♀ ♀ ; Banas Kantha Dist.: Palanpur,<sup>5</sup> no date (Z.S.I.), 5 (unsexed).

*Measurements* : External: 2 ♂ ♂ :  $f.$ , 60, 61.5;  $t.$ , 24, 26;  $ft.$ , 12.5, 13.5. 2 ♀ ♀ :  $f.$ , 59, 61.5;  $t.$ , 24.2, 25.5;  $ft.$ , 12.5, 12.6.

Skull: 2 ♂ ♂ :  $l.$ , 18.9, 20;  $zw.$ , 12.5, 12.6;  $cw.$ , 9.8, 9.9;  $m^3-m^3$ , 8.4, 9;  $c-m^3$ , 8.5, 9;  $c-m_3$ , 9.4, 9.9;  $ml.$ , 15.5, 16. 2 ♀ ♀ :  $l.$ , 19.5, 20;  $zw.$ , 12.3, 12.3;  $cw.$ , 9.5, 9.6;  $m^3-m^3$ , 8.4, 8.9;  $c-m^3$ , 8.8, 8.9;  $c-m_3$ , 9.4, 10;  $ml.$ , 15, 15.8.

**Remarks :** Hitherto known only from Ahmadabad, Kaira, Surat and Banas Kantha districts. Present material was collected from Baroda and Broach districts.

In Baroda, it was observed in September in the hot sun on the wall of a house, under overhanging tiles, hanging in the usual way with the head down. In Broach, it was found in hollows of a banyan tree. It is very active when disturbed and tries to fly away in the open or escapes into narrow passages among tiles or hollows. It was never found in association with other bats. The colonies size varies from 6-40 exs.

### 8. *Taphozous melanopogon* Temminck,

1841. *Taphozous melanopogon* Temminck, *Mon. Mamm.*, 2 : 287.

**Material :** The Dangs Dist.: Bansda, 27.9.1976, 1♂, 1♀.

**Measurements :** External: 1♂ : *f.*, 64; *t.*, 25; *ft.*, 13.1. 1♀ : *f.*, 65; *t.*, 24.6; *ft.*, 14.

**Skull:** 1♂ : *l.*, 20.7; *zw.*, 12.5; *cw.*, 9.5; *m<sup>3</sup>-m<sup>3</sup>*, 8.6; *c-m<sup>3</sup>*, 9; *c-m<sub>3</sub>*, 9.6; *ml.*, 16.4. 1♀ : *l.*, 20.5; *zw.*, 12.5; *cw.*, 10; *m-m<sup>3</sup>*, 9; *c-m<sup>3</sup>*, 8.6; *c-m<sub>3</sub>*, 9.4; *ml.*, 15.3.

**Remarks :** This bat although wide spread in Java Malay States, Sumatra, Borneo, Laos, Vietnam, Tenasserim, Burma and Peninsular India has hitherto not been recorded from Gujarat. Recently I obtained a female from Bansda, The Dangs district, Gujarat. Brosset (1962a) mentioned that the closely allied species, *T perforatus* shares the ecological niche of *T melanopogon*.

It was collected from the semidark room of an old house. The size of colony was about 30 exs.

### 9. *Taphozous kachhensis kachhensis* Dobson

1872. *Taphozous kachhensis* Dobson, *J. Asiat. Soc. Beng.*, 41 : 221.

**Material :** Baroda Dist.: Rajmahal, Baroda, 10.9.1976, 8♂♂, 1♀; Nayai Mandir, Baroda, 12.9.1976, 2♂♂, 6♀♀ Broach Dist.: Broach, 15.9.1976, 2♂♂, 7♀♀ Junagadh Dist.: Junagadh, no date, (Z.S.I.), 7♂♂, 1♀ Kutch Dist.: Bhuj, no date (Z.S.I.), 1♀

**Measurements :** External : 19♂♂ : *f.*, 73-81 (75.5); *t.*, 30. 4-34 (31.8); *ft.*, 14-16.4 (15.5). 15♀♀ : *f.*, 69-74.4 (73); *t.*, 26-30.5 (28.5); *ft.*, 15-18.5 (17.2).

