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A key to the bats (Mammalia: Chiroptera) of South Asia

C. Srinivasulu, Paul A. Racey & Shahroukh Mistry



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A key to the bats (Mammalia: Chiroptera) of South Asia

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Abstract: A checklist and dichotomous key to 128 species of bats known from South Asia including Afghanistan, India, Pakistan, Nepal, Bhutan, Bangladesh, Sri Lanka and Maldives is provided. Character matrices for families, genera and species are also included. This article also briefly reviews their distribution (both physiographic and country-wise), status and main identification characters.

Keywords: Checklist, Chiroptera, dichotomous key, diversity, Mammalia, South Asia

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INTRODUCTION

Of the rich diversity of vertebrate fauna, bats are unique in being the only group of mammals that, like birds, have sustained flight. One of the 26 mammalian orders, the Chiroptera includes 1117 species of bats world over in rather two unequal suborders - the Megachiroptera (consisting 186 species of Old World fruit bats in one family) and the Microchiroptera (consisting 931 species in 17 families) (Mickleburgh et al. 1992; Koopman 1993; Srinivasulu & Srinivasulu 2001; Hutson et al. 2001; Mickleburgh et al. 2002; Simmons 2005). Recent molecular phylogenetic studies challenged this traditional subdivision and proposed that the bats be subdivided into two new suborders (Table 1), Yinpterochiroptera (includes the families Pteropodidae, Rhinolophidae, Megadermatidae and Rhinopomatidae) and Yangochiroptera (includes all the remaining families) (Teeling et al. 2005). However, until the new suborders are widely accepted, we prefer to retain the traditional subdivision.

Bats are widely distributed and have been recorded throughout the world excepting the Antarctic and a few Oceanic Islands (Mickleburgh et al. 2002). Some of the bat families are widespread and are recorded from both the Old World and the New World. Others are restricted in their range and are recorded either only from the Old World or the New World. Of the 18 families of bats, eight families (Pteropodidae, Rhinopomatidae, Nycteridae, Megadermatidae, Rhinolophidae, Hipposideridae, Myzopodidae and Mystacinidae) are restricted to the Old World; six families (Noctilionidae, Phyllostomidae, Desmodontidae, Natalidae, Furipteridae and Thyropteridae) are restricted to the New World; and three families (Emballonuridae, Molossidae and Vespertilionidae) are found both in the Old and New Worlds (Mickleburgh et al. 2002; Simmons 2005).

Scope of this article

Although work on taxonomy and systematics of the region's bat diversity has been considerable (recently reviewed by Bates & Harrison (1997)), there exists no published material that could help bat researchers in easy identification of bats both in the field and in the laboratory or museum. The necessity of identifying living bats in the field and preserved specimens prompted the preparation of this key. During the Conservation Assessment and Management Plan (CAMP) Workshop on South Asian Bats, held at Madurai in southern India in January 2002, the need for such a key for the South Asian region was felt to be indispensable. Hence, after deliberation and seeking the opinions from fellow bat researchers, the work on the preparation of the key for field identification of all the known species from Afghanistan, India, Pakistan, Nepal, Bhutan, Bangladesh, Sri Lanka and Maldives was

undertaken by the first author. We consulted published literature in the process of preparation of this work (Appendix I).

The key, designed for use with a vernier caliper or a millimeter scale and a hand lens, is modified from Blanford (1888-1891), Corbet & Hill (1992), and Bates & Harrison (1997). Numerous other publications, listed in the Reference section, were also consulted. As some authorities suggest that keys may lead to some confusion, the present work also incorporates identification character matrices in tabular form for the ease of the user. In the character matrices the dental formula for each genus dealt with in this key is provided. The dental formula includes details of incisors, canines, premolars, molars of one side for both upper and lower jaw followed by total number of teeth present. Variations within genus are denoted by the numerical in parenthesis.

We encourage readers to contact the lead author with suggestions and recommendations so that the key may be kept current.

Taxonomic composition and endemism of the bats of South Asia:

A total of 128 species of bats are reported from South Asia (Table 2), with the microchiropterans being better represented than the megachiropterans (115 vs. 13 species). Among the Microchiroptera large number of species are from the family Vespertilionidae, followed by the families Rhinolophidae, Hipposideridae, Emballonuridae, Molossidae, Rhinopomatidae and Megadermatidae (Fig. 1). Of this diversity, 10 species, namely, *Pteropus faunulus* (Pteropodidae), *Pteropus melanotus* (Pteropodidae), *Latidens salimalii* (Pteropodidae), *Rhinolophus cognatus* (Rhinolophidae), *Rhinolophus mitratus* (Rhinolophidae), *Hipposideros durgadasi* (Hipposideridae), *Hipposideros hypophyllus* (Hipposideridae), *Myotis csorbai* (Vespertilionidae), *Eptesicus tatei* (Vespertilionidae) and *Harpiola grisea* (Vespertilionidae) are endemic to the region. Family-wise percent endemism is greatest in Pteropodidae (21.4) followed by Hipposideridae (13.3), Rhinolophidae (11.7 species) and Vespertilionidae (4.8).

Among the countries representing South Asia, India has more than 90% of the total bat diversity of this region, while others have less than 50% diversity (Fig. 2). Bhutan has 51%, Nepal has 40%, Pakistan has 33%, Bangladesh has 29%, Afghanistan has 28%, Sri Lanka has 23% and Maldives has 2% of the total bat diversity of South Asia.

Characters used for identification of bats

Identification of bats depends upon a series of external, cranial and dental measurements. Besides mensural characters many qualitative characters also help in easy identification, and wherever applicable we

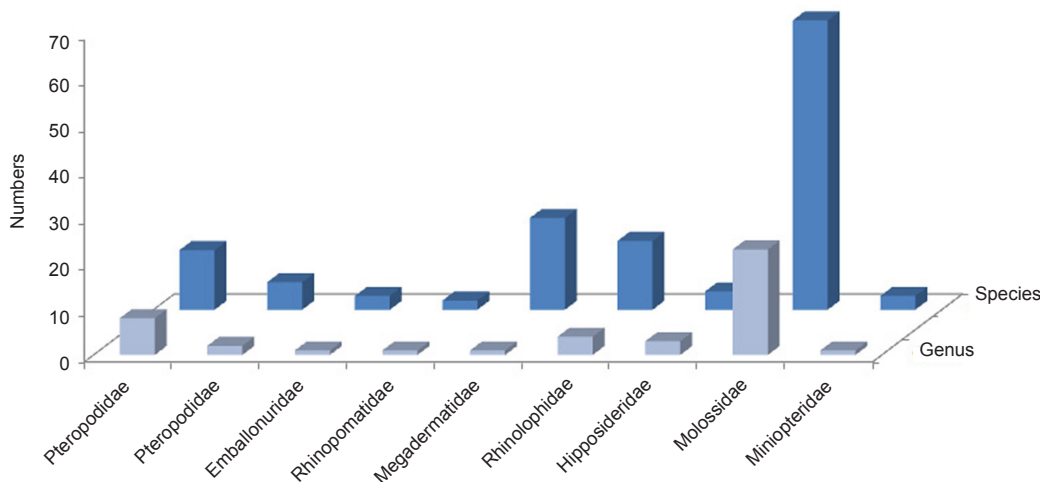


Figure 1. Chiropteran diversity in South Asia

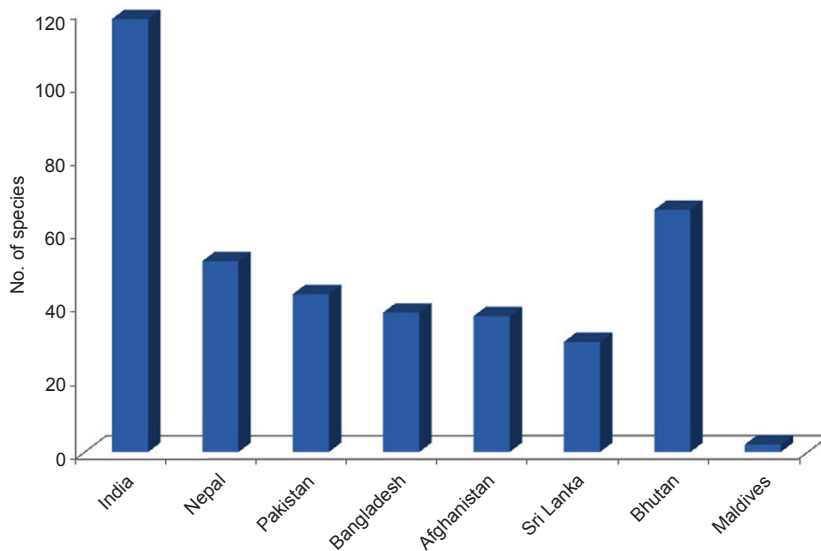


Figure 2. Number of bat species occurring in each country of South Asia

have included these. In this section, various external and cranial (including dental) measurements dealt in the present article as well as those useful in taxonomic studies have been detailed.

External (see Figs. 3a and 3b for details)

E (Ear length): from the lower border of the external auditory canal to the tip of the pinna, excluding hairs.

FA (Forearm length): taken with the wings folded, from the outer end of the elbow to the outer end of the wrist joint (or carpus).

HB (Head Body length): taken dorsally, from the tip of the snout to the base of the tail.

HF (Hindfoot length): from the outer end of the heel at the base of the calcar to the outer end of the longest digit, excluding hairs or claws.

TL (Tail length): from the base of the tail near the anal opening to tip of the tail.

Some other external measurements that are considered for taxonomic studies include:

3mt (Third metacarpal length): from the outer end of wrist joint (or carpus) to the distal outer end of the metacarpal.

1ph 3mt (Length of the first phalanx of the third metacarpal): from the proximal to the distal end of the first phalanx.

2ph 3mt (Length of the second phalanx of the third metacarpal): from the proximal to the distal end of the second phalanx.

(*Note*: Similarly, 4mt (length of the fourth metacarpal), 5mt (length of the fifth metacarpal), 1ph 4mt (Length of the first phalanx of the fourth metacarpal), and 2ph 4mt (Length of the second phalanx of the fourth metacarpal) is also taken in to consideration.)

TIB (Tibia length): taken from the knee joint to the ankle.

Thumb (Thumb length): length of the first digit including metacarpal and phalanx excluding claw.

WSP (Wingspan): maximum spread of the wing from tip to tip taken with wings fully stretched.

Cranial (see Figs. 4 and 5 for details)

CBL (Condylbasal length): from occipito-condyle to the anterior edge of alveolus of the anterior incisor.

CCL (Condylcanine length): from occipito-condyle to the anterior edge of alveolus of the canine.

CM^u (Maxillary tooththrow): from the front of the upper canine to the back of the crown of the last upper molar.

CM_l (Mandibular tooththrow): from the front of the lower canine to the back of the crown of the last lower molar.

GTL (Greatest length of the skull): from the extreme end of the anterior to the extreme end of the posterior parts of the skull.

M (Mandible length): from the extreme end of the condyle to the extreme end of the anterior of the mandible including the incisors.

M^u-M^l (Width across the last molars): taken from the outer borders of the crown of the last upper molars.

ZB (Zygomatic breadth): Greatest width of the skull across the zygomatic arches.

Some other dental and cranial measurements that are considered for taxonomic studies include:

BB (Breadth of the braincase): Greatest width of the brain case.

IC (Interorbital constriction): the narrowest width across the interorbital region.

RW (Rostral width): taken across the front of the orbits

at their most anterior point.

Some important terms defined

Antebrachial membrane: membrane in front of the arm extending between shoulder to forearm, wrist or thumb.

Antitragus: a lobe developed from the basal part of the outer margin of the ear.

Bicuspidate: a tooth possessing two cusps.

Bifid: a structure having two distal processes.

Calcar: a cartilaginous or bony spur like projection arising from the ankle that supports the interfemoral membrane.

Canine: a single tall and pointed tooth situated behind the incisors in each toothrow.

Cusp: a prominence or point on tooth.

Echolocation: navigation in flight by means of the echo of sound pulses.

Gular sac: a glandular pouch like structure in the skin of the throat.

Incisor: a front tooth situated in front of the canine tooth in each toothrow.

Interfemoral membrane: also uropatagium, a membrane extending between inner margins of the legs and the distal end of the body enclosing all or a part of the tail.

Jugal: also malar or the cheekbone, present in the middle of the zygomatic arch.

Lancet: present in the forms belonging to the genus *Rhinolophus*, it is the erect, subtriangular, posterior part of the nose leaf.

Mandible: the lower jaw composed of two bones, fused to different degrees.

Metacarpal: one of the long bones of the hand of the bat extending from the carpal bones to the proximal phalanx of the finger.

Molar: a posterior cheektooth.

Narial: pertaining to nasal region.

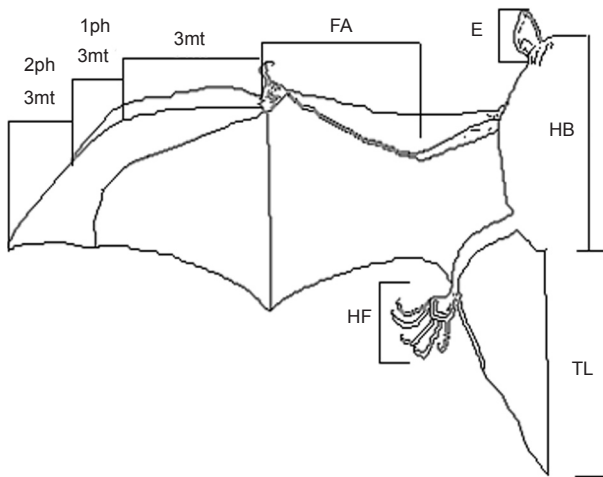


Figure 3a. Schematic diagram of a bat showing important external measurements

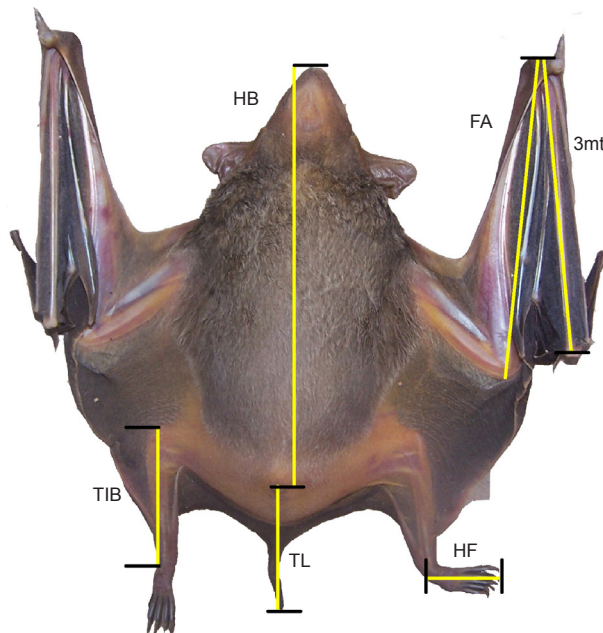


Figure 3b. Important external measurements of *Taphozous longimanus*

Noseleaf: a simple to complex structure derived from the skin around the nose in some bats.

Pararhinal glands: specialized sebaceous glands on the side of the muzzle.

Phalanx: (plural Phalanges) Digital bone of a finger or toe.

Premolar: a cheektooth in front of the first molar.

Radio-metacarpal pouch: a pocket on the ventral side

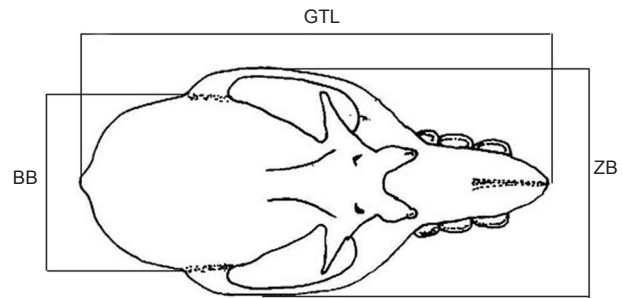


Figure 4. Dorsal view of the skull of *Pteropus giganteus*

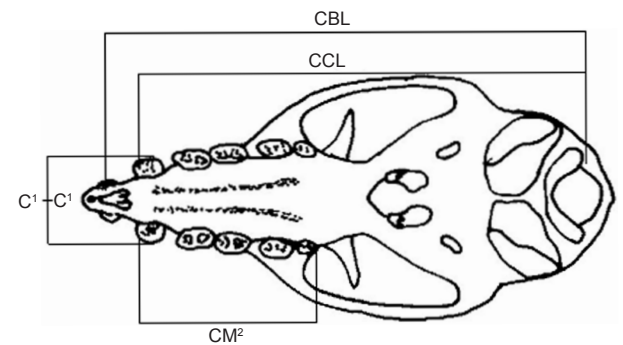


Figure 5. Ventral view of the skull of *Pteropus giganteus*

of the wing extending between the radius and the fifth metacarpal in some bats.

Rostrum: the facial part of the skull in front of the orbits.

Sella: a median anterior projection of the noseleaf of the genus *Rhinolophus* (Fig. 6).

Tibia: the bone extending between the knee and the ankle.

Tragus: a cutaneous projection at the opening of the external ear.

Unicuspid: a tooth with single cusp.

Zygoma: (plural Zygomata) The arch of the cheek bone comprising part of squamosal at the base, jugal in centre and part of maxilla in front.

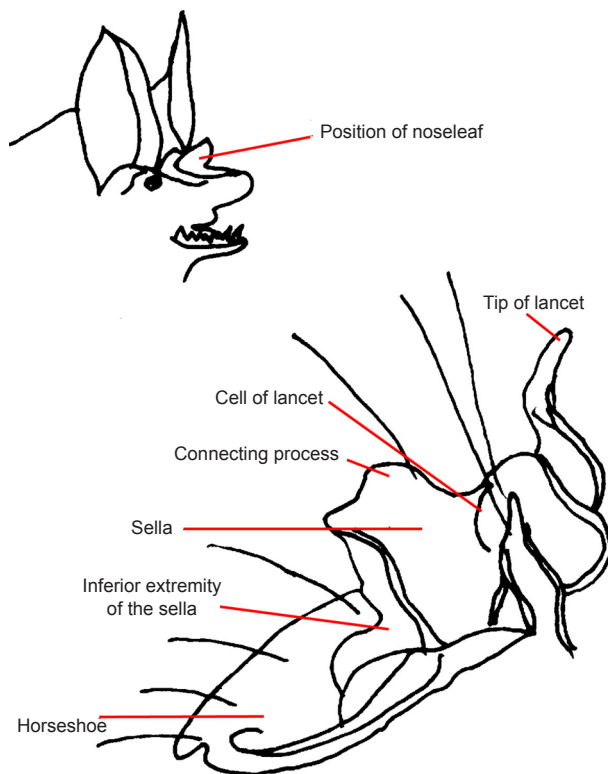


Figure 6. Lateral view of noseleaf of *Rhinolophus sinicus*

BRIEF NOTES ON BATS OF SOUTH ASIA

Order Chiroptera

Suborder Megachiroptera

Family Pteropodidae

Includes about 186 species of bats that feed chiefly on fruits, leaves, flowers and flower products. Distributed in Europe, Africa, Asia, Australia and Oceania (Mickleburgh et al. 2002; Simmons 2005). They have strong muzzle and jaws. Do not possess noseleaf or tragus. Eyes are large. They possess keen sense of smell. Ears simple (Fig. 7A). Tail small or absent, and proximal part of the caudal vertebrae included, the distal ones are free (Fig. 8A). Fourteen species belonging to eight genera have been reported from South Asia.

Brief descriptions of the genera of the family Pteropodidae present in South Asia:

Rousettus Gray, 1821 – Medium-sized fruit bats (FA – 75.0-90.0 mm) of rather heavier built and short tail (8.0-21.0 mm). Muzzle heavy and has deep emargination between the projecting nostrils. First digit has large claws while the second has smaller ones. Males have well-developed glandular hairs on the throat than the females. Echolocate for orientation within roost by clicking tongue against the roof of mouth. Rostrum moderately elongated. Two pairs of lower and upper incisors present. Two species – *R. aegyptiacus* (E. Geoffroy, 1810) and *R.*

leschenaultii (Desmarest, 1820) – occur in South Asia. Diagnostic morphological characters of the genus are provided in Table 3 and those of the species belonging to it in Table 3.1.

Pteropus Brisson, 1762 – Medium to large-sized fruit bats (FA – 110.0-209.0 mm) without tail. Patagium arises from sides of dorsum and the back of the second toe. Uropatagium less developed. Second digit has a small claw. Rostrum moderate. Two pairs of lower and upper incisors present. Four species – *P. giganteus* Brünnich, 1782, *P. hypomelanus* Temminck, 1853, *P. melanotus* Blyth, 1863 and *P. faunulus* Miller, 1902 – occur in South Asia. Diagnostic morphological characters of the genus are provided in Table 3 and those of the species belonging to it in Table 3.2.

Cynopterus Cuvier, F., 1824 – Medium-sized fruit bats (FA – 57.0-79.0 mm) with short tail (2.0-19.0 mm) that is half enclosed within the interfemoral membrane. Muzzle short, and has deep emargination between the projecting nostrils. Both the first and second fingers have distinct claws. Rostrum short. Two pairs of lower and upper incisors present. Two species – *C. sphinx* (Vahl, 1797) and *C. brachyotis* (Müller, 1838) – occur in South Asia. Diagnostic morphological characters of the genus are provided in Table 3 and those of the species belonging to it in Table 3.3.

Megaerops Peters, 1865 – Medium-sized fruit bats (FA – 52.0-63.0 mm) without any external tail. Muzzle short, and has deep emargination between the projecting nostrils. Ears simple with broadly rounded tips. Interfemoral membrane narrow with dorsal medial parts hairy. Rostrum short. Two pairs of upper and one pair of lower incisors present. One species – *M. niphanae* Yenbutra & Felten, 1983 – occurs in South Asia. Diagnostic morphological characters of the genus are provided in Table 3 and those of the species belonging to it in Table 3.4.

Latidens Thonglongya, 1972 – Medium-sized fruit bats (FA – 66.0-69.0 mm) without tail. Muzzle long, and has deep emargination between the projecting nostrils. Ears simple and oval, with narrowly rounded tips. Interfemoral membrane with some hairs on upper and lower sides. Rostrum elongated and narrow. Only one pair of lower and upper incisors present. One species – *L. salimalii* Thonglongya, 1972 – occurs in South Asia. Diagnostic morphological characters of the genus are provided in Table 3 and those of the species belonging to it in Table 3.4.

Sphaerias Miller, 1906 – Medium-sized fruit bats (FA – 52.0-61.0 mm) without tail. Muzzle long, and has deep emargination between the projecting nostrils. Ears with well defined pale anterior margin, and with small triangular antitragal lobe. Interfemoral membrane very narrow and calcar absent. Rostrum long and narrow. Two pairs of lower and upper incisors present. One species

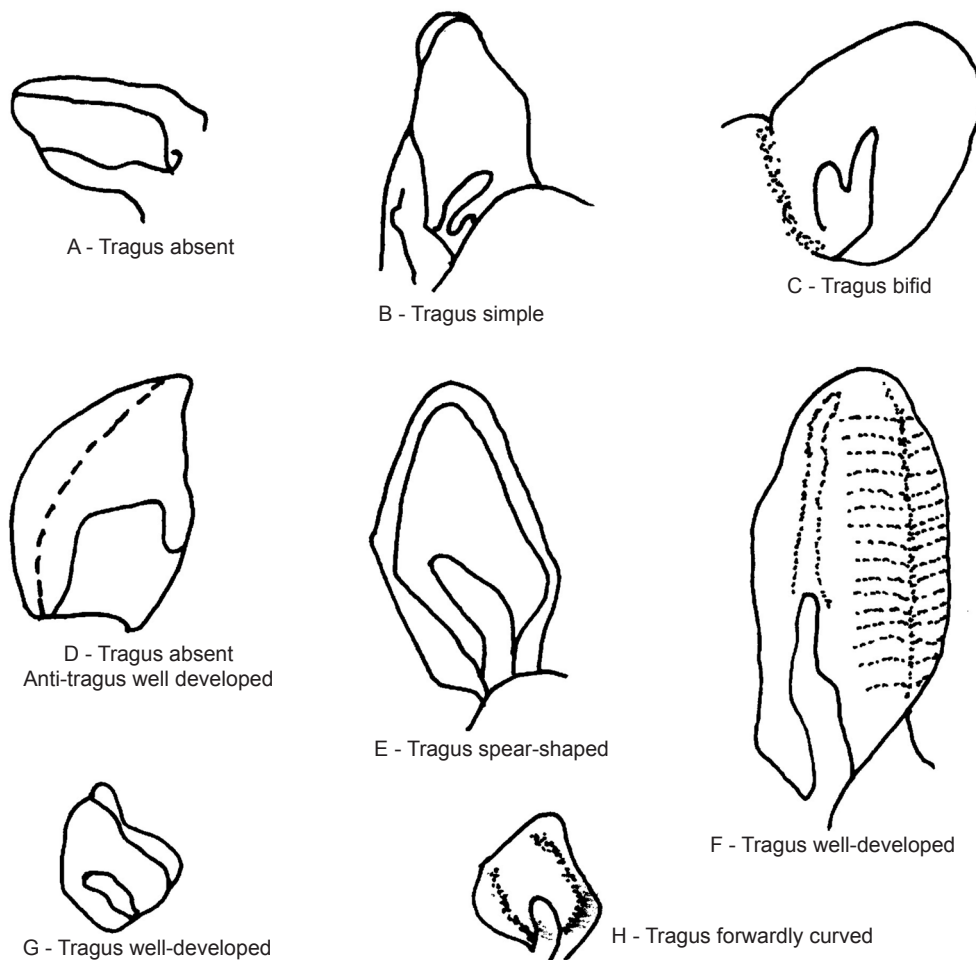


Figure 7. Outline of ear and shape of tragus in select species of bats

[A - *Pteropus giganteus*; B - *Rhinopoma microphyllum*; C - *Megaderma lyra*; D - *Rhinolophus luctus*; E - *Myotis* sp.; F - *Plecotus wardi*; G - *Pipistrellus pipistrellus*; H - *Miniopterus schreibersii*]

– *S. blanfordi* (Thomas, 1891) – occurs in South Asia. Diagnostic morphological characters of the genus are provided in Table 3 and those of the species belonging to it in Table 3.4.

