



A review of Chiropterological studies and a distributional list of the Bat Fauna of India

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Abstract

A historical review of studies on various aspects of the bat fauna of India is presented. Based on published information and study of museum specimens, an upto date checklist of the bat fauna of India including 127 species in 40 genera is being provided. Additionally, new distribution localities for Indian bat species recorded after Bates and Harrison, 1997 is also provided. Since the systematic status of many species occurring in the country is unclear, it is proposed that an integrative taxonomic approach may be employed to accurately quantify the bat diversity of India.

Keywords: Chiroptera, Checklist, Distribution, India, Review

Introduction

Chiroptera, commonly known as bats is among the 29 extant mammalian Orders (Wilson and Reeder, 2005) and is a remarkable group from evolutionary and zoogeographic point of view. Chiroptera represent one of the most speciose and ubiquitous orders of mammals (Eick *et al.*, 2005). With over 1300 extant species (Batcon, 2017), Chiroptera constitutes over 20% of all mammalian species and is only second to Rodentia in species richness (Simmons, 2005a). They are distributed throughout the world except the Arctic, Antarctic and certain oceanic islands (Simmons, 2005a, 2005b).

The order Chiroptera has been classically subdivided into two extant suborders, Megachiroptera (Old World Fruit Bats) and Microchiroptera (laryngeally echolocating bats). In addition, Chiroptera includes at least four extinct clades that were most closely related to Microchiroptera (Simmons and Conway, 1997). However, application of molecular data and explicit phylogenetic methodologies in recent times has brought about another subordinal division of Chiroptera, sub order Yinpterochiroptera comprising megabat family Pteropodidae along with microbat families Rhinolophidae, Rhinopomatidae and Megadermatidae and suborder Yangochiroptera including rest of the microbat families (Springer *et al.*, 2001; Teeling *et al.*, 2002). Besides taxonomic diversity, Chiroptera also exhibit great variations in size, the

smallest one being *Craseonycteris thonglongyai* weighing about 2g and a wingspan of 12-13cm, while the largest belong to the genus *Pteropus* weighing up to 1.5kg and a wing span over 2m (Arita and Fenton, 1997).

Bats are nocturnal and usually spend the daylight hours roosting in caves, rock crevices, foliage or various man-made structures. Some bats are solitary while others are colonial and may comprise millions of individuals. Bat's relationship to humankind dates back to antiquity. They are known to exert considerable influence on ecosystem health and human economics. Insectivorous bats are largely responsible for controlling burgeoning population of insects; many of them are agricultural pests or vector of human diseases. Fruit bats are responsible for pollination and seed dispersal of many economically and ecologically significant plants. In many oceanic islands, bats are the only indigenous mammals. Bats are also a source of protein for indigenous people in many parts of the Old World, for example, different species of bats serve as a major seasonal source of meat for Saur tribe in Madhya Pradesh (Kher, 1997) or poor Chepang people in Nepal (Kafle and Limbo, 2009). On the negative side, certain species of bats are known to harbour some deadly pathogens of diseases like rabies, histoplasmosis etc and sometime seriously affect livestock industry by causing heavy mortality in Tropical America. Certain species of fruit bats do some damages to economically important fruit crops. However, the

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immense ecological services rendered by these creatures far outweigh their negative roles.

While bat species are numerous and tremendously varied in their ecological roles, they tend to be understudied by scientists. This is due to their primarily nocturnal and volant nature which makes direct observations difficult and is the reason why they are the most difficult small vertebrates to study (Findley, 1993). Besides, bats are highly mobile creatures. They are known to fly up to 20 km between roosts and foraging areas (Fenton, 1997) and also known to exhibit seasonal geographical and altitudinal migration. Consequently our knowledge on biology, ecology and many other aspects of these obscure animals lags far behind that of other more conspicuous mammals. Bats spend all night participating in the ecology of an area with much the same diversity and vigour that birds perform during the day. Thus, any attempt to understand the diversity and functionality of an ecological system must also include an understanding of the bats.