**Skull:** 5♂♂ : *l.*, 26.5-29 (27.6); *zw.*, 16.1-17.8 (16.7); *cw.*, 12-13 (12.7); *m<sup>3</sup>-m<sup>3</sup>*, 11-12 (11.3); *c-m<sup>3</sup>*, 11-12 (11.4); *c-m<sub>3</sub>*, 12.5-13.3 (12.9); *ml.*, 21-21.5 (21.3). 2♀♀ : *l.*, 26.1, 26.5; *zw.*, 16.5, 17.3; *cw.*, 13, 13; *m<sup>3</sup>-m<sup>3</sup>*, 11, 11.3; *c-m<sup>3</sup>*, 11, 11.2; *c-m<sub>3</sub>*, 12.5, 12.6; *ml.*, 21, 21.

**Remarks :** Hitherto known only from Kutch, Rajkot, Banas Kantha, Ahmadabad and Kaira districts of Gujarat. Present material is from Baroda and Broach districts.

It was found hanging head down on walls and roof of semi dark and ruined houses in Baroda and in an old mosque in Broach. Size of colony is small (4-5 exs.). It was observed in association with *Rousettus leschenaulti* in Broach and with *Hipposideros speoris speoris* in Baroda.

#### 10. *Taphozous saccolaimus* Temminck

1838. *Taphozous saccolaimus* Temminck, *Tijdschr. Natuur. Gesch.*, 5 : 14.

**Remarks :** I have not examined this bat from Gujarat but Brosset (1962a) recorded it from Anand (Kaira district). He did not mention its subspecies name.

#### Family MEGADERMATIDAE

#### 11. *Megaderma lyra lyra* Geoffroy

1810. *Megaderma lyra* E. Geoffroy, *Ann. Mus. Hist. nat. Paris*, 15 : 190.

**Material :** Surat Dist.: Dumas, 18 km. from Surat, 12.9.1976, 1 ♂, 5 ♀ ♀ ; Banas Kantha Dist.: Palanpur, no date, (Z.S.I.), 1 ♂.

**Measurements :** External: 1 ♂ : *f.*, 62.5; *t.*, 30.5; *ft.*, 19.1; 5 ♀ ♀ : *f.*, 63.5-65.1 (64.2); *t.*, 32-34.5 (32.5); *ft.*, 17-20 (18.3).

**Skull:** 1 ♂ : *l.*, 27.1; *zw.*, 16.3; *cw.*, 12.5; *m<sup>3</sup>-m<sup>3</sup>*, 10; *c-m<sup>3</sup>*, 11; *c-m<sub>3</sub>*, 12; *ml.*, 19.1. 3 ♀ ♀ : *l.*, 27 (in all exs.); *zw.*, 16-16.2 (16.1); *cw.*, 12 (in all exs.); *m<sup>3</sup>-m<sup>3</sup>*, 9.5 (in all exs.); *c-m<sup>3</sup>*, 10.8-11 (10.9); *c-m<sub>3</sub>*, 11.7-12 (11.8); *ml.*, 19-19.3 (19.1).

**Remarks :** Earlier record of this species from Banas Kantha and Surat districts. Present material was collected by me from a semidark room of an old discarded building in Dumas (Surat district). The colony size was about 50 exs.

#### Family RHINOLOPHIDAE

#### 12. *Hipposideros speoris speoris* (Schneider)

1800. *Vespertilio speoris* Schneider, in *Schreber's Säugeth.*, pl. 59b.

**Material :** Baroda Dist.: Rajmahal, Baroda, 10.9.1976, 4 ♂ ♂, 5 ♀ ♀

**Measurements :** External : 4 ♂ ♂ : *f.*, 47-50 (49.2); *t.*, 21-23 (22.23); *ft.*, 8.2-9 (8.6). 5 ♀ ♀ : *f.*, 48-51.1 (49.5); *t.*, 21.3-22.5 (22.1); *ft.*, 8-9.2 (8.6).