Eonycteris Dobson, 1873 – Medium-sized fruit bats (FA – 66.0-78.0 mm) with well-developed tail (11.5-23.0 mm). Muzzle long and thin, and has deep emargination between the projecting nostrils. Only the thumb is clawed, second digit lacks claw. Ears are narrowly rounded. Interfemoral membrane very moderately broad, tail and calcar well-developed. A pair of large anal glands present. Tongue is sharply pointed and highly protrusible with well-developed unfringed filiform papillae at the tip. Rostrum long and narrow. Two pairs of lower and upper incisors present. There are usually eight palatal ridges. One species – *E. spelaea* (Dobson, 1871) – occurs in South Asia. Diagnostic morphological characters of the genus are provided in Table 3 and those of the species belonging to it in Table 3.4.

Macroglossus Cuvier, F., 1824 – Small to medium-

sized fruit bats (FA – 44.0-52.0 mm) without or with rudimentary tail (3.5-5.5 mm). Specialized for nectar feeding, muzzle long and narrow. The thumb and the second digit are clawed. Ears medium with narrowly rounded tips, and small antitragal lobes. Interfemoral membrane very narrow and is thickly haired. Tongue is sharply pointed and highly protrusible. Rostrum relatively long and narrow, braincase strongly deflected downwards. Two pairs of lower and upper incisors present. One species – *M. sobrinus* (K. Andersen, 1911) – occurs in South Asia. Diagnostic morphological characters of the genus are provided in Table 3 and those of the species belonging to it in Table 3.4.

Suborder Microchiroptera

Family Rhinopomatidae

Includes five species of insectivorous bats. Distributed in dry regions of Africa and Asia (Mickleburgh et al. 2002; Simmons 2005). They have strong muzzle with thickened narial pads. Possess rudimentary noseleaf (a distinct

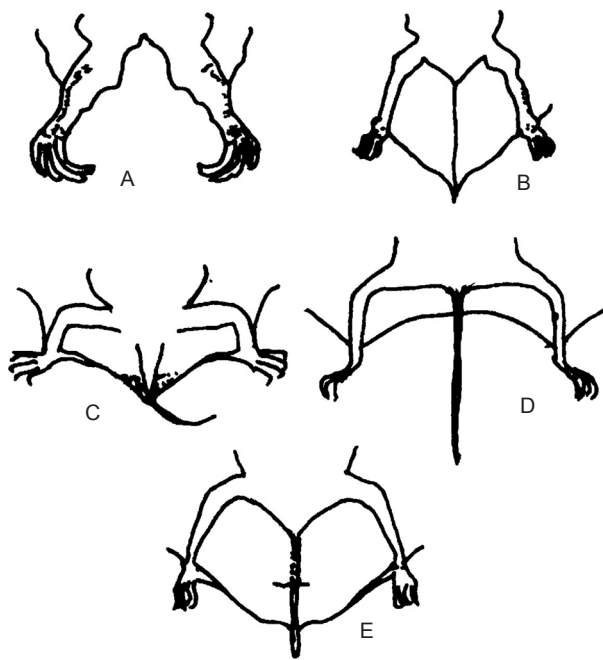


Figure 8. View of interfemoral membrane and tail in different families of bats
[A - Pteropodidae; B - Rhinolophidae, Hipposideridae, Vespertilionidae, Miniopteridae; C - Molossidae; D - Rhinopomatidae; E - Emballonuridae]

dermal ridge). Ears with simple tragus (Fig. 7B) and joined over the forehead by thin membrane. The second and the third digits of each wing have two distinct bony phalanges. Tail very long, and is only partly enclosed by a small interfemoral membrane (Fig. 8D). Three species belonging to a single genus is reported from South Asia.

Brief description of the genus of the family Rhinopomatidae present in South Asia:

Rhinopoma E. Geoffroy, 1818 – Small to medium-sized bats (FA – 46.0-74.0 mm) with long tail (49.0-78.0 mm). Tail mostly projecting free from the interfemoral membrane. One pair of upper and two pairs of lower incisors present. Other characters as outlined above. Three species – *R. microphyllum* (Brünnich, 1782), *R. hardwickii* Gray, 1837 and *R. muscatellum* Thomas, 1903 – occur in South Asia. Diagnostic morphological characters of the genus are provided in Table 4 and those of the species belonging to it in Table 4.1.

Family Emballonuridae

Includes about 51 species of insectivorous bats with wide distribution in Americas, Europe, Africa, Asia, Australia and Oceania (Mickleburgh et al. 2002; Simmons 2005). They have strong muzzle, and lack noseleaf. Ears with simple tragus. The basal part of the tail is enclosed loosely in the interfemoral membrane and the tip pierces the upper surface of the membrane and lies free on the dorsal side (Fig. 8E). Wings long and narrow and the

second digit of each lack phalanges. Males usually have well-developed glands. Six species belonging to two genera are reported from South Asia.

Brief descriptions of the genera of the family Emballonuridae present in South Asia:

Taphozous E. Geoffroy, 1818 – Small to medium-sized bats (FA – 55.6-88.0 mm) with relatively medium sized and stout tail (20.0-46.0 mm). In some the chin is either naked or haired, and gular sac and/or glands on throat present or lacking. Some species have radio-metacarpal pouch on the wing. Muzzle simple, lacks noseleaf, and nostrils open forward. Rostrum moderately elongated. One pair of upper and two pairs of lower incisors present. Five species – *T. perforatus* E. Geoffroy, 1818, *T. longimanus* Hardwicke, 1825, *T. nudiventris* Cretzschmar, 1830-31, *T. melanopogon* Temminck, 1841 and *T. theobaldi* Dobson, 1872 – occur in South Asia. Diagnostic morphological characters of the genus are provided in Table 4 and those of the species belonging to it in Table 4.2.

Saccolaimus Lesson, 1842 – Medium-sized bats (FA – 63.0-68.0 mm) with relatively medium sized and stout tail (21.0-35.0 mm). The chin is covered with short hairs. Gular sac on throat well-developed in males and less developed in females. Radio-metacarpal pouch absent. Muzzle simple, lacks noseleaf, and nostrils open forward. Rostrum moderately elongated. One pair of upper and two pairs of lower incisors present. One species – *S. saccolaimus* (Temminck, 1838) – occurs in South Asia. Diagnostic morphological characters of the genus are provided in Table 4 and those of the species belonging to it in Table 4.2.

Family Megadermatidae

Includes five species of insectivorous and carnivorous bats with distribution restricted to Africa, Asia and Australia (Mickleburgh et al. 2002; Simmons 2005). Ears are large and oval, joined over the forehead by a membrane. Tragus is distinctly bifid (Fig. 7C). They have strong muzzle and noseleaf is simple and erect. On each wing the second digit possess one phalanx and the third digit possess two phalanges. Tail absent. Two species belonging to one genus is reported from South Asia.

Brief description of the genus of the family Megadermatidae present in South Asia:

Megaderma E. Geoffroy, 1810 – Small to medium-sized bats (FA – 54.0-71.5 mm) without a tail. Upper incisors totally lacking and two pairs of lower incisors present. Other characters as outlined above. Two species – *M. spasma* Linnaeus, 1758 and *M. lyra* E. Geoffroy, 1810 – occur in South Asia. Diagnostic morphological characters of the genus are provided in Table 4 and those of the species belonging to it in Table 4.3.

Family Rhinolophidae

Includes about 77 species of insectivorous bats with

wide distribution in Europe, Africa, Asia and Australia (Mickleburgh *et al.* 2002; Simmons 2005). They have short muzzle and complex noseleaf that essentially bears an erect posterior lancet, lower horizontal horseshoe surrounding the nostrils and a perpendicular median sella (Fig. 9A). Ears pointed with well-developed antitragus (Fig. 7D). Tragus absent. The tail (13.0-55.0 mm) is enclosed in the interfemoral membrane (Fig. 8B). Twenty species belonging to the single genus is reported from South Asia.

Brief description of the genus of the family Rhinolophidae present in South Asia:

Rhinolophus Lacépède, 1799 – Small to medium-sized bats (FA – 33.4-80.5 mm) with relatively medium sized tail (13.0-55.0 mm). One pair of upper and two pairs lower incisors present. Other characters as outlined above. Twenty species – *R. ferrumequinum* (Schreber, 1774), *R. hipposideros* (Bechstein, 1800), *R. affinis* Horsfield, 1823, *R. pusillus* Temminck, 1834, *R. trifolius* Temminck, 1834, *R. luctus* Temminck, 1835, *R. rouxii* Temminck, 1835, *R. lepidus* Blyth, 1844, *R. macrotis* Blyth, 1844, *R. mitratus* Blyth, 1844, *R. subbadius* Blyth, 1844, *R. pearsonii* Horsfield, 1851, *R. blasii* Peters, 1867, *R. yunanensis* Dobson, 1872, *R. mehelyi* Matschie, 1902, *R. beddomei* Andersen, 1905, *R. sinicus* Andersen, 1905, *R. cognatus* Andersen 1906, *R. bocharicus* Kastchenko and Akimov, 1917 and *R. shortridgei* K. Andersen, 1918 – occur in South Asia. Diagnostic morphological characters of the genus are provided in Table 4 and those of the species belonging to it in Table 4.4.

Family Hipposideridae

Includes about 81 species of insectivorous bats with wide distribution in Africa, Asia, Australia and Oceania (Mickleburgh *et al.* 2002; Simmons 2005). They have short muzzle and complex noseleaf that bears a horizontal horseshoe surrounding the nostrils, often thrown into skin folds and associated leaflets (Fig. 9B). Intermediate leaf may or may not be clearly differentiated. Posterior leaf simple to complex. Sella and connecting process absent. The tail is well-developed and enclosed in the interfemoral membrane (Fig. 8B). Other characters vary at the generic level. Fifteen species belonging to four genera are reported from South Asia.

Brief descriptions of the genera of the family Hipposideridae present in South Asia:

Hipposideros Gray, 1831 – Small to medium-sized leaf-nosed bats (FA – 33.0-99.0 mm) with a medium-sized tail (20.0-64.0 mm). Noseleaf with anterior leaf with or without median emargination, an intermediate leaf and a posterior leaf (Fig. 8). Supplementary leaflets may be absent or present, if present may vary from 1 to 4 and in some species the last being much reduced. Ears pointed with large antitragus. Tragus absent. The interfemoral

membrane is broad and completely encloses the tail except the extreme tip. One pair of upper incisors and two pairs of lower incisors are present. Twelve species – *H. speoris* (Schneider, 1800), *H. diadema* (Geoffroy, E., 1813), *H. larvatus* (Horsfield, 1823), *H. armiger* (Hodgson, 1835), *H. fulvus* Gray, 1838, *H. galeritus* Cantor, 1846, *H. ater* Templeton, 1848, *H. lankadiva* Kelaart, 1850, *H. cineraceus* Blyth, 1853, *H. pomona* Andersen, 1908, *H. durgadasi* Khajuria, 1970 and *H. hypophyllus* Kock & Bhat, 1994 – occur in South Asia. Diagnostic morphological characters of the genus are provided in Table 5 and those of the species belonging to it in Table 5.1.

Trienops Dobson, 1871 – Medium-sized leaf-nosed bats (FA – 48.3-54.0 mm) with a long tail (31.0-39.0 mm). Muzzle elongated and broad. Noseleaf with anterior leaf with a deep median emargination, and internarial septum greatly expanded. Intermediate and posterior leaves undifferentiated, and upper border bears three vertical pointed processes. Narial lappets present. A single pair of supplementary leaflets present. Ears small. Tragus absent. The interfemoral membrane is broad and completely encloses the tail except the extreme tip. A bony spicule at the base of the terminal phalanx of the third finger is characteristic. One pair of upper and two pairs of lower incisors are present. One species – *T. persicus* Dobson, 1871 – occurs in South Asia. Diagnostic morphological characters of the genus are provided in Table 5 and those of the species belonging to it in Table 5.2.

Asellia Gray, 1838 – Medium-sized leaf-nosed bats (FA – 50.1-52.3 mm) with a moderately small tail (25.0-28.0 mm). Muzzle elongated and narrow. Noseleaf with simple anterior leaf lacking any emargination, and internarial septum not expanded. Intermediate leaf is smooth and slightly protuberant. Posterior leaf divided into four shallow cells with three ill-defined septa. The upper margin has three vertical processes of which the central one is pointed while those on the sides are blunt. Narial lappets little developed. Two pairs of supplementary leaflets present. The interfemoral membrane is broad and completely encloses the tail except the extreme tip (ca. 3-5 mm). One pair of upper and two pairs of lower incisors are present. One species – *A. tridens* Geoffroy, E., 1813 – occurs in South Asia. Diagnostic morphological characters of the genus are provided in Table 5 and those of the species belonging to it in Table 5.2.

Coelops Blyth, 1848 – Small-sized leaf-nosed bats (FA – 37.8-42.0 mm) with a rudimentary tail (< 2.0 mm). Noseleaf distinct with anterior leaf – distinctly divided into two by deep emargination and also bearing two elongated narrow supplementary lappets projecting beyond the muzzle. Intermediate leaf has moderately developed median process. Posterior leaf has a single cell and a median process. Noseleaf is covered with hairs. Ears



Figure 9. Frontal view of noseleaf of a Rhinolophid [A] and a Hipposiderid [B] bats

broad and have large antitragal lobe. The interfemoral membrane is narrow and poorly developed. One pair of upper and two pairs of lower incisors are present. One species – *C. frithii* Blyth, 1848 – occurs in South Asia. Diagnostic morphological characters of the genus are provided in Table 5 and those of the species belonging to it in Table 5.2.

Family Molossidae

Includes about 100 species of insectivorous bats with wide distribution in Americas, Europe, Africa, Asia, Australia and Oceania (Mickleburgh et al. 2002; Simmons 2005). Lacks noseleaf. Tail stout and conspicuously projecting out of a narrow interfemoral membrane (Fig. 8C). Ears variable, usually fleshy could either be free or joined by membrane over the head. Tragus is rudimentary, while the antitragus is rudimentary to large. The upper lip often wrinkled. Four species belonging to three genera are reported from South Asia.

Brief descriptions of the genera of the family Molossidae present in South Asia:

Tadarida Rafinesque, 1814 – Medium-sized free-tailed bats (FA – 43.1-63.9 mm) with a medium-sized tail (30.0-54.8 mm). Ear, tail and other characters as outlined above. In some species ears are not joined over the forehead, while in some they are joined. Normally one pair of upper and two pairs of lower incisors are present, but one species has three pairs of lower incisors. Two species – *T. teniotis* (Rafinesque, 1814) and *T. aegyptiaca* (E. Geoffroy, 1818) – occur in South Asia. Diagnostic morphological characters of the genus are provided in Table 6 and those of the species belonging to it in Table

6.1.

Chaerephon Dobson, 1874 – Moderate-sized free-tailed bats (FA – 43.1-50.5 mm) with a relatively long tail (30.0-44.0 mm). Ears large and connected by a membrane over the forehead. Tragus quadrate and minute, and antitragus half oval, separated posteriorly by a deep notch. One pair of upper and two pairs of lower incisors are present. One species – *C. plicatus* (Buchanan, 1800) – occurs in South Asia. Diagnostic morphological characters of the genus are provided in Table 6 and those of the species belonging to it in Table 6.1.

Otomops Thomas, 1913 – Moderately large-sized free-tailed bats (FA – 63.0-67.0 mm) with a relatively long tail (41.0-49.0 mm). Ears large and connected by a membrane over the forehead. Tragus triangular and minute, and antitragus absent. One pair of upper and two to three pairs of lower incisors are present. One species – *O. wroughtoni* (Thomas, 1913) – occurs in South Asia. Diagnostic morphological characters of the genus are provided in Table 6 and those of the species belonging to it in Table 6.1.

Family Vespertilionidae

Includes more than 400 species of insectivorous bats with wide distribution in Americas, Europe, Africa, Asia, Australia and Oceania (Mickleburgh et al. 2002; Simmons 2005). Muzzle simple and lacks the noseleaf. Ears separate from each other, however in few species they are joined over the forehead. Tragus is well-developed (Fig. 7E, F, G, H). The shape of antitragus can also be diagnostic. There is a considerable variation in the number of teeth among the genera. The long tail

is completely enclosed in the interfemoral membrane or the extreme tip protrudes out (Fig. 8B). Sixty-three species belonging to twenty three genera are reported from South Asia.

Brief descriptions of the genera of the family Vespertilionidae present in South Asia:

Murina Gray, 1842 – Small to medium-sized bats (FA – 27.7-40.9 mm) with a moderately long tail (27.0-41.0 mm). The interfemoral membrane encloses the entire but the extreme tip of the tail. Ears short and broad with long and narrow tragus. Projecting tubular nostrils characteristic. Wings attached either to the base of the claw of the first toe or to the base of the toe. Two pairs of upper incisors and three pairs of lower incisors are present. Two pairs each of upper and lower premolars are present. Five species – *M. leucogaster* Milne-Edwards, 1872, *M. aurata* Milne-Edwards, 1872, *M. cyclotis* Dobson, 1872, *M. huttoni* (Peters, 1872) and *M. tubinaris* (Scully, 1881) – occur in South Asia. Diagnostic morphological characters of the genus are provided in Table 7 and those of the species belonging to it in Table 7.1.

Harpiola Thomas, 1915 – Medium-sized bats (FA – 32.4-32.8 mm) with a moderately long tail (~27.5 mm). The interfemoral membrane encloses the entire but the extreme tip of the tail. Ears short and broad with triangular terminal half. Tragus long and narrow, acutely pointed and curved outwards. Projecting tubular nostrils characteristic. Wings attached to the base of the first toe. Two pairs of upper incisors and three pairs of lower incisors are present. Two pairs each of upper and lower premolars are present. One species – *H. grisea* (Peters, 1872) – occurs in South Asia. Diagnostic morphological characters of the genus are provided in Table 7 and those of the species belonging to it in Table 7.1.

Harpiocephalus Gray, 1842 – Small to medium-sized bats (FA – 44.1-50.1 mm) with a moderately long tail (40.0-50.0 mm). The interfemoral membrane encloses the entire but the extreme tip of the tail. Muzzle short. Ears moderate with long tragus. Projecting tubular nostrils characteristic. Two pairs of upper incisors and three pairs of lower incisors are present. Two pairs each of upper and lower premolars are present. One species – *H. harpia* (Temminck, 1840) – occurs in South Asia. Diagnostic morphological characters of the genus are provided in Table 7 and that of the species belonging to it in Table 7.1.

Kerivoula Gray, 1842 – Small-sized bats (FA – 31.5-42.0 mm) with a long tail (35.0-55.0 mm). The interfemoral membrane encloses the entire but the extreme tip of the tail. Ears moderately long and funnel shaped with long and slender tragus. Muzzle simple. Two pairs of upper incisors and three pairs of lower incisors are present. Three pairs each of upper and lower premolars are present. Three species – *K. picta* (Pallas, 1767),

K. hardwickii (Horsfield, 1825) and *K. lenis* Thomas, 1916 – occur in South Asia. Diagnostic morphological characters of the genus are provided in Table 7 and those of the species belonging to it in Table 7.2.

Myotis Kaup, 1829 – Small to medium-sized bats (FA – 30.0-58.3 mm) with a long tail (25.0-68.0 mm). The interfemoral membrane encloses the entire but the extreme tip of the tail. Ears usually tall and slender, and occasionally large. Tragus well-developed and spear shaped (Fig. 7E). Two pairs of upper and three pairs of lower incisors are present. Some species have three pairs each of upper and lower premolars, while in some species consistently only two pairs of both upper and lower premolars present. Fourteen species – *M. emarginatus* (E. Geoffroy, 1806), *M. laniger* (Peters, 1871), *M. formosus* (Hodgson, 1835), *M. hasseltii* (Temminck, 1840), *M. horsfieldii* (Temminck, 1840), *M. muricola* (Gray, 1846), *M. siligorensis* (Horsfield, 1855), *M. blythii* (Tomes, 1857), *M. annectans* (Dobson, 1871), *M. nipalensis* (Dobson, 1871), *M. longipes* (Dobson, 1873), *M. montivagus* (Dobson, 1874), *M. sicarius* Thomas, 1915 and *M. csorbai* Topal, 1997 – occur in South Asia. Diagnostic morphological characters of the genus are provided in Table 7 and those of the species belonging to it in Table 7.3.

Plecotus Geoffroy, E., 1818 – Small-sized bats (FA – 36.5-45.1 mm) with a long tail (48.0-54.0 mm). The interfemoral membrane encloses entire but the extreme tip of the tail. Ears usually large and joined over the forehead. Tragus well-developed and antitragus absent (Fig. 7F). Nostrils open upwards with their orifices extended backwards by a fissure. Two pairs of upper and three pairs of lower incisors are present. Two pairs of upper and three pairs of lower premolars are present. Three species – *P. homochrous* Hodgson, 1847, *P. wardi* Thomas, 1911 and *P. strelkovi* Spitzenberger, 2008 – occur in South Asia. Diagnostic morphological characters of the genus are provided in Table 7 and those of the species belonging to it in Table 7.4.

Barbastella Gray, 1821 – Small-sized bats (FA – 38.7-42.1 mm) with a moderately long tail (40.0-47.0 mm). The interfemoral membrane encloses the entire but the extreme tip of the tail. Ears broad and not greatly elongated, forward facing and joined over the forehead. Tragus triangular and antitragus undefined. Nostrils open upwards and outwards. Two pairs of upper and three pairs of lower incisors are present. Two pairs each of upper and lower premolars are present. One species – *B. leucomelas* (Cretzschmar, 1826) – occurs in South Asia. Diagnostic morphological characters of the genus are provided in Table 7 and those of the species belonging to it in Table 7.4.

Otonycteris Peters, 1859 – Large-sized bats (FA – 64.7-65.6 mm) with a moderately long tail (40.0-58.0 mm). The interfemoral membrane encloses the entire

but the extreme tip of the tail. Ears elongated. Tragus large and antitragus small with a shallow notch. Nostrils are crescent shaped. One pair of upper and three pairs of lower incisors are present. One pair of upper and two pairs of lower premolars are present. One species – *O. hemprichii* Peters, 1859 – occurs in South Asia. Diagnostic morphological characters of the genus are provided in Table 7 and those of the species belonging to it in Table 7.4.

Scotoecus Thomas, 1901 – Small-sized bats (FA – 34.1-37.3 mm) with a moderately long tail (34.0-41.0 mm). The interfemoral membrane encloses the entire but the extreme tip of the tail. Ears moderate with long and narrow tragus. Muzzle broadened and flattened. One pair of upper and three pairs of lower incisors are present. One pair of upper and two pairs of lower premolars are present. One species – *S. pallidus* Dobson, 1876 – occurs in South Asia. Diagnostic morphological characters of the genus are provided in Table 7 and those of the species belonging to it in Table 7.5.