Skull: 2♂♂: *l.*, 18, 18.5; *zw.*, 10.5, 10.6; *cw.*, 9, 9.5; *m<sup>3</sup>-m<sup>3</sup>*, 7.3, 7.5; *c-m<sup>3</sup>*, 7, 7; *c-m<sub>3</sub>*, 7.6, 7.6; *ml.*, 11.7, 12.3. 2♀♀: *l.*, 18, 18; *zw.*, 10.3, 10.4; *cw.*, 9, 9; *m<sup>3</sup>-m<sup>3</sup>*, 7, 7.1; *c-m<sup>3</sup>*, 6.7, 6.7; *c-m<sub>3</sub>*, 7.2, 7.4; *ml.*, 11.8, 12.

*Remarks* : Brosset (1962) mentioned its absence in Gujarat. Sinha (1975) recorded its occurrence in Baroda on the basis of a single specimen collected in 1918, present in Z. S. I. Calcutta collection. The present material further confirms its presence in Baroda. It is felt that it must be occurring in other parts of Gujarat also.

This bat was obtained from the roof of a bowri in Baroda Rajmahal compound. It was in association with *Taphozous kachhensis*. Size of colony was about 100 exs.

### 13. *Hipposideros galeritus brachyotus* Dobson

1874. *Phyllorhina brachyota* Dobson, *J. Asiat. Soc. Beng.*, 43 : 237.

This species was not collected by me. Wroughton (1918) recorded it from Palanpur (Banas Kantha district).

### 14. *Hipposideros fulvus pallidus* Andersen

1918. *Hipposideros fulvus pallidus* Andersen, *Ann. Mag. nat. Hist.*, (9) 2 : 381.

*Material* : Junagadh Dist.: Junagadh, 24.9.1912, (Z.S.I.), 14♂♂, 16♀♀; Rajkot Dist.: Rajkot, 2.1.1913, (Z.S.I.), 1♀

*Measurements* : External: 14♂♂: *f.*, 39-40 (39.2); *t.*, 17.5-18, (17.8); *ft.*, 7.6-9 (8.2). 17♀♀: *f.*, 39-40.5 (39.9); *t.*, 17.8-19 (18.3); *ft.*, 7-8.1 (7.1).

Skull: 2♂♂: *l.*, 17, 17.3; *zw.*, 9.2, 9.5; *cw.*, 8.1, 8.5; *m<sup>3</sup>-m<sup>3</sup>*, 6.2, 6.5; *c-m<sup>3</sup>*, 6.2, 6.7; *c-m<sub>3</sub>*, 6.6, 7; *ml.*, 11.2, 12. 1♀: *l.*, 17.3; *zw.*, 9; *cw.*, 8.2; *m<sup>3</sup>-m<sup>3</sup>*, 6.5; *c-m<sup>3</sup>*, 6; *c-m<sub>3</sub>*, 6.6; *ml.*, 11.3.

*Remarks* : This species is known from Kutch, Junagadh, Rajkot and Banas Kantha districts of Gujarat.

## Family MOLOSSIDAE

### 15. *Tadarida aegyptiaca thomasi* Wroughton

1919. *Tadarida thomasi* Wroughton, *J. Bombay nat. Hist. Soc.*, 26 : 732.

I could not examine this bat from Gujarat. Wroughton (1919) described it from Bhuj (Kutch district) and Brosset (1962c) recorded it from Anand (Kaira district).



## Family VESPERTILIONIDAE

16. *Pipistrellus mimus mimus* Wroughton

1899. *Pipistrellus mimus* Wroughton, *J. Bombay nat. Hist. Soc.*, 12 : 722.

*Material* : Junagadh Dist.: Junagadh, no date, (Z.S.I.), 1 ♂, 1 ♀ ; Banas Kantha Dist.: Palanpur, no date, (Z.S.I.), 2 ♂ ♂.

*Measurements* : External: 3 ♂ ♂ : *f.* 25-28 (27); *t.*, 10-11 (10.7).

Skull: 3 ♂ ♂ : *l.*, 11-11.5 (11.3); *zw.*, 6.5-7.5 (7.2); *cw.*, 6 (in all exs.); *m<sup>3</sup>-m<sup>3</sup>*, 5-5.2 (5.1); *c-m<sup>3</sup>*, 3.6-3.8 (3.7); *c-m<sub>3</sub>*, 4.1-4.3 (4.2); *ml.*, 8.1-8.6 (8.4).

*Remarks* : Wroughton (1918) recorded it from Kutch, Junagadh and Banas Kantha districts of Gujarat and Brosset (1962c) from Kaira and Surat districts.

17. *Pipistrellus coromandra coromandra* (Gray)

1838. *Scotophilus coromandra* Gray, *Mag. Zool. Bot.*, 2 : 428.

*Remarks* : Wroughton (1918) and Brosset (1962) recorded this species from Surat District.

18. *Pipistrellus dormeri dormeri* (Dobson)

1875. *Scotozous dormeri* Dobson, *Proc. zool. Soc. London*, (1875) : 373.

*Material* : Broach Dist.: Fata Talab, Broach, 16.9.1976, 1 ♂, 3 ♀ ♀ ; Rajpipla, 17.9.1976, 2 ♀ ♀ ; Sukal Tirath, 19.9.1976, 3 ♂ ♂ 5 ♀ ♀ ; The Dang Dist.: Bansda, 27.9.1976, 20 ♂ ♂, 9 ♀ ♀ ; Surat Dist.: Tithal village near Bulsar, 30.9.1976, 11 ♂ ♂, 9 ♀ ♀ ; Dadra and Nagar Haveli: Silvassa, 4.10.1976, 1 ♂.

*Measurements* : External: 35 ♂ ♂ : *f.*, 34-37 (34.5); *t.*, 11.5-13.5 (12.6); *ft.*, 6.8-8 (7.5). 28 ♀ ♀ : *f.*, 33-37.1 (35.6); *t.*, 11-13.3 (12.1); *ft.*, 6.5-8 (7.3).

Skull: 2 ♂ ♂ : *l.*, 13.6, 14; *zw.*, 9.5, 9.8; *cw.*, 7.6, 7.7; *m<sup>3</sup>-m<sup>3</sup>*, 6.3, 6.5; *c-m<sup>3</sup>*, 5.4, 5.4; *c-m<sub>3</sub>*, 5.5, 5.6; *ml.*, 10, 10.5. 2 ♀ ♀ : *l.*, 14, 14.2; *zw.*, 9.4, 9.8; *cw.*, 7.5, 7.5; *m<sup>3</sup>-m<sup>3</sup>*, 6.5, 6.6; *c-m<sub>3</sub>*, 5.5, 5.5; *c-m<sup>3</sup>*, 5.7, 5.9; *ml.*, 10.2, 10.3.

*Remarks* : Hitherto known only from Kutch, Junagadh, Banas Kantha and Kaira districts (Wroughton, 1918; Brosset, 1962c). Present material was collected from Surat, The Dangs and Broach districts and Dadra and Nagar Haveli.

This bat was collected from cracks and crevices in roofs and walls of old houses and temple and from holes in large banyan trees (*Ficus bengalensis*). The colony size varies from 2 to 24 exs.

Females with one or two young ones were found in last week of September and first week of October in Baroda and Broach (Gujarat).

### 19. *Pipistrellus ceylonicus chrysothrix* Wroughton

1899. *Pipistrellus chrysothrix* Wroughton, *J. Bombay nat. Hist. Soc.*, 12 : 720.

*Material* : Broach Dist.: Broach Hospital, Broach, 18.9.1976, 4 ♀ ♀ ; Rajpipla, 17.9.1976, 1 ♀

*Measurements* : External: 5 ♀ ♀ : *f.*, 36.5-39 (38.1); *t.*, 14.2-15.2 (14.8); *ft.*, 7.6-8.2 (8).

*Skull*: 5 ♀ ♀ : *l.*, 14.6-15 (14.8); *zw.* 9.7-10.3 (10); *cw.*, 7.4-8 (7.7); *m<sup>s</sup>-m<sup>s</sup>*, 6.7-7.2 (6.9); *c-m<sup>s</sup>*, 5.4-5.5 (5.45); *c-m<sub>3</sub>*, 6 (in all exs.); *ml.*, 10.5-11.4 (10.9).