Scotomanes Dobson, 1875 – Medium to large-sized bats (FA – 56.1-61.2 mm) with a moderately long tail (52.0-66.0 mm). The interfemoral membrane encloses the entire but the extreme tip of the tail. Ears elongated with broad tragus. Antitragus undefined. Nostrils simple and face slightly outward. One pair of upper and three pairs of lower incisors are present. One pair of upper and two pairs of lower premolars are present. One species – *S. ornatus* (Blyth, 1851) – occurs in South Asia. Diagnostic morphological characters of the genus are provided in Table 7 and those of the species belonging to it in Table 7.5.

Scotophilus Leach, 1821 – Medium to large-sized bats (FA – 44.0-65.8 mm) with a moderately long tail (40.0-71.0 mm). The interfemoral membrane encloses the entire but the extreme tip of the tail. Ears relatively small with crescent shaped tragus. Antitragus well-developed. Nostrils simple and face slightly outward. One pair of upper and three pairs of lower incisors are present. One pair of upper and two pairs of lower premolars are present. Two species – *S. kuhlii* Leach, 1821 and *S. heathi* Horsfield, 1831 – occur in South Asia. Diagnostic morphological characters of the genus are provided in Table 7 and those of the species belonging to it in Table 7.5.

Arielulus Hill & Harrison, 1987 – Large-sized bats (FA – 41.8-43.6 mm) with a moderately long tail (~40.0 mm). The interfemoral membrane encloses the entire but the extreme tip of the tail. Ears short and broad, tragus well-developed and broadest in the middle. Usually two pairs of upper and three pairs of lower incisors; and two pairs each of upper and lower premolars are present. One species – *A. circumdatus* (Temminck, 1840) – occurs in South Asia. Diagnostic morphological characters of the genus are provided in Table 7 and those of the species

belonging to it in Table 7.6.

Hesperoptenus Peters, 1869 – Medium to large-sized bats (FA – 50.0-60.4 mm) with a moderately long tail (44.0-63.0 mm). The interfemoral membrane encloses the entire but the extreme tip of the tail. Ears large, thick and fleshy with large crescent shaped tragus. Antitragus well-developed. Muzzle broadened. Two pairs of upper incisors and three pairs of lower incisors are present. One pair of upper premolars and two pairs of lower premolars are present. One species – *H. tickelli* (Blyth, 1851) – occurs in South Asia. Diagnostic morphological characters of the genus are provided in Table 7 and those of the species belonging to it in Table 7.6.

Eptesicus Rafinesque, 1820 – Small to medium-sized bats (FA – 35.4-55.1 mm) with a moderately long tail (38.0-58.0 mm). The interfemoral membrane encloses the entire but the extreme tip of the tail. Ears large with short and blunt tragus. Antitragus not well defined. Two pairs of upper and three pairs of lower incisors are present. One pair of upper and two pairs of lower premolars are present. Seven species – *E. serotinus* (Schreber, 1774), *E. bottae* (Peters, 1869), *E. pachyotis* (Dobson, 1871), *E. nasutus* (Dobson, 1877), *E. dimissus* Thomas, 1916, *E. gobiensis* Bobrinskii, 1926 and *E. tatei* Ellerman & Morrison-Scott, 1951 – occur in South Asia. Diagnostic morphological characters of the genus are provided in Table 7 and those of the species belonging to it in Table 7.6.

Nyctalus Bowdich, 1825 – Medium-sized bats (FA – 42.1-57.8 mm) with a moderately long tail (31.0-55.0 mm). The interfemoral membrane encloses the entire but the extreme tip of the tail. Ears relatively short with a club shaped tragus. Two pairs of upper and three pairs of lower incisors are present. Two pairs each of upper and lower premolars are present. Three species – *N. noctula* (Schreber, 1774); *N. leisleri* (Kuhl, 1817); and *N. montanus* (Barrett-Hamilton, 1906) – occur in South Asia. Diagnostic morphological characters of the genus are provided in Table 7 and those of the species belonging to it in Table 7.7.

Pipistrellus Kaup, 1829 – Small to medium-sized bats (FA – 25.0-42.6 mm) with a moderately long tail (20.0-49.0 mm). The interfemoral membrane encloses the entire but the extreme tip of the tail. Ears short and broad, tragus well-developed (Fig. 7G). Antitragus is not well defined. On the muzzle, parahinal glands and internarial groove are distinct. Usually two pairs of upper and three pairs of lower incisors; and two pairs each of upper and lower premolars are present. Some species have reduction in dentition. Eight species – *P. pipistrellus* (Schreber, 1774), *P. kuhlii* (Kuhl, 1817), *P. coromandra* (Gray, 1838), *P. javanicus* (Gray, 1838), *P. abramus* (Temminck, 1840), *P. tenuis* (Temminck, 1840), *P. ceylonicus* (Kelaart, 1852) and *P. paterculus* Thomas, 1915 – occur in South Asia. Diagnostic morphological

characters of the genus are provided in Table 7 and those of the species belonging to it in Table 7.7.

Scotozous Dobson, 1875 – Medium-sized bats (FA – 32.7-36.0 mm) with a moderately long tail (27.0-41.0 mm). The interfemoral membrane encloses the entire but the extreme tip of the tail. Ears short and broad, tragus well-developed with small triangular lobe near the base of the outer margin. Penis enlarged. One pair of upper (second upper usually absent, when present very minute) and three pairs of lower incisors; and two pairs each of upper and lower premolars are present. One species – *S. dormeri* Dobson, 1875 – occurs in South Asia. Diagnostic morphological characters of the genus are provided in Table 7 and those of the species belonging to it in Table 7.7.

Tylonycteris Peters, 1872 – Small-sized bats (FA – 26.1-29.0 mm) with a long tail (26.0-33.0 mm). The interfemoral membrane encloses the entire but the extreme tip of the tail. Ears triangular, with short and broad tragus. Head characteristically broadened and flattened. Fleshy pads on the ball of thumb and sole of the foot characteristic. Two pairs of upper and three pairs of lower incisors are present. One pair of upper and two pairs of lower premolars are present. Two species – *T. pachypus* (Temminck, 1840) and *T. robustula* Thomas, 1915 – occur in South Asia. Diagnostic morphological characters of the genus are provided in Table 7 and those of the species belonging to it in Table 7.8.

Ia Thomas, 1902 – Large-sized bats (FA – 70.9-77.3 mm) with a moderately long tail (~ 65.0mm). The interfemoral membrane encloses the entire but the extreme tip of the tail (~ 6.0mm). Ears broad with moderately long tragus. Nostrils simple and face slightly outward. Two pairs of upper and three pairs of lower incisors are present. Two pairs each of upper and lower premolars are present. One species – *I. io* Thomas, 1902 – occurs in South Asia. Diagnostic morphological characters of the genus are provided in Table 7 and those of the species belonging to it in Table 7.8.

Falsistrellus Throughton, 1943 – Medium-sized bats (FA – 38.4-41.4 mm) with a moderately long tail (30.0-41.0 mm). The interfemoral membrane encloses the entire but the extreme tip of the tail. Ears squarish with broadly rounded tips, tragus well-developed with a small triangular lobe near the base of the outer margin. On the muzzle, parahrinal glands and internarial groove are distinct. Two pairs of upper and three pairs of lower incisors; and two pairs each of upper and lower premolars are present. One species – *F. affinis* (Dobson, 1871) – occurs in South Asia. Diagnostic morphological characters of the genus are provided in Table 7 and those of the species belonging to it in Table 7.8.

Philetor Thomas, 1902 – Small-sized bats (FA – 31.7-35.7 mm) with a moderately long tail (27.1-32.2 mm). The interfemoral membrane encloses the entire

but the extreme tip of the tail. Ears short with broad, short fleshy and thick tragus. Two pairs of upper incisors and three pairs of lower incisors are present. One pair of upper premolars and two pairs of lower premolars are present. One species – *P. brachypterus* (Temminck, 1840) – occurs in South Asia. Diagnostic morphological characters of the genus are provided in Table 7 and those of the species belonging to it in Table 7.8.

Vespertilio Linnaeus, 1758 – Medium-sized bats (FA – 42.0-45.5 mm) with a moderately long tail (40.0-48.0 mm). The interfemoral membrane encloses the entire but the extreme tip of the tail. Ears relatively small and broad, with small, short, blunt and rounded tragus. Antitragus well defined. Nostrils simple and face slightly outward. Two pairs of upper and three pairs of lower incisors are present. One pair of upper and two pairs of lower premolars are present. One species – *V. murinus* Linnaeus, 1758 – occurs in South Asia. Diagnostic morphological characters of the genus are provided in Table 7 and those of the species belonging to it in Table 7.8.

Hypsugo Kolenati, 1856 – Medium-sized bats (FA – 32.1-38.0 mm) with a moderately long tail (30.0-49.0 mm). The interfemoral membrane encloses the entire but the extreme tip of the tail. Ears short and broad, tragus well-developed. Antitragus is not well defined. Usually two pairs of upper and three pairs of lower incisors; and one pair of upper and two pairs lower premolars are present. Two species – *H. savii* (Bonaparte, 1873) and *H. cadornae* (Thomas, 1916) – occur in South Asia. Diagnostic morphological characters of the genus are provided in Table 7 and those of the species belonging to it in Table 7.8.

Family Miniopteridae

Includes about 19 species of insectivorous bats with wide distribution in Americas, Europe, Africa, Asia, Australia and Oceania (Mickleburgh et al. 2002; Simmons 2005). Muzzle simple and lacks the noseleaf. Ears separate from each other. Tragus is well-developed. The long tail is completely enclosed in the interfemoral membrane or the extreme tip protrudes out. Characteristically possess greatly elongated third digit whose second phalanx is markedly longer than that of the first, owing to which the distal end of the wing bends over the body while at rest. Three species belonging to one genus are reported from South Asia.

Miniopterus Bonaparte, 1837 – Medium-sized bats (FA – 39.6-49.6 mm) with a long tail (39.6-61.0 mm). The interfemoral membrane encloses the entire but the extreme tip of the tail. Ears small with tall, slender and slightly forwardly curved tragus (Fig. 7H). Muzzle short. Two pairs of upper incisors and three pairs of lower incisors are present. Two pairs of upper premolars and three pairs of lower premolars are present. Three

species – *M. fuliginosus* (Hodgson, 1835), *M. pusillus* Dobson, 1876 and *M. magnater* Sanborn, 1931 – occur in South Asia. Diagnostic morphological characters of the genus are provided in Table 8 and those of the species belonging to it in Table 8.1.

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Appendix I. Some important literature consulted to prepare the key

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Table 1. Classical and modern classification of bats

Classical	Modern		
	Simmons & Geisler 1998 Gunnels & Simmons 2005	Springer et al. 2001 Teeling et al. 2005	Eick et al. 2005 Jones & Teeling 2006
Order Chiroptera	Order Chiroptera	Order Chiroptera	Order Chiroptera
Suborder Megachiroptera	Suborder Megachiroptera	Suborder Yinpterochiroptera	Suborder Yinpterochiroptera
Family Pteropodidae	Family Pteropodidae	Superfamily Pteropodoidea	Superfamily Pteropodoidea
Suborder Microchiroptera	Suborder Microchiroptera	Family Pteropodidae	Family Pteropodidae
Family Rhinopomatidae	Superfamily Emballonuroidea	Superfamily Rhinolophoidea	Superfamily Rhinolophoidea
Family Craseonycteridae	Family Emballonuridae	Family Rhinopomatidae	Family Rhinolophidae
Family Nycteridae	Infraorder Yinochiroptera	Family Megadermatidae	Family Hipposideridae
Family Megadermatidae	Superfamily Rhinopomatoidea	Family Rhinolophidae	Family Megadermatidae
Family Rhinolophidae	Family Rhinopomatidae	Subfamily Rhinolophinae	Family Craseonycteridae
Family Hipposideridae	Superfamily Rhinolophoidea	Subfamily Hipposiderinae	Family Rhinopomatidae
Family Mormoopidae	Family Nycteridae	Suborder Yangochiroptera	Suborder Yangochiroptera
Family Noctilionidae	Family Megadermatidae	Family Nycteridae <i>incertae sedis</i>	Family Nycteridae
Family Phyllostomidae	Family Rhinolophidae	Superfamily Emballonuroidea	Superfamily Emballonuroidea
Family Mormoopidae	Subfamily Hipposiderinae	Family Emballonuridae	Family Emballonuridae
Family Noctilionidae	Subfamily Rhinolophinae	Superfamily Noctilionoidea	Superfamily Noctilionoidea
Family Furipteridae	Infraorder Yangochiroptera	Family Noctilionidae	Family Phyllostomidae
Family Thyropteridae	Superfamily Noctilionoidea	Family Phyllostomidae	Family Mormoopidae
Family Natalidae	Family Noctilionidae	Superfamily Vespertilionoidea	Family Noctilionidae
Family Mystacinidae	Family Phyllostomidae	Family Natalidae	Family Furipteridae
Family Vespertilionidae	Superfamily Nataloidea	Family Vespertilionidae	Family Thyropteridae
Family Molossidae	Family Natalidae	Family Molossidae	Family Mystacinidae
	Superfamily Molossoidea		Superfamily Vespertilionoidea
	Family Antrozoidae		Family Vespertilionidae
	Family Molossidae		Family Molossidae
	Superfamily Vespertilionoidea		Family Miniopteridae
	Family Vespertilionidae		Family Natalidae

Table 2. Checklist of bats of South Asia

Family Pteropodidae (Old World fruit bats) [8 Genera, 13 Species]	37. <i>Rhinolophus blasii</i> Peters, 1867
1. <i>Rousettus aegyptiacus</i> (E. Geoffroy, 1810)	38. <i>Rhinolophus macrotis</i> Blyth, 1844
2. <i>Rousettus leschenaultii</i> (Desmarest, 1820)	39. <i>Rhinolophus luctus</i> Temminck, 1835
3. <i>Pteropus giganteus</i> Brunnich, 1782	40. <i>Rhinolophus beddomei</i> Andersen, 1905
4. <i>Pteropus faunulus</i> Miller, 1902	41. <i>Rhinolophus trifolius</i> Temminck, 1834
5. <i>Pteropus hypomelanus</i> Temminck, 1853	42. <i>Rhinolophus pearsonii</i> Horsfield, 1851
6. <i>Pteropus melanotus</i> Blyth, 1863	43. <i>Rhinolophus yunanensis</i> Dobson, 1872
7. <i>Cynopterus sphinx</i> (Vahl, 1797)	44. <i>Rhinolophus mitratus</i> Blyth, 1844
8. <i>Cynopterus brachyotis</i> (Muller, 1838)	Family Hipposideridae (Leaf-nosed bats) [4 Genera, 15 Species]
9. <i>Megaerops niphanae</i> Yenbutra & Felten, 1983	45. <i>Hipposideros ater</i> Templeton, 1848
10. <i>Latidens salimalii</i> Thonglongya, 1972	46. <i>Hipposideros cineraceus</i> Blyth, 1853
11. <i>Sphaerias blanfordi</i> (Thomas, 1891)	47. <i>Hipposideros durgadasi</i> Khajuria, 1970
12. <i>Eonycteris spelaea</i> (Dobson, 1871)	48. <i>Hipposideros fulvus</i> Gray, 1838
13. <i>Macroglossus sobrinus</i> K. Andersen, 1911	49. <i>Hipposideros pomona</i> K. Andersen, 1918
Family Rhinopomatidae (Mouse-tailed bats) [1 Genus, 3 Species]	50. <i>Hipposideros hypophyllus</i> Kock & Bhat, 1994
14. <i>Rhinopoma microphyllum</i> (Brunnich, 1782)	51. <i>Hipposideros galeritus</i> Cantor, 1846
15. <i>Rhinopoma hardwickii</i> Gray, 1831	52. <i>Hipposideros speoris</i> (Schneider, 1800)
16. <i>Rhinopoma muscatellum</i> Thomas, 1903	53. <i>Hipposideros larvatus</i> (Horsfield, 1823)
Family Emballonuridae (Sheath-tailed bats) [2 Genera, 6 Species]	54. <i>Hipposideros armiger</i> (Hodgson, 1835)
17. <i>Taphozous longimanus</i> Hardwicke, 1825	55. <i>Hipposideros lankadiva</i> Kelaart, 1850
18. <i>Taphozous melanopogon</i> Temminck 1841	56. <i>Hipposideros diadema</i> (E. Geoffroy, 1813)
19. <i>Taphozous perforatus</i> E. Geoffroy, 1818	57. <i>Triaenops persicus</i> Dobson, 1871
20. <i>Taphozous theobaldi</i> Dobson, 1872	58. <i>Asellia tridens</i> E. Geoffroy, 1813
21. <i>Taphozous nudiventris</i> Cretzschmar, 1830	59. <i>Coelops frithi</i> Blyth, 1848
22. <i>Saccolaimus saccolaimus</i> (Temminck, 1838)	Family Molossidae (Free-tailed bats) [3 Genera, 4 Species]
Family Megadermatidae (False Vampire bats) [1 Genus, 2 Species]	60. <i>Tadarida teniotis</i> (Rafinesque, 1814)
23. <i>Megaderma lyra</i> E. Geoffroy, 1810	61. <i>Tadarida aegyptiaca</i> (E. Geoffroy, 1818)
24. <i>Megaderma spasma</i> (Linnaeus, 1758)	62. <i>Chaerephon plicatus</i> (Buchanan, 1800)
Family Rhinolophidae (Horseshoe bats) [1 Genus, 20 Species]	63. <i>Otomops wroughtoni</i> (Thomas, 1913)
25. <i>Rhinolophus mehelyi</i> Matschie, 1901	Family Vespertilionidae (Evening bats) [23 Genera, 63 Species]
26. <i>Rhinolophus ferrumequinum</i> (Schreber, 1774)	64. <i>Myotis blythii</i> (Tomes, 1857)
27. <i>Rhinolophus bocharicus</i> Kastschenko and Akimov, 1917	65. <i>Myotis sicarius</i> Thomas, 1915
28. <i>Rhinolophus affinis</i> Horsfield, 1823	66. <i>Myotis formosus</i> (Hodgson, 1835)
29. <i>Rhinolophus rouxii</i> Temminck, 1835	67. <i>Myotis nipalensis</i> (Dobson, 1871)
30. <i>Rhinolophus sinicus</i> Andersen, 1905	68. <i>Myotis muricola</i> (Gray, 1846)
31. <i>Rhinolophus hipposideros</i> (Bechstein, 1800)	69. <i>Myotis siligorensis</i> (Horsfield, 1855)
32. <i>Rhinolophus pusillus</i> Temminck, 1834	70. <i>Myotis montivagus</i> (Dobson, 1874)
33. <i>Rhinolophus subbadius</i> Blyth, 1844	71. <i>Myotis annectans</i> (Dobson, 1871)
34. <i>Rhinolophus lepidus</i> Blyth, 1844	72. <i>Myotis longipes</i> (Dobson, 1873)
35. <i>Rhinolophus shortridgei</i> Andersen, 1918	73. <i>Myotis csorbai</i> Topal, 1997
36. <i>Rhinolophus cognatus</i> K. Andersen, 1906	74. <i>Myotis laniger</i> (Peters, 1871)
	75. <i>Myotis horsfieldii</i> (Temminck, 1840)

76. <i>Myotis hasseltii</i> (Temminck, 1840)
77. <i>Myotis emarginatus</i> (E. Geoffroy, 1806)
78. <i>Plecotus homochrous</i> Hodgson, 1847
79. <i>Plecotus wardi</i> Thomas, 1911
80. <i>Plecotus strelkovi</i> Spitzenberger, 2008
81. <i>Barbastella leucomelas</i> (Cretzschmar, 1826)
82. <i>Otonycteris hemprichii</i> Peters, 1859
83. <i>Scotomanes ornatus</i> (Blyth, 1851)
84. <i>Scotophilus heathi</i> Horsfield, 1831
85. <i>Scotophilus kuhlii</i> Leach, 1821
86. <i>Eptesicus serotinus</i> (Schreber, 1774)
87. <i>Eptesicus bottae</i> (Peters, 1869)
88. <i>Eptesicus pachyotis</i> (Dobson, 1871)
89. <i>Eptesicus dimissus</i> Thomas, 1916
90. <i>Eptesicus gobiensis</i> Bobrinskii, 1926
91. <i>Eptesicus nasutus</i> (Dobson, 1877)
92. <i>Eptesicus tatei</i> Ellerman & Morrison-Scott, 1951
93. <i>Vespertilio murinus</i> Linnaeus, 1758
94. <i>la io</i> Thomas, 1902
95. <i>Tylonycteris pachypus</i> (Temminck, 1840)
96. <i>Tylonycteris robustula</i> Thomas, 1915
97. <i>Pipistrellus pipistrellus</i> (Schreber, 1774)
98. <i>Pipistrellus paterculus</i> Thomas, 1915
99. <i>Pipistrellus javanicus</i> (Gray, 1838)
100. <i>Pipistrellus coromandra</i> (Gray, 1838)
101. <i>Pipistrellus tenuis</i> (Temminck, 1840)
102. <i>Pipistrellus ceylonicus</i> (Kelaart, 1852)
103. <i>Pipistrellus kuhlii</i> (Kuhl, 1817)
104. <i>Pipistrellus abramus</i> (Temminck, 1840)
105. <i>Hypsugo savii</i> (Bonaparte, 1837)
106. <i>Hypsugo cadornae</i> (Thomas, 1916)
107. <i>Falsistrellus affinis</i> (Dobson, 1871)
108. <i>Arielulus circumdatus</i> (Temminck, 1840)
109. <i>Scotozous dormeri</i> (Dobson, 1875)
110. <i>Scotoecus pallidus</i> (Dobson, 1876)
111. <i>Nyctalus noctula</i> (Schreber, 1774)
112. <i>Nyctalus leisleri</i> (Kuhl, 1817)
113. <i>Nyctalus montanus</i> (Barrett-Hamilton, 1906)
114. <i>Philetor brachypterus</i> (Temminck, 1840)
115. <i>Hesperoptenus tickelli</i> (Blyth, 1851)
116. <i>Murina leucogaster</i> Milne-Edwards, 1872
117. <i>Murina aurata</i> Milne-Edwards, 1872
118. <i>Murina cyclotis</i> Dobson, 1872
119. <i>Murina tubinaris</i> (Scully, 1881)
120. <i>Murina huttoni</i> (Peters, 1872)

121. <i>Harpicola grisea</i> Peters, 1872
122. <i>Harpiocephalus harpia</i> (Temminck, 1840)
123. <i>Kerivoula picta</i> (Pallas, 1767)
124. <i>Kerivoula hardwickii</i> (Horsfield, 1824)
125. <i>Kerivoula lenis</i> Thomas, 1916
Family Miniopteridae (Long-fingered Bats) [1 Genus, 3 Species]
126. <i>Miniopterus schreibersii</i> (Kuhl, 1817)
127. <i>Miniopterus pusillus</i> Dobson, 1876
128. <i>Miniopterus magnater</i> Sanborn, 1931

Key to the Suborders and the Families

- 1A. Eyes conspicuous (>4mm in diameter); ear pinna simple, tragus and anti tragus absent; noseleaf absent; second digit of the wing with well-developed phalanges, with claw (with one exception); tail absent, if present small (shorter than ¼ of tibia); interfemoral membrane reduced or virtually absent; head dog-like in profile

Family Pteropodidae Key 1

- 1B. Eyes medium to small (<3mm in diameter); ear pinna with distinctive tragus or/and antitragus; second digit of the wing with reduced phalanges and no claw; tail present (lacking in one family), long (longer than ½ of tibia); interfemoral membrane moderate to wide; head not dog-like in profile

Go to 2

- 2A. Muzzle with a simple or complex noseleaf, with or without supplementary leaflets and other processes; tragus present or absent

3

- 2B. Noseleaf usually absent; may or may not have dermal ridge between the nostrils; tragus present

4

- 3A. Noseleaf simple, with an erect leaf behind nostrils and a heart-shaped leaf surrounding nostrils; tragus bifid; antitragal lobe not developed; ear pinnae large (nearly 2/3rd of the forearm length), fused at bases; tail absent

Family Megadermatidae Key 2

- 3B. Noseleaf complex, consisting of a horseshoe; tragus absent; antitragal lobe conspicuous; tail enclosed within the interfemoral membrane

5

- 4A. Muzzle with small dermal ridge; second and third digits of each wing with two distinct bony phalanges; tail thin with greatest part projecting free from the narrow interfemoral membrane

Family Rhinopomatidae Key 3

- 4B. Muzzle without a dermal ridge; ears may or may not be joined over the forehead; interfemoral membrane well-developed; tail may or may not be free

6

- 5A. Noseleaf triangular with sella between the nostrils; lancet pointed and raising to near or above the forehead; anterior noseleaf horseshoe shaped; antitragus distinct; toes with three joints each

Family Rhinolophidae Key 4

- 5B. Noseleaf squarish without sella or lancet; anterior noseleaf lobate or horseshoe shaped; posterior leaf simple or complex; supplementary leaflets may or may not be present; antitragus notch-like; toes with two joints each

Family Hipposideridae Key 5

- 6A. Tail completely enclosed within the wide interfemoral membrane or the last one or two vertebrae are free

7

6B.	At least a part of the tail free from the interfemoral membrane	8
7A.	Tail completely enclosed within the wide interfemoral membrane or the last one or two vertebrae are free; second phalanx of third finger only slightly longer than first Family Vespertilionidae Key 6	
7B.	Tail completely enclosed within the wide interfemoral membrane; second phalanx of third finger much longer than first, the lengthened distal part folds upon the wing at rest Family Miniopteridae Key 7	
8A.	Tail emerging on the upper surface from the mid-point of the interfemoral membrane Family Emballonuridae Key 8	
8B.	Tail emerging out from the outer edge of the interfemoral membrane, wrinkle-lipped Family Molossidae Key 9	

Keys to the Genera and Species of Bats of South Asia

Key 1, Family Pteropodidae (13 species)		
1A.	Second digit of the wing lacks a claw (claw present only on thumb); tongue sharply pointed and protrusible; tail relatively long, about equal to hind foot length; a pair of large anal glands distinct; Four upper and four lower incisors; FA: 66.0-78.0 mm; CBL: 31.7-36.3 mm; CM ² : 11.9-13.4 mm <i>Eonycteris spelaea</i>	
1B.	Claws present on both thumb and second digit; tail usually shorter than hind foot or obscure	2
2A.	Large body size; in adults, forearm length more than 110mm	3
2B.	Small to medium body size; in adults, forearm length less than 100mm	4
3A.	Forearm less than 150mm; ears moderate in length, bluntly rounded	5
3B.	Forearm usually longer than 150mm; ears long (E: 28.0-57.0 mm), more or less pointed	6
4A.	Tail extremely short (5mm or less) or absent	7
4B.	Tail longer than 10mm	8

5A. Pelage on the back pale russet brown with gray and black hairs; ear length 25.0-28.0 mm, short and broad, tips rounded; FA: 135.0-145.0 mm; CBL: 59.0-64.1 mm; CM²: 22.8-25.7 mm

Pteropus hypomelanus

5B. Pelage on the back blackish-brown with white hairs; ear length about 22.0mm, moderate and broad, tips rounded; FA: 110.0-116.0 mm; CBL: ~ 48.6mm; CM²: 19.0-19.2 mm

Pteropus faunulus

6A. Pelage on the back blackish-brown with a few paler hairs and on ventral side pale tan to deep orange red or chestnut brown; FA: 145-183 mm; CBL: 61.5-74.9 mm; CM²: 24.0-29.0 mm

Pteropus giganteus

6B. Pelage on the back blackish brown with a few paler hairs and on ventral side dark brown or blackish-brown; FA: 148.0-163.0 mm; CBL: 63.3-70.7 mm; CM²: 24.6-27.9 mm

Pteropus melanotos

7A. Muzzle narrow and elongate, slightly curved downwards; tongue very long and slender with papillae on distal part; tail absent or rudimentary (3.5-5.5 mm); wing membrane attached to dorsal side of foot; FA: 44.0-52.0 mm; CBL: 26.6-27.1 mm; CM²: 8.6-8.8 mm

Macroglossus sobrinus

7B. Muzzle not narrow and elongate, not curved downwards; tongue moderately long, lacks papillae on distal part; tail totally absent; wing membrane attached to the outer side of the foot or to outmost digit

9

8A. Forearm less than 75mm; muzzle short and relatively broad; ears with conspicuous white margins

10

8B. Forearm longer than 75mm; muzzle moderate in length and breadth; ears without any white margins

11

9A. Forearm greater than 65mm; one pair each of upper and lower incisors present; FA: 66.0-69.0 mm; CBL: 31.4-33.0 mm; CM¹: 11.3-11.8 mm

Latidens salimalii

9B. Forearm lesser than 65mm; two pairs of upper incisors, one or two pairs of lower incisors present

12

10A. Ears large (E: 17.5-24.0 mm) with well-developed pale anterior and posterior border; metacarpals and phalanges pale; FA: 64.0-79.0 mm; CBL: 28.4-33.3 mm; CM¹: 10.2-12.2 mm

Cynopterus sphinx

10B. Ears small (E: 14.5-18.0 mm) with poorly developed or no pale anterior and posterior border; metacarpals and phalanges dark; FA: 57.3-63.3 mm; CBL: 26.0-28.8 mm; CM¹: 8.9-10.7 mm

Cynopterus brachyotis

11A. FA: 83.0-90.0 mm; T: 14.0-20.0 mm; CBL: 36.9 -40.4 mm; CM²: 14.9-16.6 mm

Rousettus aegyptiacus

11B. FA: 75.0-86.0 mm; T: 8.0-21.0 mm; CBL: 33.5-37.7 mm; CM²: 13.5-15.2 mm

Rousettus leschenaultii

12A. Muzzle moderate; distance between eye and nostril equal to that between eye and ear; ears with thin white margins; rudimentary interfemoral membrane entirely concealed with dense and long fur on hind limbs; two pairs of lower incisors; FA: 52.0-61.0 mm; CBL averages 26.2mm; CM¹: 8.0-8.1 mm

Sphaerias blanfordi

12B. Muzzle very short and broad; distance between eye and nostril less than that between eye and ear (auditory meatus); ears without any white margins; interfemoral membrane visible, not entirely concealed by fur; one pair of lower incisors; FA: 52.0-63.0 mm; CBL: 25.6-26.7 mm; CM¹: 8.4-8.6 mm

Megaerops niphanae

Key 2 Family Megadermatidae (2 species)

1A. Vertical noseleaf tall (c'10mm), straight sided with longitudinal ridge and a simple rounded horizontal base; inner margins of the ears fused at about 30% of its height; FA: 56.0-71.5 mm; CCL: 24.5-27.8 mm; CM³: 10.6-12.1 mm

Megaderma lyra

1B. Vertical noseleaf short (c' 6.5mm); convex sided with longitudinal ridge and a distinctly heart-shaped base; inner margins of the ears fused at about 15% or less of its height; FA: 54.0-62.0 mm; CCL: 21.9-23.6 mm; CM³: 9.3-10.5 mm

Megaderma spasma

Key 3, Family Rhinopomatidae (3 species)

1A. Tail (50.0-77.0 mm) shorter than FA; FA: 59.5-74.6 mm; CCL: 17.2-22.7 mm; CM³: 7.0-8.0 mm

Rhinopoma microphyllum

1B. Tail (49.0-78.0 mm) longer than FA; FA: 46.0-64.0 mm

2

2A. Dermal ridge on the muzzle well-developed; FA: 52.9-64.0 mm; CCL: 15.5-17.5 mm; CM³: 6.0-6.8 mm

Rhinopoma hardwickii

2B. Dermal ridge on the muzzle poorly developed; FA: 46.0-53.2 mm; CCL: 14.7-15.1 mm; CM³: 5.3-5.9 mm

Rhinopoma muscatellum

Key 4, Family Rhinolophidae (20 species)

- | | | |
|-----|---|--|
| 1A. | Sella with lateral projecting lappets at its base | 2 |
| 1B. | Sella lacking lateral basal lappets | 3 |
| 2A. | Noesleaf and ears brownish; inferior surface of the sella broad (c' 4.3mm) | 4 |
| 2B. | Noseleaf and ears yellowish; inferior surface of the sella relatively narrow (c' 1.4mm at the apex); FA: 50.0-53.3 mm; CCL: 19.5-21.5 mm; CM ³ : 8.4-8.9 mm | <i>Rhinolophus trifolius</i> |
| 3A. | Connecting process pointed | 5 |
| 3B. | Connecting process rounded, not pointed | 6 |
| 4A. | Large in size (FA >70.0mm); inferior surface of the sella parallel-sided and broad (c' 4.3mm); FA: 70.0 -80.5 mm; CCL: 27.5-28.7 mm; CM ³ : 11.8-12.6 mm | <i>Rhinolophus luctus</i> |
| 4B. | Small in size (FA <65.0mm); inferior surface of the sella parallel-sided and moderately broad (c' 2.4mm); FA: 54.9-64.3 mm; CCL: 22.2-24.4 mm; CM ³ : 9.6-10.4 mm | <i>Rhinolophus beddomei</i> |
| 5A. | Anterior median swellings moderately low, protruding anteriorly | 7 |
| 5B. | Anterior median swellings higher, directing upwards | 8 |
| 6A. | Connecting process low, rounded, its tip pointed more or less downwards; superior connecting process broadly rounded and low; FA: 35.9-40.0 mm; CCL: 13.0-14.0 mm; CM ³ : 4.6-5.5 mm | <i>Rhinolophus hipposideros</i> |
| 6B. | Connecting process well-developed, rounded, its tip pointed more or less forwards | 9 |
| 7A. | Sella parallel-sided; dorsal pelage light brown, well marked dark brownish patches under each eye; ventral pelage light grayish-brown or even purely white; FA: 47.0-53.0 mm; GTL: 18.8-20.4 mm; CM ³ : 6.2-7.2 mm | <i>Rhinolophus mehelyi</i> |
| 7B. | Sella wedge-shaped; dorsal pelage light brown to yellowish-brown, ventral pelage grayish, white or creamy; FA: 43.0-50.0 mm; CCL: 16.0-17.0 mm; CM ³ : 6.0-7.6 mm | <i>Rhinolophus blasii</i> |
| 8A. | Superior process more horn like | 10 |

8B. Superior process not horn like	11
9A. Connecting process forming a continuous arch or obsolete; lower lip with one mental groove, internarial not expanded	12
9B. Connecting process not forming a continuous arch	13
10A. Base of the sella broadly rounded; FA: 34.9- 37.8 mm; CCL: 13.0-14.0 mm; CM ³ : 5.4-6.0 mm	<i>Rhinolophus pusillus</i>
10B. Base of the sella not broadly rounded	14
11A. Small skull (GTL usually <17.0mm); small upper canine, feeble saggital crest; FA: 37.0-41.8 mm; GTL: 15.7-17.3 mm; CM ³ : 5.6-6.8 mm	<i>Rhinolophus lepidus</i>
11B. Heavy built skull (GTL usually >17.0mm); very long upper canine, strong saggital crest; FA: 39.0-42.0 mm; GTL: 17.2-17.9 mm; CM ³ : 6.5-7.2 mm	<i>Rhinolophus shortridgei</i>
12A. Inferior surface of the sella not rounded and the base expanded	15
12B. Inferior surface of the sella rounded and the base narrow; FA: ~ 57.1mm; T: ~ 30.0mm	<i>Rhinolophus mitratus</i>
13A. Sella long and wide; palatal bridge more than 1/3 rd length of maxillary tooththrow CM ³ ; superior connecting process broadly rounded; inferior extremity short and emarginated; lancet short with pointed tip; FA: 39.0-46.0 mm; CCL: 15.2-16.6 mm; CM ³ : 6.2-6.7 mm	<i>Rhinolophus macrotis</i>
13B. Sella shorter and narrower; palatal bridge less than 1/3 rd length of maxillary tooththrow CM ³	16
14A. Large in size; horn like superior connecting process slightly curved downwards; FA: 37.5-40.7 mm; CCL: 14.2-15.8 mm; CM ³ : 6.0-7.0 mm	<i>Rhinolophus cognatus</i>
14B. Small in size; horn like superior connecting process not curved downwards; FA: 33.4-35.9 mm; CCL: 11.9-12.9 mm; CM ³ : 5.1-5.5 mm	<i>Rhinolophus subbadius</i>
15A. Small; FA: 50.8-54.8 mm; CCL: 20.2-21.6 mm; CM ³ : 9.2-9.9 mm	<i>Rhinolophus pearsonii</i>
15B. Large; FA: 54.2-59.5 mm; CCL: 22.3-22.9 mm; CM ³ : 9.5-10.6 mm	<i>Rhinolophus yunanensis</i>

16A.	Connecting process high and bluntly rounded, anterior upper premolar when present always minute and fully extruded from the tooth row	17
16B.	Connecting process lower and rounded, anterior premolar larger and usually in row or only slightly extruded, very rarely totally external	18
17A.	Large (FA >53.0mm); FA: 54.8-62.1 mm; GTL: 20.8-24.9 mm; CM ³ : 8.5-9.6 mm <i>Rhinolophus ferrumequinum</i>	
17B.	Small (FA <53.0mm); FA: 47.5-53.0 mm; GTL: 19.0-22.2 mm; CM ³ : 6.7-7.2 mm <i>Rhinolophus bocharicus</i>	
18A.	Lancet triangular, lateral margins more or less straight; FA: 50.0-55.0 mm; CCL: 18.7-20.5 mm; CM ³ : 8.5-9.5 mm <i>Rhinolophus affinis</i>	
18B.	Lancet abruptly narrowed at central, its lateral margins strongly concave	19
19A.	Second phalanx of third metacarpal 52.8-66.0% of its length; FA: 44.4-52.3 mm; CCL: 17.5-21.0 mm; CM ³ : 7.9-9.2 mm <i>Rhinolophus rouxii</i>	
19B.	Second phalanx of third metacarpal 65.0-75.3% of its length; FA: 45.7-49.6 mm; CCL: 17.4-18.4 mm; CM ³ : 7.6-8.2 mm <i>Rhinolophus sinicus</i>	

Key 5, Family Hipposideridae (15 species)

1A.	Tail long and enclosed within interfemoral membrane, except for the extreme tip; supplementary lappets absent; noseleaf with or without supplementary leaflets	2
1B.	Tail rudimentary (<2.0mm); interfemoral membrane much reduced and narrow; anterior noseleaf, deeply emarginated anteriorly, extends beyond muzzle; with forwardly projecting two supplementary lappets; FA: 37.8-42.0 mm; CCL: 14.3-14.8 mm; CM ³ : 5.8-6.0 mm <i>Coelops frithi</i>	
2A.	Posterior leaf of the noseleaf with three vertical processes	3
2B.	Posterior leaf of the noseleaf without three vertical processes	4
3A.	Narial lappets well-developed; ears small funnel shaped; noseleaf with a single pair of supplementary leaflets; a fourth vertical process projecting downwards also present; FA: 48.3-54.0 mm; CBL: 16.9-18.9 mm; CM ³ : 6.1-7.1 mm <i>Triaenops persicus</i>	

3B.	Narial lappets less developed; ears broad with pointed tips; noseleaf with two pairs of supplementary leaflets; the central vertical process taller and pointed than others; FA: 50.1-52.3 mm; CCL: 15.7-17.0 mm; CM ³ : 6.5-7.2 mm	
		<i>Asellia tridens</i>
4A.	Noseleaf without supplementary leaflets	5
4B.	Noseleaf with supplementary leaflets	6
5A.	Ears moderate, averages less than 18.0mm (E: 13.0-20.0 mm)	7
5B.	Ears large, averages more than 20.0mm (E: 18.5-26.0 mm)	8
6A.	Two or less than two supplementary leaflets	9
6B.	Three or four supplementary leaflets	10
7A.	Jugal bone of each zygoma with dorsal process; fourth metacarpal exceeds fifth; FA: 34.9-42.3 mm; CCL: 13.2-15.0 mm; CM ³ : 5.1-5.9 mm	
		<i>Hipposideros ater</i>
7B.	Jugal bone of each zygoma lacking the dorsal process	11
8A.	Zygomata exceeds braincase in width; third metacarpal shorter than fourth; FA: 38.4-44.0 mm; CCL: 15.0-16.4 mm; CM ³ : 6.0-6.9 mm	
		<i>Hipposideros fulvus</i>
8B.	Zygomata equal to braincase in width; third metacarpal shorter than fifth; FA: 38.1-43.2 mm; CCL: 14.6-2-16.0 mm; CM ³ : 5.5-6.2 mm	
		<i>Hipposideros pomona</i>
9A.	One supplementary leaflet; fifth metacarpal shorter than the third; FA: 37.1-40.0 mm; CCL: 14.2-14.8 mm; CM ³ : 5.3-5.7 mm	
		<i>Hipposideros hypophyllus</i>
9B.	Two supplementary leaflets; fifth metacarpal significantly shorter than the third; FA: 45.0-51.3 mm; CCL: 14.6-15.8 mm; CM ³ : 5.3-6.2 mm	
		<i>Hipposideros galeritus</i>
10A.	Three supplementary leaflets, third sometimes reduced or absent	12
10B.	Four supplementary leaflets, fourth sometimes reduced or absent	13
11A.	Small; tail projects up to 1.0mm beyond the interfemoral membrane; FA: 33.0-36.3 mm; CCL: 12.7 -13.7 mm; CM ³ : 4.9-5.3 mm	
		<i>Hipposideros cineraceus</i>

11B. Large; tail projects up to 2.5-4.0 mm beyond the interfemoral membrane; FA: 36.0-37.5 mm; CBL: 13.0 -13.9 mm; CM³: 5.0-6.0 mm

Hipposideros durgadasi

12A. Small in size; outer supplementary leaflet distinctly small; ears markedly small (E: 12.5-9.0 mm); FA: 45.6-54.0 mm; CCL: 15.9-17.5 mm; CM³: 6.6-7.5 mm

Hipposideros speoris

12B. Large in size; outer supplementary leaflet normal; ears relatively large (E: 23.0-26.0 mm); FA: 61.2-64.8 mm; CCL: 20.8-21.4 mm; CM³: 8.9-9.4 mm

Hipposideros larvatus

13A. Small in size, forearm less than 65.0; outer leaflet distinctly small or even absent; fleshy outgrowths behind posterior leaf or even protuberances before eyes lacking; FA: 58.8-64.2 mm; CCL: 22.6-22.9 mm; CM³: 9.7-10.0 mm

Hipposideros diadema

13B. Large in size, forearm in the range of 75.0-99.0 mm; fleshy outgrowths present behind posterior leaf, at least in the form of small protuberances before the eyes

14

14A. Second upper incisor greatly enlarged; dorsal pelage fawn, yellow, brown or red; ears short (E: 19.5 -30.0 mm); outer leaflet slightly reduced; FA: 75.0-99.0 mm; CCL: 24.8-31.5 mm; CM³: 11.6-14.5 mm

Hipposideros lankadiva

14B. Second upper incisor not greatly enlarged; dorsal pelage dark brown; ears large (E: 26.0-34.0 mm); outer leaflet distinctly small; FA: 85.4-95.0 mm; CCL: 25.6-29.2 mm; CM³: 11.3-12.5 mm

Hipposideros armiger

Key 6, For subfamilies of the family Vespertilionidae (63 species)

1A. Nostrils elongated and tubular

Murininae, Key 6A

1B. Nostrils not elongated

2

2A. Ears funnel-shaped

Kerivoulinae, Key 6B

2B. Ears not funnel-shaped

3

3A. Tragus long, slender, bluntly pointed more or less straight, its length along the anterior margin at least three times its greatest width; usually three pairs of upper and lower premolars

Myotinae, Key 6C

3B. Tragus shorter, wider, generally rounded at tip, usually curved forwards, its length along the anterior margin usually less than three times its greatest width; less than three pairs of upper and lower premolars

Vespertilioninae, Key 6D

Key 6A, Subfamily Murinae (8 species)

- 1A. Forearm less than 44.0mm, last upper molar normal 2
- 1B. Forearm more than 44.0mm, last upper molar reduced, often deciduous; FA: 44.1-50.1 mm; CCL: 19.0-19.5 mm; CM³: 6.5-6.9 mm
Harpiocephalus harpia
- 2A. Upper incisors (I² and I³) are approximately two-third that of the C¹ in height; wings attached to the base of the first toe; interfemoral membrane densely covered with rather long hairs above and naked below; FA: ~ 32.8mm; CCL: ~ 12.1mm; CM³: ~ 4.9mm
Harpicola grisea
- 2B. Upper incisors (I² and I³) are almost one-half that of the C¹ in height 3
- 3A. Wings attached to the base of the first toe; ears with faint to distinct emargination on the posterior border 4
- 3B. Wings attached to the base of the claw of the first toe; ears without emargination on the posterior border 5
- 4A. Emargination on the posterior border of the ear indistinct; interfemoral membrane moderately covered with pale gray or ferruginous hairs above and naked below; FA: 30.1-34.1 mm; CCL: 13.4-14.2 mm; CM³: 5.0-5.4 mm
Murina tubinaris
- 4B. Emargination on the posterior border of the ear distinct and conspicuous; Interfemoral membrane moderately covered with long thick reddish hair above and naked below; FA: ~ 40.9mm; CCL: ~ 16.3mm; CM³: ~ 6.1mm
Murina leucogaster
- 5A. Interfemoral membrane naked below 6
- 5B. Interfemoral membrane moderately covered with golden hairs above and gray hairs below; FA: 27.7-29.6 mm; CCL: ~ 12.3mm; CM³: ~ 4.5mm
Murina aurata
- 6A. FA: 32.8-35.4 mm; CCL: 14.9-15.5 mm; CM³: 5.8-6.1 mm; Skull relatively long with average CCL being 15.2mm
Murina huttoni
- 6B. FA: 29.7-34.5 mm; CCL: 123.9-15.0 mm; CM³: 5.2-5.7 mm; Skull relatively small with average CCL being 14.4mm
Murina cyclotis

Key 6B, Subfamily Kerivoulinae (3 species)

- 1A. Wing membranes parti-coloured orange and black; interfemoral membrane orange to scarlet, hairy above; FA: 31.5-37.9; CCL: 12.2-13.3 mm; CM³: 5.5-5.8 mm
Kerivoula picta
- 1B. Wing membranes uniformly brown 2
- 2A. Interfemoral membrane sparsely haired above near body parts and posterior border; FA: 31.7-36.0 mm; CCL: 12.4-13.0 mm; CM³: 5.5-5.8 mm
Kerivoula hardwickii
- 2B. Interfemoral membrane lacks hair, sometimes with whitish veins; FA: 37.2-41.0 mm; CCL: 14.5-15.1 mm; CM³: 6.6-6.8 mm
Kerivoula lenis

Key 6C, Subfamily Myotinae (14 species)

- 1A. Wings, forearm and interfemoral membrane conspicuously parti-coloured black, red, orange and yellow; FA: 44.5-49.1 mm; CCL: 16.3-16.6 mm; CM³: 6.8-7.2 mm
Myotis formosus
- 1B. Wings, forearm and interfemoral membrane not parti-coloured 2
- 2A. Outer margin of the ear with conspicuous emarginations; FA: 36.0-41.0 mm
Myotis emarginatus
- 2B. Outer margin of ear lacking any conspicuous emarginations 3
- 3A. Foot including the claws less than half of the tibia 4
- 3B. Foot including the claws half to three fourth of the tibia 5
- 4A. Small (FA <37.0mm); Forearm in the range of 30.0-37.0 mm 6
- 4B. Large (FA >44.0mm); Forearm in the range of 44.7-54.6 mm 7
- 5A. Wings attached to the side of the foot immediately below the ankle 8
- 5B. Wings attached to the foot at the ankle or little above 9