*Remarks* : Hitherto known only from Kutch, Junagadh, The Dangs and Surat districts. Present material is from Broach district.

This bat was also collected from crevices between wall and wooden fixtures of the roof of the hospital building.

### 20. *Pipistrellus ceylonicus subcanus* Thomas

1915. *Pipistrellus ceylonicus subcanus* Thomas, *J. Bombay nat. Hist. Soc.*, 24 : 30

*Remarks* : Wroughton (1918) further recorded this subspecies from Kutch and Banas Kantha districts. I did not come across this subspecies in Gujarat.

### 21. *Scotophilus kuhlii kuhlii* Leach

1821. *Scotophilus kuhlii* Leach, *Trans. Linn. Soc. Lond.*, 13 : 69.

1897. *Scotophilus wroughtoni* Thomas, *J. Bombay nat. Hist. Soc.*, 11 : 275.

*Remarks* : Hill and Thonglongya (1972) have synonymised *S. temmincki* with *S. kuhlii* Leach. Besides type locality "Kim, Surat district", Wroughton (1918a) reports *S. temmincki* from Junagadh. I could not obtain this species from Gujarat.

### 22. *Scotophilus heathi heathi* (Horsfield)

1831. *Nycticejus heathi* Horsfield, *Proc. zool. Soc. London*, (1831) : 113.

*Material* : Baroda Dist.: Kirti Mandir, Baroda, 11.9.1976, 2 ♂ ♂, 4 ♀ ♀ ; Broach Dist.: Fata Talab, Broach, 16.9.1976, 1 ♂, 3 ♀ ♀ ; Rajpipla, 17.9.1976, 3 ♂ ♂, 5 ♀ ♀ ; Dadra and Nagar Haveli: Silvassa, 4.10.1976, 1 ♂, 1 ♀ ; Banas Kantha Dist.: Palanpur, no date, (Z.S.I.), 2 ♀ ♀ ,

**Measurements** : External: 7 ♂♂ : *f.*, 55-56.5 (56); *t.*, 21-22 (21.7); *ft.*, 11.7-12.5 (12.1). 13 ♀♀ : *f.*, 56.8-60 (58.5); *t.*, 21.5-24.5 (23.3); *ft.*, 11-13 (11.8).

**Skull**: 1 ♂ : *l.*, 20; *zw.*, 14; *cw.*, 10.5; *m<sup>3</sup>-m<sup>3</sup>*, 9.3; *c-m<sup>3</sup>*, 7.5; *c-m<sub>3</sub>*, 8.4; *ml.*, 15. 6 ♀♀ : *l.*, 20.5-21.1 (20.8); *zw.*, 14.2-15 (14.7); *cw.*, 10-10.8 (10.3); *m<sup>3</sup>-m<sup>3</sup>*, 9.1-10 (9.7); *c-m<sup>3</sup>*, 7-7.4 (7.2); *c-m<sub>3</sub>*, 8-8.5 (8.3); *ml.*, 15-15.6 (15.2).

**Remarks** : Hitherto known only from Kutch, Junagadh, Banas Kantha, Ahmadabad, Surat and Kaira districts. Present material is from Baroda and Broach districts and Silvassa (Dadra and Nagar Haveli).

This bat was collected from cracks, crevices and holes in walls and ceiling of buildings in town.

#### SUMMARY

This paper deals with 22 species and subspecies of bats found in Gujarat, belonging to seven families namely—Pteropodidae, Rhinopomatidae, Emballonuridae, Megadermatidae, Rhinolophidae, Molossidae and Vespertilionidae.

*Taphozous melanopogon melanopogon* Temminck has been recorded for the first time from Gujarat. The occurrence of *Hipposideros speoris speoris* (Schneider) earlier recorded from Gujarat (Sinha, 1975) has been confirmed. The range of the nine other species in Gujarat has been considerably extended. The bat fauna of Dadra and Nagar Haveli was not known. Here four species have been studied from this area. Ecological notes on twelve species are added.

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