6A.	Canines and molars very weak; FA: 30.0-31.5 mm; CCL: ~ 11.2mm; CM ³ : 4.7-4.8 mm	
		<i>Myotis siligorensis</i>
6B.	Canines and molars well-developed	10
7A.	Ear relatively large (about 32% of the HB); FA: 48.1-54.6 mm; CCL: 16.9-17.7 mm; CM ³ : 7.1-7.5 mm	
		<i>Myotis sicarius</i>
7B.	Ears not large (<32% of the HB)	11
8A.	Dorsal pelage sooty gray brown; FA: ~ 34.8mm; CBL: 10.6-11.9 mm; CM ³ : 4.8-5.0 mm	
		<i>Myotis laniger</i>
8B.	Dorsal pelage black; FA: 36.5-41.5 mm; CCL: 13.4-14.3 mm; CM ³ : 5.5-5.9 mm	
		<i>Myotis horsfieldii</i>
9A.	Tragus short and narrow; dorsal pelage dark brown; FA: 37.2-40.3 mm; CCL: 14.0-14.6 mm; CM ³ : 5.8-6.0 mm	
		<i>Myotis hasseltii</i>
9B.	Tragus long and narrow; dorsal pelage brown	12
10A.	Braincase domed or bulbous; ventral pelage pale gray to cream; FA: 34.5-36.8 mm; CCL: 11.6-12.4 mm; CM ³ : 4.7-5.3 mm	
		<i>Myotis nipalensis</i>
10B.	Braincase flatter; ventral pelage brownish; FA: 31.2-37.0 mm; CCL: 11.5-12.3 mm; CM ³ : 4.8-5.3 mm	
		<i>Myotis muricola</i>
11A.	Ears small, about 25% of HB; FA: 44.7-46.8 mm; CCL: 15.1-15.6 mm; CM ³ : 6.5-6.8 mm	
		<i>Myotis montivagus</i>
11B.	Ears large, about 30% of the HB; FA: 45.3-46.5 mm; CCL: 14.9-15.5 mm; CM ³ : 6.5-6.7 mm	
		<i>Myotis annectans</i>
12A.	Large in size (FA >55.0mm); interfemoral membrane pale brown and hairless throughout; FA: 55.5-58.3 mm; CCL: 18.1-18.9 mm; CM ³ : 8.2-8.5 mm	
		<i>Myotis blythii</i>
12B.	Small in size (FA <41.0mm)	13
13A.	FA: 36.5-39.0 mm; TIB: 14.4-17.80 mm; CBL: 12.77-13.76 mm; ZB: ~ 8.4 mm; CM ³ : 5.1-5.3 mm	
		<i>Myotis longipes</i>
13B.	FA: 34.80-37.50 mm; TIB: 14.84-15.80 mm; CBL: 12.11-12.71 mm; ZB: 7.59-8.19 mm; CM ³ : 4.72-5.19 mm	
		<i>Myotis csorbai</i>

Key 6D, For tribes of the subfamily Vespertilioninae (38 species)

- 1A. Nostrils margined by grooves on the upper surface of the muzzle; ears long, joined, or may not be joined, across the forehead
Plecotini, Key 6D i
- 1B. Nostrils simple, opening by crescentic or circular apertures at the extremity of the muzzle; ears generally moderate, forehead not grooved
2
- 2A. Total teeth 30; dental formula 1113/3123
Nycticeiini, Key 6D ii
- 2B. Total teeth 32-34; dental formula 211(2)3/3123
3
- 3A. First upper premolar usually absent, except in genus *Arielulus* where it is present; dental formula 2113/3123 in former, 2123/3123 in later
Eptesicini, Key 6D iii
- 3B. First upper premolar usually present; dental formula 2123/3123
4
- 4A. Medium to large bats (FA between 25.0-57.8 mm); pipistrelles, with parahinal glands (highly variable genus *Pipistrellus*) or pipistrelle-like with relatively less depressed skull and absence or variable presence of I² (genus *Scotozous*) or with narrow wings, high and broad rostra (genus *Nyctalus*)
Pipistrellini, Key 6D iv
- 4B. Medium to very large bats (FA between 26.1- 77.3 mm); pipistrelle-like with variable characters, like enlarged pads on feet and base of thumbs (genus *Tylonycteris*), rounded braincase (genus *Philetor*), large size with forearm usually greater than 70.0mm (genus *Ia*), skull with full rostrum (genus *Vespertilio*), absence of keeled calcar (genus *Hypsugo*) or with parahinal glands (genus *Falsistrellus*)
Vespertilionini, Key 6D v

Key 6D i, Tribe Plecotini (5 species)

- 1A. Ears long, greater than 30mm in length **2**
- 1B. Ears, joined over forehead by a band of integument, are short, up to 18mm in length, barely extending beyond the tip of the muzzle when laid forward, and wide with 5-6 furrows; FA: 38.7-42.1 mm; CCL: 13.4-14.2 mm; CM³: 4.7-5.1 mm
Barbastella leucomelas
- 2A. Small, forearm less than 50mm; ears longer than 30 mm with numerous horizontal furrows, joined by an integument over forehead **3**
- 2B. Large, forearm greater than 55mm; ears longer than 35 mm, but not joined by an integument over forehead; tragus half the height of the pinna; antitragus shallow notch-like; dorsal pelage buffy brown, ventral pelage uniformly pale grey; FA: 64.7-65.6 mm; CCL: ~ 21.7mm; CM³: ~ 8.5mm
Otonycteris hemprichii
- 3A. Large, forearm greater than 41mm **4**
- 3B. Small, forearm lesser than 41mm; pelage dense and woolly, uniformly dark brown dorsally and ventrally; ears, wing and tail membranes dark brown; FA: 36.5-40.7 mm; CCL: 13.8-14.2 mm; CM³: 5.0-5.4 mm
Plecotus homochrous
- 4A. Pelage dense but not woolly, brownish dorsally and whitish ventrally; ears, wing and tail membranes pale to mid brown; FA: 41.4-44.7 mm; CCL: 14.8-15.5 mm; CM³: 5.4-5.8 mm
Plecotus wardi
- 4B. Pelage not very dense dorsally and shaggy ventrally, cold grayish-drab dorsally and yellowish white ventrally; ears, wing and tail membranes semitransparent cold brown; FA: 39.6-44.8 mm; CCL: 14.1-15.6 mm; CM³: 5.3-6.1 mm
Plecotus strelkovi

Key 6D ii, Tribe Nycticeiini (4 species)

1A. Small size (Forearm less than 38.0mm); head flattened with broad and flat muzzle; tragus long and narrow; FA: 34.1-37.3 mm; CCL: 13.8-14.8 mm; CM³: 5.5-5.9 mm

Scotoecus pallidus

1B. Large size (Forearm more than 44.0mm); head not flattened

2

2A. Dorsal pelage orange brown with white spots on crown, back and shoulders; ears large and lacking any ridges; FA: 56.1-61.2 mm; CCL: 20.1-20.9 mm; CM³: 7.8-8.5 mm

Scotomanes ornatus

2B. Dorsal pelage tawny or chestnut brown, lacks any marking; ears small with numerous transverse ridges

3

3A. Large (Forearm averaging 60.7mm); ventral pelage with distinctly yellow tinge; FA: 55.4-65.8 mm; CCL: 19.0-21.3 mm; CM³: 7.1-8.4 mm

Scotophilus heathi

3B. Smaller (Forearm averaging 49.0mm); ventral pelage buffy brown; FA: 44.0-56.4 mm; CCL: 16.3- 18.0 mm; CM³: 6.1-6.8 mm

Scotophilus kuhlii

Key 6D iii, Tribe Eptesicini (9 species)

1A. Ears with well-visible white margins; dorsal pelage is dark brown, the tip of longer guard hairs are bright cuprous-red or golden; interfemoral membrane uniformly dark brown; broad tragus has pale margin; FA: 41.8-43.6 mm; CCL: 14.6-15.6 mm; CM³: 6.0-6.5 mm

Arielulus circumdatus

1B. Ears lacking white or pale margins; dorsal pelage lacks cuprous-red or orange hue 2

2A. Ears thick and fleshy, yellowish-brown, without ridges; dorsal pelage with distinct yellowish tinge; FA: 50.0-60.4 mm; CCL: 17.2-19.6 mm; CM³: 6.5-6.9 mm

Hesperoptenus tickelli

2B. Ears with conspicuous ridges, dark; dorsal pelage without yellowish tinge 3

3A. Large in size (FA >50.0mm); ears moderately tall averaging 14.0mm, bears six transverse ridges; FA: 54.2-55.1 mm; CCL: 18.3-19.5 mm; CM³: 7.1-7.8 mm

Eptesicus serotinus

3B. Small in size (FA <50.0mm, in the range of 35.4 -45.3 mm) 4

4A. Membranes and naked areas pale yellow; FA: 41.0-41.5 mm; CBL: ~ 15.1mm; CM³: ~ 5.9mm

Eptesicus gobiensis

4B. Membranes and naked areas shades of brown 5

5A. Pelage black throughout; FA: ~ 43.4mm; HB: ~ 48.5mm; T: 45.9mm

Eptesicus tatei

5B. Pelage not uniformly black throughout 6

6A. Ears triangular in shape with rounded tips; tragus short; proximal part of ear thick and fleshy; FA: 38.0-40.3 mm; HB: 55.0-56.0 mm; T: 40.0-41.0 mm; GTL: ~ 21.2mm

Eptesicus pachyotis

6B. Ears not triangular in shape; proximal part of ear normal 7

7A. Tail nearly as long as the HB (>90%), rostrum short; FA: 35.4-36.9 mm; CCL: 11.7-12.2 mm; CM³: 4.4-4.8 mm

Eptesicus nasutus

7B. Tail not as long as the HB (<85%), rostrum long 8

8A. Basioccipital pits prominent; FA: ~ 42mm;

Eptesicus dimissus

8B. Basioccipital pits not very prominent; FA: ~ 42.1mm; CCL: ~ 15.0mm; CM³: ~ 5.8mm

Eptesicus bottae

Key 6D iv, Tribe Pipistrellini (12 species)

- 1A. Ears short (about 28% of the forearm length) and broad; tragus usually half the height of the pinna, with faintly concave anterior border 2
- 1B. Ears relatively short (about 24% of the forearm length); tragus club-shaped, more than twice wider in distal part than at base 3
- 2A. Inner upper incisor (i^2) large, unicuspidate and in contact with canine or nearly so; outer incisor (i^3) absent, if present, no more than a minute spicule; interfemoral membrae uniformly mid brown, veins sometimes white; FA: 32.7-36.3 mm; CCL: 12.8-13.6 mm; CM³: 5.2-5.6 mm
Scotozous dormeri
- 2B. Inner upper incisor (i^2) usually bicuspidate; outer incisor large similar in crown area to inner and half or more its height 4
- 3A. Large (forearm more than 50mm); FA: 50.9-57.8 mm; CCL: 17.1-18.6 mm; CM³: 7.1-7.7 mm
Nyctalus noctula
- 3B. Small (forearm less than 50mm) 5
- 4A. Second upper premolar (pm^2) positioned usually in toothrow; interfemoral membrane haired only above but naked below; FA: 30.0-31.6 mm; CCL: 10.4-11.3 mm; CM³: 4.1-4.4 mm
Pipistrellus pipistrellus
- 4B. Second upper premolar (pm^2) intruded 6
- 5A. Fur bicoloured; FA: 42.1-45.2 mm; CCL: 14.7-15.2 mm; CM³: 5.5-5.9 mm
Nyctalus leisleri
- 5B. Fur uniform brown; FA: 42.9-43.0 mm; CCL: 15.4-16.0 mm; CM³: 6.5-6.6 mm
Nyctalus montanus
- 6A. Large (forearm averaging over 35.0mm); pelage on ventral side conspicuously paler than on dorsal side; interfemoral membrane sparsely haired above and below; FA: 33.0-42.0 mm; CCL: 13.1-14.3 mm; CM³: 5.2-5.9 mm
Pipistrellus ceylonicus
- 6B. Small (Forearm length averaging less than 35.0mm); pelage on ventral side slightly paler than on dorsal side 7
- 7A. Interfemoral membrane pallid and translucent; FA: 33.4-36.0 mm; CCL: 12.0-12.9 mm; CM³: 4.6-5.0 mm
Pipistrellus kuhlii

7B. Interfemoral membrane not pallid and translucent	8
8A. Canine lacks secondary posterior cusps; upper molars relatively massive; pelage dark brown; penis over 10mm in length; FA: 29.2-34.0 mm; CCL: 10.6-11.6 mm; CM ³ : 4.1-4.8 mm	<i>Pipistrellus paterculus</i>
8B. Canine with posterior secondary cusp	9
9A. Pelage colouration pale; tragus gradually narrowing along its terminal half, with somewhat pointed apex; penis long, over 8mm in length	10
9B. Pelage colouration usually relatively dark; tragus more or less even together; penis short, less than 8mm in length	11
10A. Large, forearm between 30.0 to 36 mm; interfemoral membrane not haired; penis short, about 8.0-10.0 mm in length; FA: 30.0-36.0 mm; CCL: 11.9 -13.1 mm; CM ³ : 4.6-5.2 mm	<i>Pipistrellus javanicus</i>
10B. Small, forearm between 31.4 to 34.4 mm; penis long, about 10-13 mm in length; FA: 31.4-34.4 mm; CCL: 11.4-12.8 mm; CM ³ : 4.2-4.9 mm	<i>Pipistrellus abramus</i>
11A. Large, forearm length averaging 30mm; interfemoral membrane haired near the body both above and below; FA: 25.5-34.3 mm; CCL: 10.6-11.9 mm; CM ³ : 3.9-4.6 mm	<i>Pipistrellus coromandra</i>
11B. Small, forearm length averaging 28mm; interfemoral membrane not haired; FA: 25.0-30.2 mm; CCL: 9.3-10.7 mm; CM ³ : 3.5-4.1 mm	<i>Pipistrellus tenuis</i>

Key 6D v, Tribe Vespertilionini (8 species)

- | | | |
|-----|---|--------------------------------------|
| 1A. | Soles of the feet expanded in to fleshy pads; head noticeably flattened | 2 |
| 1B. | Soles of the feet normal; head not flattened | 3 |
| 2A. | Pelage shades of golden brown; FA: 26.1-29.0 mm; CCL: 10.0-11.3 mm; CM ³ : 3.4-4.2 mm | <i>Tylonycteris pachypus</i> |
| 2B. | Pelage shades of brown; FA: 26.6-28.1 mm; CCL: 11.1-11.7 mm; CM ³ : 3.9-4.4 mm | <i>Tylonycteris robustula</i> |
| 3A. | Large bat, forearm greater than 70.0mm; FA: 70.9-77.3 mm; CCL: 25.2-26.2 mm; CM ³ : 10.5-11.0 mm | <i>la io</i> |
| 3B. | Small bat, forearm lesser than 70.0mm | 4 |
| 4A. | Two upper premolars and two lower premolars | 5 |
| 4B. | One upper premolar and two lower premolars | 6 |
| 5A. | Large bat, forearm greater than 38mm; braincase small; basisphenoid pits absent; FA: 38.4-41.4 mm; CCL: 13.7-14.5 mm; CM ³ : 5.5-5.7 mm | <i>Falsistrellus affinis</i> |
| 5B. | Small bat, forearm lesser than 38mm | 7 |
| 6A. | Tragus fleshy and thickened; FA: 31.7-38.0 mm; CCL: 12.4-13.7 mm; CM ³ : 4.5-4.8 mm | <i>Philetor brachypterus</i> |
| 6B. | Tragus small and short; FA: 42.0-45.5 mm; CCL: ~ 15.0mm; CM ³ : 4.9-5.5 mm | <i>Vespertilio murinus</i> |
| 7A. | Interfemoral membrane sparsely haired near the body; dorsal pelage long, silky and variably chestnut brown; FA: 32.1-38.0 mm; CCL: 12.4-13.3 mm; CM ³ : 4.6-5.1 mm | <i>Hypsugo savii</i> |
| 7B. | Interfemoral membrane mostly naked; dorsal pelage long, silky and dark brown; FA: 32.6-36.5 mm; CCL: 12.6-12.8 mm; CM ³ : 4.6-4.9 mm | <i>Hypsugo cadornae</i> |

Key 7, Family Miniopteridae (3 species)

- 1A. Large with forearm greater than 47mm and condylobasal length greater than 15.5mm;
FA: 47.5 -52.8 mm; CBL: 15.7-17.3 mm; CM³: 6.4-7.3 mm
Miniopterus magnater
- 1B. Small with forearm lesser than 50mm and condylobasal length lesser than 15.5mm
2
- 2A. Hairs on the interfemoral membrane near body parts; FA: 44.7-49.6 mm; CBL: 14.6-
15.5 mm; CM³: 5.8-6.3 mm
Miniopterus schreibersii
- 2B. Hairs on the interfemoral membrane extend further away from body parts; FA: 39.6-
40.2 mm; CBL: 12.7-13.2 mm; CM³: 5.1-5.3 mm
Miniopterus pusillus

Key 8, Family Emballonuridae (6 species)

- 1A. Radio-metacarpal pouch distinct; lower lip scarcely grooved
2
- 1B. Radio-metacarpal pouch absent; lower lip deeply grooved; gular sac present in both
the sexes (smaller in females); wings attached to ankles; FA: 63.0-68.2 mm; CCL: 21.7-
24.6 mm; CM³: 9.8-11.2 mm
Saccolaimus saccolaimus
- 2A. Radio-metacarpal pouch small; gular pouch less visible; wings attached to tibiae;
posterior back and lower abdomen naked; FA: 71.0-80.0 mm; CCL: 21.6 -25.6 mm; CM³:
10.3-11.8 mm
Taphozous nudiventris
- 2B. Radio-metacarpal pouch well-developed
3
- 3A. Gular pouch present; wings attached either to tibiae or ankles
4
- 3B. Gular pouch absent; wings attached to tibiae
5
- 4A. Gular pouch present in males and absent in females; wings attached to tibiae;
FA: 59.2-63.8 mm; CCL: 18.4-19.7 mm; CM³: 8.2-8.9 mm
Taphozous perforatus
- 4B. Gular pouch rudimentary in females; wings attached to ankles; posterior back and
lower abdomen hairy; FA: 55.6-62.0 mm; CCL: 19.2-21.6 mm; CM³: 8.7-9.2 mm
Taphozous longimanus

5A. Large with forearm length greater than 70mm; wing and interfemoral membrane naked; FA: 71.0- 76.0 mm; CCL: 21.9-23.4 mm; CM³: 9.4-10.5 mm

Taphozous theobaldi

5B. Small with forearm length lesser than 70mm; dorsal fur extends over wing and interfemoral membranes; males with black beard; FA: 60.0-68.0 mm; CCL: 19.5-21.5 mm; CM³: 8.6-9.2 mm

Taphozous melanopogon

Key 9, Family Molossidae (4 species)

1A. Ears not joined by membrane over the forehead

2

1B. Ears joined by membrane over the forehead

3

2A. Forearm less than 52.3mm; two pairs of lower incisors (some aberrant individuals may have three pairs); FA: 46.0-52.3 mm; CCL: 17.1-18.8 mm; CM³: 7.1-7.8 mm

Tadarida aegyptiaca

2B. Forearm greater than 58.4mm; three pairs of lower incisors; FA: 58.4-63.9 mm; CCL: 21.6-23.1 mm; CM³: 8.2-9.3 mm

Tadarida teniotis

3A. Forearm less than 51mm; two pairs of lower incisors; FA: 43.1-50.2 mm; CCL: 15.9-17.1 mm; CM³: 6.4-7.3 mm

Chaerephon plicatus

3B. Forearm greater than 63.0mm; two (or sometimes three) pairs of small and bifid lower incisors; pelage diagnostic with glossy dark chocolate brown on the back, thin white lines on the flanks and antebrachial membrane; FA: 63.0-67.0 mm; CCL: 21.8-23.2 mm; CM³: 8.8-9.3 mm

Otomops wroughtoni

Table 3. Diagnostic morphological characters of eight genera of the family Pteropodidae present in South Asia

Genus	<i>Rousettus</i> Gray, 1821	<i>Pteropus</i> Brisson, 1762	<i>Cynopterus</i> Cuvier, F., 1824	<i>Megaerops</i> Peters, 1865	<i>Latidens</i> Thonglongya, 1972	<i>Sphaerias</i> Miller, 1906	<i>Eonycteris</i> Dobson, 1873	<i>Macroglossus</i> Cuvier, F., 1824
External characters								
Forearm length	75.0-90.0	110.0-209.0	57.0-79.0	52.0-63.0	66.0-69.0	52.0-61.0	66.0-78.0	44.0-52.0
Head Body length	111.0-147.0	148.0-300.0	76.0-113.0	81.0-90.0	102.0-109.0	NA	92.0-130.0	78.0-89.0
Tail length	8.0-21.0	Absent	2.0-19.0	Absent	Absent	Absent	11.5-23.0	Absent/ (3.5-5.5)
Hind Foot length	15.0-25.0	38.0-65.0	11.0-18.0	~ 14.0	8.0-15.0	~ 12.0	17.0-21.0	~ 10.0
Ear length	17.5-24.0	22.0-57.0	14.5-24.0	18.5-19.0	15.5-18.5	16.1-19.5	16.9-21.0	15.0-17.0
Cranial characters								
Condylbasal length	33.5-40.4	48.6-74.9	26.0-33.3	25.6-26.7	31.4-33.0	~ 26.2	31.7-36.3	26.6-27.1
Maxillary toothrow (CM [†])	13.5-16.6	19.0-29.0	8.9-12.2	8.4-8.6	11.3-11.8	8.0-8.1	11.9-13.4	8.6-8.8
Incisors – Upper	2 pairs	2 pairs	2 pairs	2 pairs	1 pair	2 pairs	2 pairs	2 pairs
– Lower	2 pairs	2 pairs	2 pairs	1 pair	1 pair	2 pairs	2 pairs	2 pairs
Cheek teeth	Robust	Robust	Robust	Short & broad	Broad	Narrow	Narrow	Extremely narrow
Il upper molar	Present	Present	Absent	Absent	Absent	Absent	Present	Present
Dental formula	2132 2133 = 34	2132 2133 = 34	2131 2132 = 30	2131 1132 = 28	1131 1132 = 26	2131 2132 = 30	2132 2133 = 34	2132 2133 = 34
Species content	<i>R. aegyptiacus</i> (E. Geoffroy, 1810); <i>R. leschenaulti</i> (Desmarest, 1820)	<i>P. giganteus</i> Brünnich, 1782; <i>P. faunulus</i> Miller, 1902; <i>P. hypomelanus</i> Temminck, 1853; <i>P. melanotus</i> Blyth, 1863	<i>C. sphinx</i> Vahl, 1797; <i>C. brachyotis</i> (Müller, 1838)	<i>M. niphaeae</i> Yenbutra & Felten, 1983	<i>L. salimalii</i> Thonglongya, 1972	<i>S. bianfordi</i> (Thomas, 1891)	<i>E. spelaea</i> (Dobson, 1871)	<i>M. sobrinus</i> (K. Andersen, 1911)
Further table reference	3.1	3.2	3.3	3.4	3.4	3.4	3.4	3.4

Note: All measurements are in mm

Table 3.1. Diagnostic morphological characters of the two species of the genus *Rousettus* Gray, 1821 present in South Asia

Species	<i>Rousettus aegyptiacus</i> (E. Geoffroy, 1810)	<i>Rousettus leschenaultii</i> (Desmarest, 1810)
External characters		
Forearm length	83.0-90.0	75.0-86.0
Head Body length	113.0-126.0	111.0-147.0
Tail length	14.0-20.0	8.0-21.0
Hind Foot length	20.0-25.0	15.0-22.0
Ear length	18.0-22.0	17.5-24.0
Thumb (including claw)	30.0-33.4	24.0-31.3
II phalanx of 3 rd metacarpal	51.9-56.3	39.6-46.2
Cranial characters		
Condylbasal length	36.9-40.4	33.5-37.7
Maxillary tooththrow (CM ²)	14.9-16.6	13.5-15.2
Mandibular tooththrow (CM ₃)	16.5-18.2	14.8-16.7
Zygomatic breadth	23.7-25.2	20.2-24.0
Mandible length	30.5-32.7	27.6-31.1

Note: All measurements are in mm

Table 3.2. Diagnostic morphological characters of four species of the genus *Pteropus* Brisson, 1762 present in South Asia

Species	<i>Pteropus giganteus</i> (Brünnich, 1782)	<i>Pteropus faunulus</i> Miller, 1902	<i>Pteropus hypomelanus</i> Temminck, 1853	<i>Pteropus melanotus</i> Blyth, 1863
External characters				
Forearm length	145.0-183.0	110.0-116.0	135.0-145.0	148.0-163.0
Head Body length	198.0-300.0	~ 170.0	199.0-220.0	NA
Tail length	Absent	Absent	Absent	Absent
Hind Foot length	38.0-58.0	~ 34.0	~ 59.2	NA
Ear length	33.0-45.0 Long & pointed, triangular shaped	~ 22.0 Moderate length, tips rounded off	25.0-28.0 Short & broad, tips rounded off	NA Large & broad, with narrow tips
Rostrum	Long & robust	Narrow	Narrow	Broad & robust
Pelage on the back	Blackish-brown with a few paler hairs	Blackish-brown with white hairs	Pale russet brown with gray & black hairs	Blackish-brown with a few gray hairs
Ventral surface	Pale tan to deep orange red or chestnut brown	Gray-chestnut brown	Fawn	Dark brown or blackish brown
Cranial characters				
Condylbasal length	61.5-74.9	~ 48.6	59.0-64.1	63.3-70.7
Maxillary tooththrow (CM ²)	24.0-29.0	19.0-19.2	22.8-25.7	24.6-27.9
Mandibular tooththrow (CM ₃)	25.6-33.0	21.5-22.0	25.7-28.6	27.8-30.6
Zygomatic breadth	32.2-44.0	~ 28.0	32.2-34.8	32.9-40.2
Mandible length	47.8-60.0	40.0-42.0	48.9-53.2	52.6-59.1

Note: All measurements are in mm; NA - Data not available

Table 3.3. Diagnostic morphological characters of the two species of the genus *Cynopterus* Cuvier, F., 1824 present in South Asia

Species	<i>Cynopterus sphinx</i> (Vahl, 1797)	<i>Cynopterus brachyotis</i> (Müller, 1838)
External characters		
Forearm length	64.0-79.0	57.3-63.3
Head Body length	76.0-113.0	80.0-96.0
Tail length	4.5-19.0	2.0-13.0
Hind Foot length	12.6-18.0	11.0-15.0
Ear length	17.5-24.0 Large with pale anterior and posterior borders	14.5-18.0 Small with pale anterior and posterior borders absent or poorly developed
Metacarpals & phalanges	Pale	Dark
Cranial characters		
Condylbasal length	28.4-33.3	26.0-28.8
Maxillary tooththrow (CM ¹)	10.2-12.2	8.9-10.7
Mandibular tooth row (CM ₂)	12.3-13.5	10.0-11.9
Zygomatic breadth	18.8-23.1	17.6-19.8
Mandible length	22.7-27.5	20.5-23.8

Note: All measurements are in mm

Table 3.4. Diagnostic morphological characters of the species of the genera *Megaerops* Peters, 1865; *Latidens* Thonlongya, 1972; *Sphaerias* Miller, 1906; *Eonycteris* Dobson, 1873; and *Macroglossus* Cuvier, F., 1824 present in South Asia

Species	<i>Megaerops niphanae</i> Yenbutra & Felten, 1983	<i>Latidens salimalii</i> Thonglongya, 1972	<i>Sphaerias blanfordi</i> (Thomas, 1891)	<i>Eonycteris spelaea</i> (Dobson, 1871)	<i>Macroglossus sobrinus</i> (K. Andersen, 1911)
External characters					
Forearm length	52.0-63.0	66.0-69.0	51.7-60.5	66.0-78.0	44.0-52.0
Head Body length	81.0-90.0	102.0-109.0	NA	92.0-130.0	78.0-89.0
Tail length	Absent	Absent	Absent	11.5-23.0	Absent/ if present 3.5-5.5
Hind Foot length	~ 14.0	8.0-15.0	~ 12.0	17.0-21.0	~ 10.0
Ear length	18.5-19.0 Small, broadly rounded	15.5-18.5 Oval, narrowly rounded tip	16.1-19.5 Narrowly rounded tip	16.9-21.0 Narrowly rounded tip	15.0-17.0 Medium with narrowly rounded tips
Interfemoral membrane	Narrow, medial part hairy	Narrow, sparsely haired above and below	Extremely narrow, sparsely haired	Moderately broad sparsely haired along the body	Narrow, thickly covered with short hairs above and below
Cranial characters					
Condylbasal length	25.6-26.7	31.4-33.0	~ 26.2	31.7-36.3	26.6-27.1
Maxillary tooththrow (CM ¹)	8.4-8.6	11.3-11.8	8.0-8.1	11.9-13.4*	8.6-8.8*
Mandibular tooththrow (CM ₃)	~ 9.4	12.4-12.9	~ 9.6	13.0-13.7†	9.7-10.1†
Zygomatic breadth	17.9-18.6	21.0-22.1	~ 18.0	19.0-22.1	14.4-14.8
Mandible length	20.2-21.0	24.8-26.3	~ 19.4	25.1-28.8	21.6-22.5

Note: All measurements are in mm; * – CM²; † – CM₃

Table 4. Diagnostic morphological characters of the genera of the families Rhinopomatidae, Emballonuridae, Megadermatidae and Rhinolophidae present in South Asia

Family	Rhinopomatidae	Emballonuridae	Megadermatidae	Rhinolophidae
Genus	<i>Rhinopoma</i> E. Geoffroy, 1818	<i>Taphozous</i> E. Geoffroy, 1818	<i>Saccolaimus</i> Temminck, 1838	<i>Rhinolophus</i> Lacépède, 1799
External characters				
Forearm length	46.0-74.0	55.6-80.0	63.0-68.2	33.4-80.5
Head Body length	49.0-84.0	67.0-105.0	80.0-93.0	3.0-90.0
Tail length	49.0-78.0	20.0-46.0	21.0-35.0	13.0-55.0
Hind Foot length	11.0-18.0	8.0-18.0	12.0-17.0	5.5-20.0
Ear length	15.8-22.2	14.0-25.0	16.0-20.0	13.5-40.0
Noseleaf	Absent	Absent	Absent	Present with erect posterior lancet & perpendicular median sella
Cranial characters				
Condylacanine length	14.7-22.7	18.4-25.6	21.7-24.6	11.9-28.7
Maxillary toothrow (CM ³)	5.3-5.9	8.2-11.8	9.8-11.2	5.1-12.6
Incisors – Upper – Lower	1 pair 2 pairs	1 pair 2 pairs	1 pair 2 pairs	1 pair 2 pairs
Dental formula	11/13 2/123 = 28	11/23 2/123 = 30	11/23 2/123 = 30	11/23 2/123 = 32
Species content	<i>R. microphyllum</i> (Brünnich, 1782); <i>R. hardwickii</i> Gray, 1837; <i>R. muscatellum</i> Thomas, 1903	<i>T. longimanus</i> Hardwicke, 1825; <i>T. melanopogon</i> Temminck, 1841; <i>T. perforatus</i> E. Geoffroy, 1818; <i>T. theobaldi</i> Dobson, 1872; <i>T. nudiventris</i> Cretzschmar, 1830-31	<i>S. saccolaimus</i> (Temminck, 1838)	<i>R. ferrumequinum</i> (Schreber, 1774); <i>R. affinis</i> Horsfield, 1823; <i>R. rouxii</i> Temminck, 1835; <i>R. sinicus</i> (Andersen, 1905); <i>R. hipposideros</i> (Bechstein, 1800); <i>R. pusillus</i> Temminck, 1834; <i>R. subbadius</i> Blyth, 1844; <i>R. lepidus</i> Blyth, 1844; <i>R. cognatus</i> Andersen, 1906; <i>R. blasii</i> Peters, 1867; <i>R. macrotis</i> Blyth, 1844; <i>R. luctus</i> Temminck, 1835; <i>R. beddomei</i> Andersen, 1905; <i>R. trifoliatus</i> Temminck, 1834; <i>R. pearsonii</i> Horsfield, 1851; <i>R. yunnanensis</i> Dobson, 1872; <i>R. mifratius</i> Blyth, 1844
Further table reference	4.1	4.2	4.2	4.3 4.4

Note: All measurements are in mm

Table 4.1. Diagnostic morphological characters of the three species of the genus *Rhinopoma* E. Geoffroy, 1818 present in South Asia

Species	<i>Rhinopoma microphyllum</i> (Brünnich, 1782)	<i>Rhinopoma hardwickii</i> Gray, 1831	<i>Rhinopoma muscatellum</i> Thomas, 1903
External characters			
Forearm length	59.5-74.6	52.9-64.0	46.0-53.2
Head Body length	60.0-84.0	55.0-73.0	49.0-62.0
Tail length	50.0-77.0	56.0-78.0	49.0-64.3
Hind Foot length	14.0-18.0	11.0-15.0	11.0-13.0
Ear length	18.0-22.0	17.0-21.0	15.8-20.0
Dermal ridge	Poorly developed	Well-developed	Poorly developed
Tail length in relation to forearm length	Shorter	Longer	Longer
Cranial characters			
Condylacanine length	17.2-22.7	15.5-17.5	14.7-15.1
Maxillary tooththrow (CM ²)	7.0-8.0	6.0-6.8	5.3-5.9
Mandibular tooth row (CM ₃)	7.6-8.6	6.5-7.5	5.1-6.7
Zygomatic breadth	11.4-13.4	10.1-11.7	8.8-9.8
Mandible length	13.7-15.8	11.8-13.6	10.5-11.4
Nasal inflations	Small	Moderate	Large

Note: All measurements are in mm

Table 4.3. Diagnostic morphological characters of the two species of the genus *Megaderma* E. Geoffroy, 1810 present in South Asia

Species	<i>Megaderma lyra</i> E. Geoffroy, 1810	<i>Megaderma spasma</i> (Linnaeus, 1758)
External characters		
Forearm length	56.0-71.5	54.0-62.0
Head Body length	70.0-95.0	54.0-81.0
Tail length	Absent	Absent
Hind Foot length	14.0-20.0	13.0-17.0
Ear length	31.5-45.0 Oval with white inner margin, joined by membrane over the forehead about 1/3 to 1/2 of its length	33.0-40.0 Oval lacking white inner margin, joined over the forehead near the base
Tragus	Bifid with taller posterior process	Bifid with narrower and taller posterior process
Noseleaf – sides – longitudinal ridge – base	Tall (~ 10 mm) Straight Present Simple rounded horizontal	Short (~ 6.5 mm) Convex Present Heart-shaped
Cranial characters		
Condylacanine length	24.5-27.8	21.9-23.6
Maxillary tooththrow (CM ²)	10.6-12.1	9.3-10.5
Mandibular tooththrow (CM ₃)	11.6-12.2	10.2-11.4
Zygomatic breadth	15.4-17.1	13.6-14.8
Mandible length	18.8-21.2	16.8-18.5

Note: All measurements are in mm

Table 4.2. Diagnostic morphological characters of five species of the genera *Taphozous* E. Geoffroy, 1818 and *Saccolaimus* Lesson, 1842 present in South Asia

Species	<i>Taphozous longimanus</i> Hardwicke, 1825	<i>Taphozous melanopogon</i> Temminck, 1841	<i>Taphozous perforatus</i> E. Geoffroy, 1818	<i>Taphozous theobaldi</i> Dobson, 1872	<i>Taphozous nudiventris</i> Cretzschmar, 1830-31	<i>Saccolaimus saccolaimus</i> (Temminck, 1838)
External characters						
Forearm length	55.6-62.0	60.0-68.0	59.2-63.8	71.0-76.0	71.0-80.0	63.0-68.2
Head Body length	73.0-86.0	67.0-86.0	71.0-80.0	88.0-89.0	90.0-105.0	80.0-93.0
Tail length	20.0-30.0	20.0-32.0	20.0-28.0	25.0-35.0	22.0-46.0	21.0-35.0
Hind Foot length	8.0-14.0	8.2-14.2	8.2-12.5	11.0-13.0	11.0-18.0	12.0-17.0
Ear length	16.0-19.0	16.5-22.0	14.0-20.0	21.0-24.0	18.0-25.0	16.0-20.0
Chin	Naked	Hairy, males with black beard	Hairy	Hairy	Naked	Short hairs
Gular sac in males In females	Present Rudimentary	Absent Absent	Variably present Absent	Absent Absent	Present Present	Present Present
Wings attached to	Ankles	Tibiae	Tibiae	Tibiae	Tibiae	Ankles
Posterior back & lower abdomen	Hairy	Hairy	Hairy	Hairy	Naked	Hairy
III metacarpal length in relation to forearm length	Long (95.8-109.4%)	Short (84.9-92.7%)	Short (87.1-92.7%)	NA	NA	NA
Radio-metacarpal pouch	Absent	Absent	Absent	Present	Present	Absent
Cranial characters						
Condylacanine length	19.2-21.6	19.5-21.5	18.4-19.7	21.9-23.4	21.6-25.6	21.7-24.6
Maxillary toothrow (CM ³)	8.7-9.2	8.6-9.2	8.2-8.9	9.4-10.5	10.3-11.8	9.8-11.2
Mandibular toothrow (CM ₃)	9.4-10.2	9.3-10.2	9.0-9.6	10.7-12.0	11.4-13.3	10.8-12.3
Zygomatic breadth	12.0-12.9	12.0-13.1	11.5-12.1	13.2-14.0	14.4-17.8	14.2-15.6
Mandible length	15.4-16.4	15.5-16.5	14.6-15.6	18.0-18.9	18.2-21.5	17.5-19.8

Note: All measurements are in mm; NA - Data not available

Table 4.4. Diagnostic morphological characters of twenty species of the genus *Rhinolophus* Lacépède, 1799 present in South Asia

Species	<i>Rhinolophus ferrumequinum</i> (Schreber, 1774)	<i>Rhinolophus bocharicus</i> Kashtchenko & Akimov, 1917	<i>Rhinolophus affinis</i> Horsfield, 1823	<i>Rhinolophus rouxii</i> Temminck, 1835	<i>Rhinolophus sinicus</i> Andersen, 1905	<i>Rhinolophus hipposideros</i> (Bechstein, 1800)
External characters						
Forearm length	54.8-62.1	47.0-53.0	50.0-55.0	44.4-52.3	45.7-49.6	35.9-40.0
Head Body length	56.0-79.0	NA	46.0-68.0	42.0-66.0	43.0-52.5	38.0-48.0
Tail length	30.0-42.0	22.0-32.0	20.0-30.0	22.0-33.0	21.5-30.0	22.0-32.0
Hind Foot length	9.9-14.0	NA	9.8-12.5	7.2-12.8	7.5-10.0	6.9-9.0
Ear length	20.0-28.5	19.3-24.0	14.0-23.0	14.5-22.0	15.8-20.0	13.9-19.0
Horseshoe - Sella - Superior connecting Process	Narrow Relatively small Bluntly rounded	Narrow Small, constricted in mid Bluntly rounded	Relatively broad Relatively small Bluntly rounded	Broad Relatively small Bluntly rounded	Broad Relatively small Bluntly rounded	Broad Small Broadly rounded off and low
Inferior extremity	Bluntly rounded	Bluntly rounded	Bluntly rounded	Bluntly rounded	Bluntly rounded, slightly projecting forward	Projects downwards and forwards
Lancet	Narrowly pointed with concave sides	Narrowly pointed with concave sides	Narrowly pointed with concave sides	Triangular with straight sides	Triangular with straight sides	Tall and narrow with straight sides
Cranial characters						
Condylacanine length	19.7-22.3	19.0-20.2*	18.7-20.5	17.5-21.0	17.4-18.4	13.0-14.0
Maxillary toothrow (CM ₃)	8.5-9.6	6.7-7.2	8.5-9.5	7.9-9.2	7.6-8.2	5.4-6.0
Mandibular toothrow (CM ₃)	9.1-10.1	7.3-7.8	9.0-10.0	8.3-10.0	8.1-9.00	5.9-6.3
Zygomatic breadth	11.0-13.1	9.7-10.8	10.4-11.8	10.2-11.9	10.1-11.0	7.1-7.8
Mandible length	15.2-17.9	12.4-13.4	14.9-16.1	13.8-16.4	13.4-14.6	9.3-10.0

Note: All measurements are in mm; * - GTL

Contd...

Table 4.4. (Contd...). Diagnostic morphological characters of twenty species of the genus *Rhinolophus* Lacépède, 1799 present in South Asia

Species	<i>Rhinolophus pusillus</i> Temminck, 1834	<i>Rhinolophus subbadius</i> Blyth, 1844	<i>Rhinolophus lepidus</i> Blyth, 1844	<i>Rhiolephus shortridgei</i> Andersen, 1918	<i>Rhinolophus cognatus</i> K. Andersen, 1906	<i>Rhinolophus blasii</i> Peters, 1867
External characters						
Forearm length	34.9-37.8	33.4-35.9	37.0-41.8	39.0-42.0	37.5-40.7	43.0-50.0
Head Body length	30.0-40.0	35.0-37.0	35.0-54.0	NA	NA	47.0-54.0
Tail length	13.5-26.0	16.0-19.0	14.0-28.0	16.0-19.0	13.0-21.0	21.0-35.0
Hind Foot length	6.6-8.0	6.7-8.0	5.5-10.0	NA	6.5-9.0	8.0-11.0
Ear length	15.0-17.5	14.1-18.0	14.5-20.6	14.0-18.0	13.5-18.3	15.8-22.0
Horseshoe - Sella - Superior connecting process	Broad Small Broadly triangular (sometimes horn-like)	Broad Small Bluntly rounded (more horn-like)	Broad Small Bluntly rounded	Broad Small Bluntly rounded (more or less horn-like)	Broad Relatively larger Bluntly rounded (horn-like, slightly curved downwards)	Broad Large Acute and high
Inferior extremity	Bluntly rounded, not projected downward	Bluntly rounded not projected downward	Bluntly rounded not projected downwards	Bluntly rounded not projected downwards	Bluntly rounded	Acute and projects slightly downwards
Lancet	Equilateral triangle to elongate	Short & broad	Tip broadly rounded or pointed, sides deeply concave to straight	Tip broadly rounded or pointed, sides deeply concave to straight	Tail	Bluntly pointed, sides straight and wide at the base
Cranial characters						
Condylocanine length	13.0-14.0	11.9-12.9	13.3-15.5	17.2-17.9*	14.2-15.8	16.0-17.0
Maxillary toothrow (CM ³)	5.4-6.0	5.1-5.5	5.6-6.8	6.5-7.2	6.0-7.0	6.0-7.6
Mandibular toothrow (CM ₃)	5.9-6.3	5.2-5.8	6.0-7.4	7.0-7.3	6.2-7.7	6.9-7.2
Zygomatic breadth	7.1-7.8	NA	7.6-8.8	8.5-8.9	8.0-9.0	8.8-9.5
Mandible length	9.3-10.0	9.2-9.5	10.0-12.1	11.7-12.8	10.2-12.5	11.9-12.7

Note: All measurements are in mm; NA – Data not available; * - GTL

Contd...

Table 4.4. (Contd..). Diagnostic morphological characters of twenty species of the genus *Rhinolophus* Lacépède, 1799 present in South Asia

Species	<i>Rhinolophus macrotis</i> Blyth, 1844	<i>Rhinolophus mehelyi</i> Matschie, 1901	<i>Rhinolophus luctus</i> Temminck, 1835	<i>Rhinolophus beddomei</i> Andersen, 1905	<i>Rhinolophus trifolius</i> Temminck, 1834
External characters					
Forearm length	39.0-46.0	47.0-53.0	70.0-80.5	54.9-64.3	50.0-53.3
Head Body length	39.0-48.7	-	85.0-90.0	65.0-75.0	62.0-65.0
Tail length	17.3-26.2	16.2-37.0	49.0-55.0	38.5-48.0	30.0-35.0
Hind Foot length	7.5-9.0	-	16.5-20.0	13.3-18.0	~ 13.0
Ear length	21.0-25.9	18.0-23.0	~ 40.0	21.0-34.0	~ 27.0
Horseshoe	Broad	Narrow	Very broad with emargination, noseleaf has basal lappets	Very broad, divided in two halves, noseleaf has basal lappets	Broad divided in two halves noseleaf has basal lappets
- Sella - Superior connecting Process	Small, projects strongly Broadly rounded	Moderate Broadly rounded	Moderate Broadly rounded, very reduced	Moderate Broadly rounded, very reduced	Moderate Broadly rounded very reduced
Inferior extremity	Short and emarginated	Broad	Broad	Moderately broad projecting forward and downwards	Narrow
Lancet	Short with pointed tip, with slightly convex sides	Abruptly narrow, linear tip	Well-developed, tip rounded	Well-developed, tip rounded	Well-developed, tip rounded
Cranial characters					
Condylacanthine length	15.2-16.6	18.8-20.3*	27.5-28.7	22.2-24.4	19.5-21.5
Maxillary toothrow (CM ³)	6.2-6.7	6.2-7.2	11.8-12.6	9.6-10.4	8.4-8.9
Mandibular toothrow (CM ₃)	6.3-6.9	6.9-7.7	12.7-13.3	10.3-11.1	8.7-9.7
Zygomatic breadth	7.9-8.6	10.0-10.9	14.8-16.2	13.1-14.6	11.2-12.5
Mandible length	10.9-12.7	11.8-13.2	22.6-23.2	17.9-19.3	15.0-16.8

Note: All measurements are in mm; * - GTL

Contd...

Table 4.4. (Contd..). Diagnostic morphological characters of twenty species of the genus *Rhinolophus* Lacépède, 1799 present in South Asia

Species	<i>Rhinolophus pearsonii</i> Horsfield, 1851	<i>Rhinolophus yunanensis</i> Dobson, 1872	<i>Rhinolophus mitratus</i> * Blyth, 1844
External characters			
Forearm length	50.8-54.8	54.2-59.2	~ 57.1
Head Body length	51.0-64.0	60.5-68.0	NA
Tail length	20.0-29.0	21.5-26.0	~ 30.0
Hind Foot length	9.9-14.2	12.5-14.0	NA
Ear length	23.5-28.0	23.5-28.5	NA
Horseshoe - Sella - Superior connecting process	Broad Moderate Bluntly rounded	Broad Moderate Bluntly rounded	Broad Moderate Bluntly rounded
Inferior extremity	Not deflected downwards or Forwards	Not deflected downwards or forwards	Narrow
Lancet	Well-developed tip rounded	Well-developed tip rounded	Well-developed tip rounded
Cranial characters			
Condylocanine length	19.7-22.3	22.3-22.9	NA
Maxillary tooththrow (CM ²)	8.5-9.6	9.5-10.6	NA
Mandibular tooththrow (CM ₃)	9.1-10.1	10.8-11.5	NA
Zygomatic breadth	11.0-13.1	12.2-13.1	NA
Mandible length	15.2-17.9	17.7-18.3	NA

Note: All measurements are in mm; * - Known only from type specimen with damaged skull; NA – Data not available

Table 5. Diagnostic morphological characters of the genera of the family Hipposideridae present in South Asia

Genus	<i>Hipposideros</i> Gray, 1831	<i>Triaenops</i> Dobson, 1871	<i>Asellia</i> Gray, 1838	<i>Coelops</i> Blyth, 1848
External characters				
Forearm length	33.0-99.0	48.3-54.0	50.1-52.3	37.8-42.0
Head Body length	38.0-106.0	51.0-64.0	NA	NA
Tail length	20.0-64.0	31.0-39.0	25.0-28.0	Rudimentary (c' 2 mm)
Hind Foot length	5.3-20.0	8.0-11.0	NA	NA
Ear length	13.0-34.0	13.0-16.0	NA	NA
Noseleaf	Present with or without supplementary leaflets	Present with single pair of supplementary leaflets	Present with two pairs of supplementary leaflets	Present with two elongated supplementary lappets
Interfemoral membrane	Wide	Wide	Wide	Narrow
Cranial characters				
Condylacanine length	12.7-31.5	16.9-18.9*	15.7-17.0	14.3-14.8
Maxillary tooththrow (CM ³)	4.9-14.5	6.1-7.1	6.5-7.2	5.8-6.0
Incisors – Upper – Lower	1 pair 2 pairs	1 pair 2 pairs	1 pair 2 pairs	1 pair 2 pairs
Dental formula	1123 2123 = 30	1123 2123 = 30	1113 2123 = 28	1123 2123 = 30
Species content	<i>H. ater</i> , Templeton, 1848; <i>H. cineraceus</i> Blyth, 1853; <i>H. durgadasi</i> Khajuria, 1970; <i>H. fulvus</i> Gray, 1838; <i>H. pomona</i> K. Andersen, 1918; <i>H. hypophyllus</i> Kock & Bhat, 1994; <i>H. galeritus</i> Cantor, 1846; <i>H. speoris</i> (Schneider, 1800); <i>H. larvatus</i> (Horsfield, 1823); <i>H. armiger</i> Hodgson, 1835; <i>H. lankadiva</i> Kelaart, 1850; <i>H. diadema</i> Geoffroy, E., 1813	<i>T. persicus</i> Dobson, 1871	<i>A. tridens</i> Geoffroy, E., 1813	<i>C. frithii</i> Blyth, 1848
Further table reference	5.1	5.2	5.2	5.2

Note: All measurements are in mm; * - Condylbasal length; NA – Data not available

Table 5.1. Diagnostic morphological characters of twelve species of the genus *Hipposideros* Gray, 1831 present in South Asia

Species	<i>Hipposideros ater</i> Templeton, 1848	<i>Hipposideros cineraceus</i> Blyth, 1853	<i>Hipposideros durgadasi</i> Khajuria, 1970	<i>Hipposideros fulvus</i> Gray, 1838	<i>Hipposideros pomona</i> K. Andersen, 1918	<i>Hipposideros hypophylus</i> Kock & Bhat, 1994
External characters						
Forearm length	34.9-42.3	33.0-36.3	36.0-37.5	38.4-44.0	38.1-43.2	37.1-40.0
Head Body length	~ 38.0-48.0	33.0-42.0	NA	40.0-50.0	~ 36.0-52.0	42.0-47.3
Tail length	20.0-30.0	22.0-30.0	21.5-29.0	24.0-35.0	~ 28.0-35.0	21.5-23.5
Hind Foot length	5.3-7.2	6.0-7.0	5.5-8.0	6.0-9.8	~ 6.3-8.5	6.2-6.9
Ear length	14.8-20.0	13.0-17.0	13.0-19.0	19.0-26.0	18.5-25.0	18.0-20.3
No. of supplementary Leaflets	0	0	0	0	0	1
Median emargination on anterior leaf	Absent	Absent	Absent	Absent	Absent	Absent
Narial lappets	Absent	Absent	Absent	Absent	Absent	Absent
Cranial characters						
Condylacanine length	13.2-15.0	12.7-13.7	13.0-13.9*	15.0-16.4	14.2-16.0	14.2-14.8
Maxillary toothrow (CM ³)	5.1-5.9	4.9-5.3	5.0-6.0	6.0-6.9	5.5-6.2	5.3-5.7
Mandibular toothrow (CM ₃)	5.2-6.4	5.2-5.8	5.0-6.0	6.4-7.5	6.0-6.8	5.6-6.1
Zygomatic breadth	7.7-8.7	6.9-7.6	6.8-9.0	8.6-9.6	7.9-9.0	7.8-8.3
Mandible length	9.4-10.6	8.8-9.4	9.0-9.5	11.1-12.0	9.8-11.3	9.5-10.6
Dorsal process on jugal bone of zygoma	Present	Absent	Absent	NA	NA	Present
Rostral eminences	Present, 4, of which 2 less developed	Present, 4 all less developed	Present, 4 all less developed	NA	NA	NA

Note: All measurements are in mm; * - Condylobasal length; NA – Data not available

Contd...

Table 5.1 (Contd...). Diagnostic morphological characters of twelve species of the genus *Hipposideros* Gray, 1831 present in South Asia

Species	<i>Hipposideros galeritus</i> Cantor, 1846	<i>Hipposideros speoris</i> (Schneider, 1800)	<i>Hipposideros larvatus</i> (Horsfield, 1823)	<i>Hipposideros armiger</i> Hodgson, 1835	<i>Hipposideros lankadiva</i> Kelaart, 1850	<i>Hipposideros diadema</i> Geoffroy, E., 1813
External characters						
Forearm length	45.0-51.3	45.6-54.0	61.2-64.8	85.4-95.0	75.0-99.0	58.8-64.2
Head Body length	45.0-59.5	46.0-62.0	74.0-78.0	82.0-105.0	87.0-106.0	NA
Tail length	29.5-37.0	20.0-29.0	37.0-44.0	50.0-64.0	35.0-58.0	NA
Hind Foot length	4.9-8.0	7.0-11.0	NA	13.0-17.0	12.0-20.0	NA
Ear length	14.5-17.0	12.5-19.0	23.0-26.0	26.0-34.0	19.5-30.0	NA
No. of supplementary Leaflets	2	3 3 rd much reduced	3	4 4 th much reduced	4 4 th much reduced, sometimes absent	4 4 th much reduced, sometimes absent
Median emargination on anterior leaf	Absent	Present, faintly seen	Present, faintly seen	Absent	Absent	Absent
Narial lappets	Small	Well-developed	Well-developed	Less developed	Well-developed	Well-developed
Cranial characters						
Condylacanthine length	14.6-15.8	15.9-17.5	20.3-21.4	25.6-29.2	24.8-31.5	22.6-22.9
Maxillary toothrow (CM ³)	5.3-6.2	6.6-7.5	8.9-9.4	11.3-12.5	11.6-14.5	9.7-10.0
Mandibular toothrow (CM ₃)	5.9-6.3	7.2-8.3	9.9-10.5	12.6-14.0	12.6-16.5	NA
Zygomatic breadth	8.4-9.3	10.2-11.6	13.0-14.0	16.5-18.4	16.1-20.7	14.5-15.0
Mandible length	10.0-11.4	12.4-13.9	16.3-16.8	20.7-23.4	20.1-26.2	NA
Dorsal process on jugal bone of zygoma	Present	Present	Present	Present	Present	NA
Rostral eminences	Present, 4 all well-developed	Present, 4 all less developed	Present, 4 all well-developed	NA	Present, 4 all well-developed	NA

Note: All measurements are in mm; NA – Data not available

Table 5.2. Diagnostic morphological characters of one species each of the genera *Trienops* Dobson, 1871; *Asellia* Gray, 1838; and *Coelops* Blyth, 1848 present in South Asia

Species	<i>Trienops persicus</i> Dobson, 1871	<i>Asellia tridens</i> Geoffroy, E., 1813	<i>Coelops frithii</i> Blyth, 1848
External characters			
Forearm length	48.3-54.0	50.1-52.3	37.8-42.0
Head Body length	51.0-64.0	52.0-55.0	38.0-50.0
Tail length	31.0-39.0	25.0-28.0	Rudimentary, <2.0
Hind Foot length	8.0-11.0	9.0-10.0	5.3-9.0
Ear length	11.0-16.0 Small, funnel-shaped	19.0-20.0 Broad with pointed tips	11.5-15.0 Broad with rounded tip
Noseleaf	Complex with three vertical pointed processes	Complex with three vertical processes, central one pointed, others blunt	Complex with anterior leaf divided in to two and with forwardly projecting supplementary lappets
No. of supplementary leaflets	1	2	0
Median emargination on anterior leaf	Deep	Absent	Deep
Narial lappets	Well-developed	Less developed	Well-developed
Cranial characters			
Condylacanine length	16.9-18.9*	15.7-17.0	14.3-14.8
Maxillary tooththrow (CM ³)	6.1-7.1	6.5-7.2	5.8-6.0
Mandibular tooththrow (CM ₃)	7.0-7.7	7.3-8.3	6.0-6.5
Zygomatic breadth	8.7-9.5	9.7-10.7	7.2-7.5
Mandible length	11.7-13.1	12.2-13.2	9.8-10.2
Dorsal process on jugal bone of zygoma	Present	Present, less developed	Absent
Rostral eminences	Present, 4, all well-developed	Present, 4, all well-developed	Present, 4, all less developed

Note: All measurements are in mm; * - Condylbasal length; NA – Data not available

Table 6. Diagnostic morphological characters of the genera of the family Molossidae present in South Asia

Genus	<i>Tadarida</i> Rafinesque, 1814	<i>Chaerephon</i> Dobson, 1874	<i>Otomops</i> Thomas, 1913
External characters			
Forearm length	46.0-63.9	43.1-50.2	63.0-67.0
Head Body length	61.0-90.0	66.0-71.0	87.0-99.0
Tail length	33.0-60.0	30.0-44.0	41.0-49.0
Hind Foot length	7.0-12.1	9.0-11.3	10.0-14.0
Ear length	15.0-32.0 Not joined over forehead	16.0-21.0 Joined by membrane over forehead	31.2-34.0 Joined by membrane over forehead
Cranial characters			
Condylocanine length	17.1-23.1	15.9-17.1	21.8-23.2
Maxillary tooththrow (CM ³)	7.1-9.3	6.4-7.3	8.8-9.3
Incisors – Upper – Lower	1 pair 2/3 pairs	1 pair 2 pairs	1 pair 2/3 pairs
Dental formula	1123 2(3)123 = 30/32	1123 2123 = 30	1123 2(3)123 = 30/32
Species content	<i>T. teniotis</i> (Rafinesque, 1814); <i>T. aegyptiaca</i> (E. Geoffroy, 1818)	<i>C. plicatus</i> (Buchanan, 1800)	<i>O. wroughtoni</i> Thomas, 1913
Further table reference	6.1	6.1	6.1

Note: All measurements are in mm

Table 6.1. Diagnostic morphological characters of the species of the genera *Tadarida* Rafinesque, 1814, *Chaerephon* Dobson, 1874 and *Otomops* Thomas, 1913 present in South Asia

Genus	<i>Tadarida teniotis</i> (Rafinesque, 1814)	<i>Tadarida aegyptiaca</i> (E. Geoffroy, 1818)	<i>Chaerephon plicatus</i> (Buchanan, 1800)	<i>Otomops wroughtoni</i> Thomas, 1913
External characters				
Forearm length	58.4-63.9	46.0-52.3	43.1-50.2	63.0-67.0
Head Body length	74.0-90.0	61.0-77.0	66.0-71.0	87.0-99.0
Tail length	43.0-54.8	33.0-60.0	30.0-44.0	41.0-49.0
Hind Foot length	9.0-12.1	7.0-10.0	9.0-11.3	10.0-14.0
Ear length	25.0-32.0 Not joined over forehead	15.0-23.0 Not joined over forehead	16.0-21.0 Joined over forehead by a membrane	31.2-34.0 Joined over forehead by a membrane
Antitragus	Large	Small	Small	Absent
Cranial characters				
Condylocanine length	21.6-23.1	17.1-18.8	15.9-17.1	21.8-23.2
Maxillary tooththrow (CM ³)	8.2-9.3	7.1-7.8	6.4-7.3	8.8-9.3
Mandibular tooththrow (CM ₃)	9.1-9.8	7.7-8.6	6.9-7.9	9.2-9.8
Zygomatic breadth	13.4-14.2	11.3-13.3	10.9-11.4	12.6-13.3
Mandible length	16.6-17.5	13.3-14.6	11.8-13.4	15.9-16.9
Lower Incisors	3 pairs	2 pairs	2 pairs	2/3 pairs

Note: All measurements are in mm

Table 7. Diagnostic morphological characters of the genera of the subfamilies Murininae, Kerivoulinae and Myotinae of family Vespertilionidae present in South Asia

Genus	<i>Murina</i> Gray, 1842	<i>Harpiola</i> Thomas, 1915	<i>Harpiocephalus</i> Gray, 1842	<i>Kerivoula</i> Gray, 1842	<i>Myotis</i> Kaup, 1829
External characters					
Forearm length	27.7-40.9	32.4-34.2	44.1-50.1	31.5-42.0	30.0-58.3
Head Body length	38.0-50.0	35.6-42.7	60.0-75.0	39.0-55.0	38.0-80.0
Tail length	27.0-41.0	27.5	40.0-50.0	35.0-55.0	25.0-68.0
Hind Foot length	4.5-10.0	8.2	11.0-14.0	4.0-9.0	6.7-17.0
Ear length	13.0-17.0 Short, broad and tip rounded	12.1 Short, broad, triangular and tip rounded	17.0-18.0 Rounded	11.0-17.0 Moderately long and funnel shaped	6.0-19.0 Narrow and tip bluntly rounded
Cranial characters					
Condylocanine length	12.1-16.3	12.1-14.8	19.0-19.5	12.2-15.9	11.2-18.9
Maxillary tooththrow (CM ³)	4.5-6.1	4.9-5.3	6.5-6.9	5.5-7.4	4.5-8.5
Incisors – Upper – Lower	2 pairs 3 pairs	2 pairs 3 pairs	2 pairs 3 pairs	2 pairs 3 pairs	2 pairs 3 pairs
Premolars – Upper – Lower	2 pairs 2 pairs	2 pairs 2 pairs	2 pairs 2 pairs	3 pairs 3 pairs	2-3 pairs 2-3 pairs
Dental formula	-23,1,-2-4,123 123,1,-2-4,123 = 34	-23,1,-2-4,123 123,1,-2-4,123 = 34	-23,1,-2-4,123 123,1,-2-4,123 = 34	-23,1,-234,123 123,1,-234,123 = 38	213(2)3 313(2)3 = 38 / 34
Species content	<i>M. leucogaster</i> Milne-Edwards, 1872; <i>M. aurata</i> Milne-Edwards, 1872; <i>M. cyclotis</i> Dobson, 1872; <i>M. tubinaris</i> (Scully, 1881); <i>M. huttoni</i> (Peters, 1872);	<i>H. grisea</i> (Peters, 1872)	<i>H. harpia</i> (Temminck, 1840)	<i>K. picta</i> (Pallas, 1767); <i>K. hardwickii</i> (Horsfield, 1825); <i>K. lenis</i> Thomas, 1916	<i>M. blythii</i> (Tomes, 1857); <i>M. sicarius</i> Thomas, 1915; <i>M. formosus</i> (Hodgson, 1835); <i>M. nipalensis</i> (Dobson, 1871); <i>M. muricola</i> (Gray, 1846); <i>M. siligorensis</i> (Horsfield, 1855); <i>M. montivagus</i> (Dobson, 1874); <i>M. annectans</i> (Dobson, 1871); <i>M. longipes</i> (Dobson, 1873); <i>M. laniger</i> (Peters, 1871); <i>M. csorbai</i> Topal, 1997; <i>M. horsfieldii</i> (Temminck, 1814); <i>M. hasseltii</i> (Temminck, 1840)
Further table reference	7.1	7.1	7.1	7.2	7.3

Note: All measurements are in mm

Contd...

Table 7 (Contd..). Diagnostic morphological characters of the genera of the tribes Plecotini, Nycticeiini and Eptesicini of Subfamily Vespertilioninae of family Vespertilionidae present in South Asia

Genus	Plecotus Geoffroy, E., 1818	Barbastella Gray, 1821	Otonycteris Peters, 1859	Scotomanes Dobson, 1875	Scotophilus Leach, 1821	Scotoecus Thomas, 1901	Arielulus Hill & Harrison, 1987	Hesperoptenus Peters, 1869	Eptesicus Rafinesque, 1820
External characters									
Forearm length	36.5-45.1	38.7-42.1	64.7-65.6	56.1-61.2	44.0-65.8	34.1-37.3	41.8-43.6	50.0-60.4	35.4-55.1
Head Body length	40.0-53.0	47.0-51.0	61.0-76.0	64.0-85.0	60.0-93.0	50.0-58.0	92.0-95.0	61.0-79.0	40.0-80.0
Tail length	48.0-54.0	40.0-47.0	40.0-58.0	52.0-66.0	40.0-71.0	34.0-41.0	39.0-40.0	44.0-63.0	38.0-58.0
Hind Foot length	7.0-9.5	7.0-8.0	11.3-12.9	12.0-15.0	8.0-15.0	6.0-10.0	9.0-10.0	9.0-14.0	7.0-10.0
Ear length	37.0-42.0 Large and joined over forehead	15.0-17.0 Broad and joined over forehead	30.0-42.0 Large and tip broadly rounded	19.0-23.0 Large and tip broadly rounded	9.0-20.2 Relatively small with ridges	12.0-15.0 Moderate and tip broadly rounded	14.5-15.0	14.0-18.0 Large, thick, and fleshy	12.5-15.0 Large and with ridges
Cranial characters									
Condylacanthine length	13.8-15.4	13.4-14.2	~ 21.7	20.1-20.9	16.3-21.3	13.8-14.8	14.6-15.6	17.2-19.6	11.7-19.5
Maxillary toothrow (CM ³)	5.0-5.8	4.7-5.1	~ 8.5	7.8-8.5	6.1-8.4	5.5-5.9	6.0-6.5	7.1-8.2	4.4-7.8
Incisors – Upper – Lower	2 pairs 3 pairs	2 pairs 3 pairs	1 pair 3 pairs	1 pair 3 pairs	1 pair 3 pairs	1 pair 3 pairs	2 pairs 3 pairs	2 pairs 3 pairs	2 pairs 3 pairs
Premolars – Upper – Lower	2 pairs 3 pairs	2 pairs 2 pairs	1 pair 2 pairs	1 pair 2 pairs	1 pair 2 pairs	1 pair 2 pairs	2 pairs 2 pairs	1 pair 2 pairs	1 pair 2 pairs
Dental formula	2123 3133 = 36	2123 3123 = 34	1113 3123 = 30	1113 3123 = 30	1113 3123 = 30	1113 3123 = 30	2123 3123 = 34	2113 3123 = 32	2112 3123 = 32
Species content	<i>P. homochrous</i> Hodgson, 1847 <i>P. wardi</i> Thomas, 1911 <i>P. strelkovi</i> Spitzenberger, 2008	<i>B. leucomelas</i> (Cretzschmar, 1826)	<i>O. hemprichii</i> Peters, 1859	<i>S. omatus</i> (Blyth, 1851)	<i>S. heathi</i> Horsfield, 1831; <i>S. kuhlii</i> Leach, 1821	<i>S. pallidus</i> Dobson, 1876	<i>A. circumcatus</i> (Temminck, 1840)	<i>H. tickelli</i> (Blyth, 1851)	<i>E. serotinus</i> (Schreber, 1774); <i>E. boffae</i> (Peters, 1869); <i>E. pachyotis</i> (Dobson, 1871); <i>E. dimissus</i> Thomas, 1916 <i>E. gobiensis</i> Bobrinski, 1926; <i>E. nasutus</i> (Dobson, 1877); <i>E. tatei</i> Ellerman & Morrison- Scott, 1951
Further table reference	7.4	7.4	7.4	7.5	7.5	7.5	7.6	7.6	7.6

Contd ...

Note: All measurements are in mm

Table 7 (Contd...). Diagnostic morphological characters of the genera of the tribes Pipistrellini and Vespertilionini of Subfamily Vespertilioninae of family Vespertilionidae present in South Asia

Genus	Scotozous Dobson, 1875	Nyctalus Bowdich, 1825	Pipistrellus Kaup, 1829	Tylonycteris Peters, 1872	Ia Thomas, 1902	Falstrellus Troughton, 1943	Philetor Thomas, 1902	Vespertilio Linnaeus, 1758	Hypsugo Kolenati, 1856
External characters									
Forearm length	32.7-36.3	42.1-57.8	25.0-42.0	26.1-29.0	70.9-77.3	38.4-41.4	31.7-35.7	42.0-45.5	32.1-38.0
Head Body length	39.0-55.0	68.0-80.0	33.0-64.0	34.0-46.0	NA	43.0-51.0	NA	55.0-66.0	47.0-60.0
Tail length	27.0-41.0	31.0-55.0	20.0-45.0	26.0-33.0	~ 65.0	30.0-41.0	27.1-32.2	40.0-48.0	30.0-49.0
Hind Foot length	5.0-8.0	6.0-11.4	3.0-11.0	5.0-7.0	~ 17.0	7.0-8.0	6.4-8.1	8.0-10.0	6.4-8.0
Ear length	10.0-18.0	7.0-17.0 Short	5.0-14.0	8.5-10.5 Triangular	23.7-24.0 Broad and tip rounded	12.0-15.0	8.0-10.0 Short, broad & tip rounded	14.7-16.0 Short and tip broadly rounded	10.0-15.0
Cranial characters									
Condylacanthine length	12.8-13.6	14.7-18.6	9.3-14.3	10.0-11.7	25.2-26.2	13.7-14.7	12.4-13.7	~ 15.0	11.4-13.3
Maxillary toothrow (CM ³)	5.2-5.6	5.5-7.7	3.5-5.9	3.4-4.2	10.5-11.0	5.5-5.7	4.5-4.8	4.9-5.5	4.6-5.1
Incisors – Upper – Lower	1 pair* 3 pairs	2 pairs 3 pairs	2 pairs 3 pairs	2 pairs 3 pairs	2 pairs 3 pairs	2 pairs 3 pairs	2 pairs 3 pairs	2 pairs 3 pairs	2 pairs 3 pairs
Premolars – Upper – Lower	2 pairs 2 pairs	2 pairs 2 pairs	2 pairs 2 pairs	1 pair 2 pairs	2 pairs 2 pairs	2 pairs 2 pairs	1 pair 2 pairs	1 pair 2 pairs	2 pairs* 2 pairs
Dental formula	1123 3123 = 32	2123 3123 = 34	2123 3123 = 34	2113 3123 = 32	2123 3123 = 34	2123 3123 = 34	2113 3123 = 32	2112 3123 = 32	212(1)3 3123 = 34/32
Species content	<i>S. dormeri</i> Dobson, 1875	<i>N. noctula</i> (Schreber, 1774); <i>N. leisleri</i> (Kuhl, 1817); <i>N. montanus</i> (Barrett-Hamilton, 1906)	<i>P. pipistrellus</i> (Schreber, 1774); <i>P. paterculus</i> Thomas, 1915; <i>P. javanicus</i> (Gray, 1838); <i>P. coromandra</i> (Gray, 1838); <i>P. tenuis</i> (Temminck, 1840); <i>P. ceylonicus</i> (Kelaart, 1852); <i>P. kuhlii</i> (Kuhl, 1817); <i>P. abramus</i> (Temminck, 1840)	<i>T. pachypus</i> (Temminck, 1840); <i>T. robustula</i> Thomas, 1915	<i>I. io</i> Thomas, 1902	<i>F. affinis</i> (Dobson, 1871)	<i>P. brachypterus</i> (Temminck, 1840)	<i>V. murinus</i> Linnaeus, 1758	<i>H. savii</i> (Bonaparte, 1837) <i>H. cadomae</i> (Thomas, 1916)
Further table reference	7.7	7.7	7.7	7.8	7.8	7.8	7.8	7.8	7.8

Note: All measurements are in mm; * - outer upper incisor, when present, no more than a minute pointed spicule; † Anterior upper premolar (pm²) much reduced, rarely absent

Table 7.1. Diagnostic morphological characters of the species belonging to the genera *Harpiocephalus*, *Harpiola* and *Murina* present in South Asia

Species	<i>Harpiocephalus harpia</i> (Temminck, 1840)	<i>Harpiola grisea</i> Peters, 1872	<i>Murina leucogaster</i> Milne-Edwards, 1872
External characters			
Forearm length	44.1-50.1	32.8-34.2	~ 40.9
Head Body length	60.0-75.0	~ 35.6	~ 47.0
Tail length	40.0-50.0	NA	~ 35.0
Hind Foot length	11.0-14.0	NA	~ 9.0
Ear length – Posterior border – Emargination on posterior border	17.0-18.0 Evenly rounded	NA NA Conspicuous	~ 15.0 Slightly convex Distinct
Interfemoral membrane	Covered with long reddish hairs	Densely covered with rather long hairs	Moderately covered with long fine reddish hair above and naked below
Cranial characters			
Condylocanine length	19.0-19.5	~ 12.1	~ 16.3
Maxillary tooththrow (CM ³)	6.5-6.9	~ 4.9	~ 6.1
Mandibular tooththrow (CM ₃)	7.5-8.0	~ 5.8	~ 6.6
Zygomatic breadth	13.6-13.7	NA	~ 10.0
Mandible length	15.1-16.0	~ 4.1	~ 13.1

Note: All measurements are in mm; NA – Data not available

Contd...

Table 7.1 (Contd..). Diagnostic morphological characters of the species belonging to the genus *Murina* present in South Asia

Species	<i>Murina aurata</i> Milne-Edwards, 1872	<i>Murina cyclotis</i> Dobson, 1872	<i>Murina tubinaris</i> (Scully, 1881)	<i>Murina huttoni</i> (Peters, 1872)
External characters				
Forearm length	27.7-29.6	29.7-34.5	30.1-34.1	32.8-35.4
Head Body length	~ 45.0	38.0-50.0	39.0-48.0	~ 48.0
Tail length	~ 27.0	32.0-41.0	22.0-35.0	~ 37.0
Hind Foot length	~ 4.5	7.0-10.0	6.0-9.0	~ 6.0
Ear length – Posterior border – Emargination on posterior border	~ 13.0 Slightly convex Lacking	13.0-16.0 Slightly convex Lacking	13.0-15.0 Smoothly convex Small	~ 17.0 Smoothly convex Lacking
Interfemoral membrane	Moderately covered with golden hair above & gray hair below	Moderately covered with orange hairs above & nearly naked below	Moderately covered with pale gray or ferruginous hairs above & naked below	Moderately covered with pale brown hairs above & naked below
Cranial characters				
Condylocanine length	~ 12.3	13.9-15.0	13.4-14.2	14.9-15.5
Maxillary tooththrow (CM ³)	~ 4.5	5.2-5.7	5.0-5.4	5.8-6.1
Mandibular tooththrow (CM ₃)	4.5-4.9	5.6-6.2	5.2-5.8	6.4-6.9
Zygomatic breadth	~ 7.5	9.2-9.7	8.4-9.0	9.4-9.8
Mandible length	9.2-9.4	10.8-11.8	10.3-10.9	11.5-12.2

Note: All measurements are in mm; NA – Data not available

Table 7.2. Diagnostic morphological characters of the species of the genus *Kerivoula* present in South Asia

Species	<i>Kerivoula picta</i> (Pallas, 1767)	<i>Kerivoula hardwickii</i> (Horsfield, 1824)	<i>Kerivoula lenis</i> Thomas, 1916
External characters			
Forearm length	31.5-37.9	31.7-36.0	37.2-41.0
Head Body length	45.0-48.0	39.0-55.0	NA
Tail length	43.0-48.0	35.0-43.0	~48.0
Hind Foot length	4.0-8.0	5.0-8.0	NA
Ear length	14.0-16.0 Relatively large, tip rounded	11.0-15.0 Moderate-sized, tip rounded	~13.8 Moderate-sized, tip rounded
Tragus	Tall and narrow	Narrow, sharply pointed	NA
Interfemoral membrane	Orange to scarlet hairy above along the body parts	Brown & nearly transparent, sparsely haired above near body parts & posterior border	Without hairs, veins sometimes whitish
Cranial characters			
Condylacanine length	12.2-13.3	12.4-13.0	14.5-15.1
Maxillary tooththrow (CM ³)	5.5-5.8	5.5-5.8	6.6-6.8
Mandibular tooththrow (CM ₃)	5.9-6.1	5.9-6.1	7.2-7.6
Zygomatic breadth	8.4-8.8	8.6-8.7	9.6-10.6
Mandible length	10.0-10.7	9.9-10.6	11.8-12.4

Note: All measurements are in mm; NA – Data not available

Table 7.3. Diagnostic morphological characters of the species belonging to the genus *Myotis* Kaup, 1829 present in South Asia

Species	<i>Myotis blythii</i> (Tomes, 1857)	<i>Myotis sicarius</i> Thomas, 1915	<i>Myotis formosus</i> (Hodgson, 1835)	<i>Myotis nipalensis</i> (Dobson, 1871)	<i>Myotis muricola</i> (Gray, 1846)	<i>Myotis siligorensis</i> (Horsfield, 1855)
External characters						
Forearm length	55.5-58.3	48.1-54.6	44.5-49.1	34.5-36.8	31.2-37.0	30.0-31.5
Head Body length	65.0-80.0	50.0-56.0	NA	38.0-47.0	41.0-47.0	NA
Tail length	53.0-68.0	44.0-47.0	36.0-48.0	32.0-40.0	25.0-39.0	NA
Hind Foot length	11.0-17.0	10.0-11.0	10.2-11.6	7.0-8.0	4.0-6.7 Small	NA
Ear length	19.0-26.0 Tall, tips bluntly rounded	17.0-19.0 Medium, tips bluntly rounded	12.8-14.5 Ovate, orange coloured	12.0-14.0 Relatively small, dark brown/black	6.0-13.3 Relatively small, dark brown/black	NA
Tragus	Tall and narrow	Tall and narrow	Tall, narrow and obtusely pointed	Tall and narrow	Tall and narrow	Tall and narrow
Interfemoral membrane	Pale brown, hairless throughout	Semi-translucent, dark brown/black hairless throughout	Orange	Dark brownish with some hairs on dorsal side near the body	Dark brownish with some hairs on dorsal side near the body	Brown
Cranial characters						
Condylacanine length	18.1-18.9	16.9-17.7	16.3-16.6	11.6-12.4	11.5-12.3	~ 11.2
Maxillary toothrow (CM ³)	8.2-8.5	7.1-7.5	6.8-7.2	4.7-5.7	4.8-5.3	4.5-4.8
Mandibular toothrow (CM ₃)	~ 9.2	4.9-5.3	7.4-7.8	5.3-5.7	5.1-5.6	4.9-5.0
Zygomatic breadth	NA	~ 11.8	11.7-11.9	NA	7.3-8.5	NA
Mandible length	15.7-16.0	14.1-14.9	13.7-14.1	9.7-10.3	9.2-10.1	9.0-9.2

Note: All measurements are in mm; NA – Data not available

Contd ...

Table 7.3 (Contd..). Diagnostic morphological characters of the species belonging to the genus *Myotis* Kaup, 1829 present in South Asia

Species	<i>Myotis montivagus</i> (Dobson, 1874)	<i>Myotis annectans</i> (Dobson, 1871)	<i>Myotis longipes</i> (Dobson, 1873)	<i>Myotis csorbai</i> Topal, 1997	<i>Myotis laniger</i> (Peters, 1871)	<i>Myotis horsfieldii</i> (Temminck, 1840)	<i>Myotis hasseltii</i> (Temminck, 1840)
External characters							
Forearm length	44.7-46.8	45.3-46.5	36.5-39.0	34.8-37.5	~ 34.8	36.5-41.5	37.2-40.3
Head Body length	56.0-62.0	45.0-48.0	43.0-46.0	NA	~ 41.3	49.0-59.0	52.0-58.0
Tail length	42.0-48.0	39.0-45.0	37.0-42.0	NA	~ 38.6	34.0-42.0	35.0-42.0
Hind Foot length	9.0-10.0 Medium	~ 10.0 Medium	9.2-9.7 Large	14.8-15.8*	~ 7.9 Large	7.0-11.2 Large	9.0-11.0 Very large
Ear length	14.2-15.5 Relatively short	14.0-15.0 Small, tips bluntly rounded	10.6-15.0 Narrow	NA	~ 12.0 Relatively small, rounded	13.0-15.2 Small with rounded tip	15.5-16.5 Rather narrow, tips narrowly rounded
Tragus	Short	Relatively broad	Tall and narrow	NA	Short	Short	Short and narrow
Interfemoral membrane	Dark brown, hairless throughout	Dark brown/black hairless throughout	Brown with some hairs near the hindlimbs	NA	Brownish	Deep chocolate brown, some hairs on dorsal side near the body	Dark brown
Cranial characters							
Condylacanine length	15.1-15.6	14.9-15.5	12.2-12.8	12.11-12.71†	10.6-11.9†	13.4-14.3	14.0-14.6
Maxillary toothrow (CM ³)	6.5-6.8	6.5-6.7	5.1-5.3	4.72-5.19	4.8-5.0	5.5-5.9	5.8-6.0
Mandibular toothrow (CM ₃)	6.9-7.2	7.1-7.2	5.5-5.9	NA	4.9-5.5	5.9-6.4	6.2-6.6
Zygomatic breadth	NA	~ 11.5	~ 8.4	NA	~ 8.9	9.3-10.2	~ 10.5
Mandible length	12.9-13.3	12.8-13.2	10.1-10.5	NA	NA	11.2-11.6	11.7-12.0

Note: All measurements are in mm; NA – Data not available; * - Tibia length; † - Condyllobasal length (CBL)

Table 7.4. Diagnostic morphological characters of the species belonging to the genera *Plecotus*, *Barbastella* and *Otonycteris* present in South Asia

Species	<i>Plecotus homochrous</i> Hodgson, 1847	<i>Plecotus wardi</i> Thomas, 1911	<i>Plecotus strelkovi</i> Spitzenberger, 2008	<i>Barbastella leucomelas</i> (Cretzschmar, 1826)	<i>Otonycteris hemprichii</i> Peters, 1859
External characters					
Forearm length	36.5-40.3	41.9-45.1	39.6-44.9	38.7-42.1	64.7-65.6
Head Body length	40.0-45.0	47.0-53.0	-	47.0-51.0	61.0-76.0
Tail length	48.0-50.0	49.0-54.0	~ 51.0	40.0-47.0	40.0-58.0
Hind Foot length	7.0-8.0	7.0-9.5	-	7.0-8.0	11.3-12.9
Ear length	39.0-41.0 Long and oval; joined over forehead	37.0-42.0 Large and oval; joined over forehead	~ 40.0 Large and oval; joined over forehead	15.0-17.0 Small squarish; joined over forehead	30.0-42.0 Large and tip broadly rounded
Tragus	Tall, ½ the pinna, tip bluntly pointed	Tall, ½ the pinna, tip bluntly pointed	Tall, ½ the pinna, tip bluntly pointed	Triangular	Tall, ½ the pinna
Antitragus	Indefinable	Indefinable	Indefinable	Absent	Shallow notch-like
Cranial characters					
Condylocanine length	13.8-14.2	14.8-15.4	14.1-15.6	13.4-14.2	~ 21.7
Maxillary tooththrow (CM ²)	5.0-5.3	5.4-5.8	5.4-6.1	4.7-5.1	~ 8.5
Mandibular tooththrow (CM ₃)	5.4-5.7	5.9-6.3	5.8-6.4	5.1-5.7	9.7-9.8
Zygomatic breadth	8.1-8.2	8.5-8.9	8.4-9.2	7.3-7.6	13.6-15.8
Mandible length	9.8-10.2	10.6-11.2	10.4-11.4	9.6-10.1	17.1-17.4

Note: All measurements are in mm

Table 7.5. Diagnostic morphological characters of the species belonging to the genera *Scotoecus*, *Scotomanes* and *Scotophilus* present in South Asia

Species	<i>Scotoecus pallidus</i> Dobson, 1876	<i>Scotomanes ornatus</i> (Blyth, 1851)	<i>Scotophilus heathi</i> Horsfield, 1831	<i>Scotophilus kuhlii</i> Leach, 1821
External characters				
Forearm length	34.1-37.3	56.1-61.2	55.4-65.8	44.0-56.0
Head Body length	50.0-58.0	64.0-85.0	67.0-93.0	60.0-78.0
Tail length	34.0-41.0	52.0-66.0	43.0-71.0	40.0-65.0
Hind Foot length	6.0-10.0	12.0-15.0	9.0-15.0	8.0-13.0
Ear length	12.0-15.0 Moderate with rounded tip	19.0-23.0 Large and tip broadly rounded	13.0-20.2 Small with ridges	9.0-17.0 Small with ridges
Tragus	Long and narrow	Tall, up to ½ the pinna, broad & crescent-shaped	Tall, ½ the pinna, crescent-shaped	Tall, ½ the pinna, crescent-shaped
Antitragus	Indefinable	Indefinable	Well formed	Well formed
Cranial characters				
Condylocanine length	13.8-14.8	20.1-20.9	19.0-21.3	16.3-18.0
Maxillary tooththrow (CM ²)	5.5-5.9	7.8-8.5	7.1-8.4	6.1-6.8
Mandibular tooththrow (CM ₃)	5.9-6.4	8.7-9.4	8.1-9.6	6.9-7.8
Zygomatic breadth	~ 10.5	15.9-17.3	14.5-16.9	12.4-13.7
Mandible length	10.9-12.0	16.9-17.9	14.8-18.0	12.9-14.4

Note: All measurements are in mm

Table 7.6. Diagnostic morphological characters of the species belonging to the genus *Arielulus*, *Hesperoptenus* and *Eptesicus* present in South Asia

Species	<i>Arielulus circumdatus</i> (Temminck, 1840)	<i>Hesperoptenus tickelli</i> (Blyth, 1851)	<i>Eptesicus serotinus</i> (Schreber, 1774)	<i>Eptesicus bottae</i> (Peters, 1869)	<i>Eptesicus pachyotis</i> (Dobson, 1871)
External characters					
Forearm length	41.8-43.6	50.0-60.4	54.2-55.1	~ 42.1	38.0-45.3
Head Body length	~ 95.0	61.0-79.0	~ 80.0	~ 57.0	55.0-56.0
Tail length	~ 40.0	44.0-63.0	~ 58.0	~ 45.0	40.0-41.0
Hind Foot length	~ 10.0	9.0-14.0	~ 10.0	~ 7.0	8.0-9.0
Ear length	~ 15.0 Dark brown to black, with pale margins in some specimens	14.0-18.0 Moderately large, thick & fleshy	~ 14.0 Moderately tall, dark	~ 15.0 Moderately tall, dark	13.0-14.0 Triangular with rounded tip
Tragus	Broad with pale margin	Tall, ½ the pinna, crescent-shaped	Small, less than ½ the pinna, tip bluntly pointed	NA	Short, broadly rounded & curved inwards
Cranial characters					
Condylacanine length	14.6-15.6	17.2-19.6	18.3-19.5	~ 15.0	~ 21.2*
Maxillary tooththrow (CM ³)	6.0-6.5	7.1-8.2	7.1-7.8	~ 5.8	NA
Mandibular tooththrow (CM ₃)	6.4-6.8	7.9-9.2	8.4-8.7	~ 6.8	NA
Zygomatic breadth	~ 11.7	13.1-15.4	13.3-14.6	NA	NA
Mandible length	11.8-12.7	14.0-16.5	15.0-16.0	~ 6.2	NA

Note: All measurements are in mm; NA – Data not available; * - Greatest skull length

Table 7.6 (Contd..). Diagnostic morphological characters of the species belonging to the genus *Eptesicus* present in South Asia

Species	<i>Eptesicus gobiensis</i> <i>Bobrinckii</i> , 1926	<i>Eptesicus nasutus</i> Dobson, 1877	<i>Eptesicus dimissus</i> Thomas, 1916	<i>Eptesicus tatei</i> Ellerman & Morrison-Scott, 1951
External characters				
Forearm length	41.0-41.5	35.4-36.9	38.0-42.0	~ 43.4
Head Body length	NA	40.0-46.0	~ 56.0	~ 48.5
Tail length	NA	38.0-46.0	36.0-41.0	~ 45.9
Hind Foot length	NA	7.0-8.0	~ 8.0	NA
Ear length	14.0-15.0 Moderately tall	12.5-14.0 Small, narrowly rounded tip	14.0-15.0 Small and rounded	~ 15.3 Moderately tall, oval, with rounded tip
Tragus	NA	Tall, ½ the pinna	NA	Tall, ½ the pinna
Cranial characters				
Condylacanine length	~ 15.1 [†]	11.7-12.2	~ 15.4 [†]	NA
Maxillary tooththrow (CM ³)	~ 5.9	4.4-4.8	~ 5.9	NA
Mandibular tooththrow (CM ₃)	NA	4.8-5.1	NA	NA
Zygomatic breadth	NA	8.4-8.8	NA	NA
Mandible length	NA	8.6-9.6	NA	NA

Note: All measurements are in mm; NA – Data not available; * - Greatest skull length; † - Condylbasal length

Table 7.7. Diagnostic morphological characters of the species belonging to the genera *Nyctalus* and *Scotozous* present in South Asia

Species	<i>Nyctalus noctula</i> (Schreber, 1774)	<i>Nyctalus leisleri</i> (Kuhl, 1817)	<i>Nyctalus montanus</i> (Barrett-Hamilton, 1906)	<i>Scotozous dormeri</i> (Dobson, 1875)
External characters				
Forearm length	50.9-57.8	42.1-45.2	42.9-43.0	32.7-36.3
Head Body length	68.0-80.0	62.0-72.0	~ 70.0	39.0-55.0
Tail length	33.0-55.0	31.0-45.0	~ 43.0	27.0-41.0
Hind Foot length	10.2-11.4	6.0-10.0	NA	5.0-8.0
Ear length	13.0-17.0 Moderate	7.0-16.0 Moderate	~ 14.0 Short	10.0-18.0
Tragus	Club-shaped expanded distally	Club-shaped expanded distally	Club-shaped expanded distally	Without hairs, veins sometimes whitish
Cranial characters				
Condylocanine length	17.1-18.6	14.7-15.2	15.4-16.0	12.8-13.6
Maxillary tooththrow (CM ³)	7.1-7.7	5.5-5.9	6.5-6.6	5.2-5.6
Mandibular tooththrow (CM ₃)	7.5-8.2	5.9-6.3	6.9-7.0	5.5-6.1
Zygomatic breadth	12.2-13.3	9.8-10.7	NA	9.6-10.5
Mandible length	13.8-14.7	11.4-11.7	12.7-12.8	10.4-11.2

Note: All measurements are in mm; NA – Data not available

Table 7.7 (Contd..). Diagnostic morphological characters of the species belonging to the genus *Pipistrellus* present in South Asia

Species	<i>Pipistrellus pipistrellus</i> (Schreber, 1774)	<i>Pipistrellus paterculus</i> Thomas, 1915	<i>Pipistrellus javanicus</i> (Gray, 1838)	<i>Pipistrellus coromandra</i> (Gray, 1838)
External characters				
Forearm length	30.0-30.6	29.2-34.0	30.0-36.0	25.5-34.3
Head Body length	40.0-48.0	42.0-48.0	40.0-55.0	34.0-49.0
Tail length	29.0-35.0	31.0-38.0	26.0-40.0	22.0-39.0
Hind Foot length	6.0-7.0	6.0-7.0	3.0-8.0	3.4-8.0
Ear length	10.5-12.0	10.0-13.0	5.0-15.0	7.1-14.0
Interfemoral membrane	Sparsely haired above near the body parts	Sparsely haired above near the body	Without hairs	Sparsely haired above and below near the body parts
Cranial characters				
Condylocanine length	10.4-11.3	10.6-11.6	11.9-13.1	10.6-11.9
Maxillary tooththrow (CM ³)	4.1-4.4	4.1-4.8	4.6-5.2	3.9-4.6
Mandibular tooththrow (CM ₃)	4.3-4.7	4.4-5.0	4.8-5.5	4.1-5.1
Zygomatic breadth	7.2-7.9	NA	8.2-9.0	7.6-8.2
Mandible length	7.9-8.7	8.4-9.1	9.3-10.7	8.2-9.5
Posterior palatal width	4.8-5.2	5.3-5.9	5.6-6.7	5.0-6.0
I ³ ½ or > than I ²	Yes	Yes	Yes	Yes
Upper canine	Bicuspidate	Unicuspidate	Bicuspidate	Bicuspidate

Note: All measurements are in mm; NA – Data not available

Contd...

Table 7.7 (Contd.). Diagnostic morphological characters of the species belonging to the genus *Pipistrellus* present in South Asia

Species	<i>Pipistrellus tenuis</i> (Temminck, 1840)	<i>Pipistrellus ceylonicus</i> (Kelaart, 1852)	<i>Pipistrellus kuhlii</i> (Kuhl, 1817)	<i>Pipistrellus abramus</i> (Temminck, 1840)
External characters				
Forearm length	25.0-30.2	33.0-42.0	33.4-36.0	31.4-34.4
Head Body length	33.0-45.0	45.0-64.0	35.0-49.0	NA
Tail length	20.0-35.0	30.0-45.0	33.0-45.0	NA
Hind Foot length	3.0-7.0	6.0-11.0	6.0-8.0	6.4-7.6
Ear length	5.0-11.0	9.5-14.0	10.0-13.0	NA
Interfemoral membrane	Without hairs	Sparsely haired above and below near the body parts	Pallid & Translucent	NA
Cranial characters				
Condylacanine length	9.3-10.7	13.1-14.3	12.0-12.9	11.4-12.8*
Maxillary tooththrow (CM ³)	3.5-4.1	5.2-5.9	4.6-5.0	4.2-4.9
Mandibular tooththrow (CM ₃)	3.8-4.4	5.7-6.5	5.0-5.5	4.6-5.3
Zygomatic breadth	7.3-7.6	9.2-11.0	8.4-8.7	~ 8.2
Mandible length	7.2-8.3	10.6-12.0	9.3-10.4	8.9-10.0
Posterior palatal width	4.5-5.2	6.2-7.2	5.5-5.9	5.0-6.0
I ³ ½ or > than I ²	Yes	Yes	No	Yes
Upper canine	Bicuspidate	Bicuspidate	Faintly bicuspidate	Unicuspidate

Note: All measurements are in mm; NA – Data not available; * - Condylbasal length

Table 7.8. Diagnostic morphological characters of species of the genera *Tylonycteris*, *la*, *Falsistrellus* and *Vespertilio* present in South Asia

Species	<i>Tylonycteris pachypus</i> (Temminck, 1840)	<i>Tylonycteris robustula</i> Thomas, 1915	<i>la io</i> Thomas, 1902	<i>Falsistrellus affinis</i> (Dobson, 1871)	<i>Vespertilio murinus</i> Linnaeus, 1758
External characters					
Forearm length	26.1-29.0	26.6-28.1	70.9-77.3	38.4-41.4	42.0-45.5
Head Body length	34.0-46.0	40.0-44.0	NA	43.0-51.0	55.0-66.0
Tail length	26.0-33.0	26.0-31.0	~ 65.0	30.0-41.0	40.0-48.0
Hind Foot length	5.0-7.0	5.0-5.5	~ 17.0	7.0-8.0	8.0-10.0
Ear length	9.0-10.0 Small, triangular with broadly rounded tip	8.5-10.5 Small, triangular with broadly rounded tip	23.7-24.0 Large, broad with rounded tip	12.0-15.0	14.7-16.0 Short and tip broadly rounded
Tragus	Short and broad	Short and broad	Small, 1/3 rd the pinna		Small, short bluntly rounded
Cranial characters					
Condylacanine length	10.0-11.3	11.1-11.7	25.2-26.2	13.7-14.7	~ 15.0
Maxillary tooththrow (CM ³)	3.4-4.2	3.9-4.1	10.5-11.0	5.5-5.7	4.9-5.5
Mandibular tooththrow (CM ₃)	3.6-4.6	5.4-5.8	11.6-12.1	5.6-5.8	5.3-6.1
Zygomatic breadth	8.4-8.5	8.9-9.1	16.7-18.0	~ 9.1	9.1-9.7
Mandible length	7.6-8.9	8.5-9.0	20.8-21.8	10.5-11.4	10.1-11.4

Note: All measurements are in mm; NA – Data not available

Contd...

Table 7.8 (Contd.). Diagnostic morphological characters of species of the genera *Philetor* and *Hypsugo* present in South Asia

Species	<i>Philetor brachypterus</i> (Temminck, 1840)	<i>Hypsugo savii</i> (Bonaparte, 1837)	<i>Hypsugo cadornae</i> (Thomas, 1916)
External characters			
Forearm length	31.7-35.7	32.1-38.0	32.6-36.5
Head Body length	NA	47.0-60.0	47.0-52.5
Tail length	27.1-32.2	30.0-35.0	34.0-49.0
Hind Foot length	6.4-8.1	6.4-8.0	6.5-7.0
Ear length	8.0-10.0 Short and broad, broadly rounded tip	10.0-14.0	14.0-15.0
Interfemoral membrane	Broad & short, fleshy & thick	Sparsely haired near the body and tail	Without hairs
Cranial characters			
Condylocanine length	12.4-13.7	11.4-13.3	12.6-12.8
Maxillary tooththrow (CM ³)	4.5-4.8	4.6-5.1	4.6-4.9
Mandibular tooththrow (CM ₃)	4.7-5.0	4.9-5.2	4.8-5.1
Zygomatic breadth	10.0-10.7	8.5-9.1	NA
Mandible length	9.9-10.7	9.6-10.3	9.5-10.3

Note: All measurements are in mm; NA – Data not available

Table 8. Diagnostic morphological characters of one genus of the family *Miniopteridae* present in South Asia

Genus	<i>Miniopterus</i> Bonaparte, 1837
External characters	
Forearm length	39.6-49.6
Head Body length	40.1-65.0
Tail length	39.6-61.0
Hind Foot length	~ 7.0-12.0
Ear length	~ 8.7-12.0 Small and tip broadly rounded
Cranial characters	
Condylocanine length	12.0-14.8
Maxillary tooththrow (CM ³)	5.1-6.3
Incisors – Upper – Lower	2 pairs 3 pairs
Premolars – Upper – Lower	2 pairs 3 pairs
Dental formula	-23,1,-2-4,123 123,1,-234,123 = 36
Species content	<i>M. schreibersii</i> (Kuhl, 1817); <i>M. pusillus</i> Dobson, 1876 <i>M. magnater</i> Sanborn, 1931
Further table reference	8.1

Note: All measurements are in mm

Table 8.1. Diagnostic morphological characters of species of the genera *Miniopterus* Bonaparte, 1837 present in South Asia

Species	<i>Miniopterus schreibersii</i> (Kuhl, 1817)	<i>Miniopterus pusillus</i> (Dobson, 1876)	<i>Miniopterus magnater</i> Sanborn, 1931
External characters			
Forearm length	44.7-49.6	39.6-40.2	47.0-53.0
Head Body length	47.0-65.0	NA	NA
Tail length	44.0-61.0	40.1-44.1	NA
Hind Foot length	7.0-12.0	NA	NA
Ear length	8.7-12.0 Small, tip broadly rounded	NA	NA
Tragus	½ the pinna, slightly curved forward	NA	NA
Interfemoral membrane	Dark brownish-black, sparsely haired near the body parts	Dark brownish-black, fur on membrane extends further away from body parts	NA
Cranial characters			
Condylacanthine length	13.6-14.8	12.0-12.7	16.8-17.3†
Maxillary tooththrow (CM ₃)	5.8-6.3	5.1-5.3	7.0-7.2
Mandibular tooththrow (CM ₃)	6.3-6.8	5.4-5.6	8.3-8.9
Zygomatic breadth	8.5-9.1	7.5-7.6	10.0-10.2
Mandible length	10.7-11.8	9.3-10.0	13.3-13.9

Note: All measurements are in mm; NA – Data not available; † - Condylbasal length

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