Small mammals especially bats have been the subject of relatively few studies particularly in Indian context. Eminent naturalist J. C. Daniel (1997) lamented that in India, zoologists tend to treat them as children of a lesser god. The Mammal Survey of India organized by Bombay Natural History Society in the early part of 20th century generated a flurry of interest in field studies on bats in India. Significant information on taxonomy, biology, ecology and zoogeography of Indian bats were acquired during this phase of field studies. However, with publication of the survey's results, this interest died down. In the ensuing period, many workers from Zoological Survey of India and other institutions made contribution to the taxonomy, ecology and biogeography of Indian Chiroptera. Besides, researchers in the Madurai Kamraj University also contributed substantially to the breeding biology and behaviour of Indian bats. The present account reviews the published work on Indian bats from pre independence era till the present time in a chronological manner.

Materials and Methods

The present review is essentially a brief compilation of the work on the bat fauna of India which is arranged in a chronological manner. The checklist includes all the published bat records from India and takes in to consideration the recent systematic and biogeographical

revisions and hence some redundant old records have been omitted from the current checklist. The species distributional records mentioned are also based on published literature supplemented by museum specimens at Zoological Survey of India, Shillong (ZSIS) from different parts of northeastern India. Since, detailed taxonomic and distributional information of the then existing bats species of India exist in the monographic work of Bates and Harrison (1997), only those locality records after its publication are included.

Results

The beginning of Bat Studies in India

The dawn of modern taxonomy can be considered to begin from 1758, the year of publication of the tenth edition of “*Systema Naturae*” by Carolus Linnaeus. In that publication, Linnaeus classified and named seven species of bats under the single genus *Vespertilio*. Since then, zoologists of various western countries described new taxa of Indian bats based on specimens collected from India in the holding of their respective museums. Many of these workers were British nationals having access to the unrivalled collections of the British museum which also hold representative collection from all over the world, thus permitting comparison. The first scientific description of a bat species from India is probably that of Étienne Geoffroy, a French naturalist who described *Megaderma lyra* from Madras area (Geoffroy, 1810). British soldier and keen naturalist Major General Thomas Hardwicke who stayed in India from 1777 to 1823 made numerous faunal collections from India. Upon his return to England, he collaborated with zoologist John Edward Gray of the erstwhile British Museum. Based on this collection, they described some new bat taxa from India including *Hipposideros fulvus* from Madras (probably Dharwar in Karnataka according to Corbet and Hill, 1992), *Pipistrellus coromandra* from Pondicherry, *Rhinopoma hardwickii* (no exact locality), *Taphozous longimanus* from Calcutta etc. (Hardwicke, 1825; Gray, 1831, 1838).

Hodgson-Blyth-Jerdon-Dobson Period: The Golden Era of Indian Mammalogy (c. 1845 - 1880)

The Hodgson-Blyth-Jerdon-Dobson period was arguably the most illustrious period of Indian mammalogy

and can truly be considered as the 'Golden Period' of Indian chiroptology as well because a large number of mammalian collections were made and subsequently described during this period. Brian Houghton Hodgson, a British naturalist was the foremost worker of this period. He worked in India from 1818 to 1843 in different capacities in British administration and then settled in Darjeeling post retirement from 1845 to 1858. During this period, he developed a huge collection of Indian faunal specimens which later resulted in descriptions of a large number of mammal and bird taxa. Hodgson described *Plecotus homochrous*, *Plecotus darjelingensis* (= *Barbastella darjelingensis*) and *Megaderma schistacea* from Darjeeling district (Hodgson 1847a, 1847b, Hodgson, in Horsfield, 1855), the latter was synonymized with *Megaderma lyra*. Edward Blyth, an eminent naturalist and curator of the museum of Asiatic Society of Bengal, Calcutta was the pioneer of systematic studies on Indian bats. Starting the early forties of the nineteenth century (Blyth, 1841), he continued working on Indian bats till 1863 and described several new taxa and also presented a catalogue of mammals (including bats) existing in the museum of the Asiatic Society of Bengal (Blyth, 1863). New bat species described by Blyth from India include *Rhinolophus lepidus* purportedly from Calcutta (Blyth, 1844), *R. mitratus* from Bihar (Blyth, 1844), *Coelops frithii* from Sunderban area of West Bengal (Blyth, 1848), *Hesperotenus tickelli* from unspecified locality of Central India (Blyth, 1851a), *Scotomanes ornatus* from Khasi hills (Blyth, 1851b) and *Pteropus melanotus* from Nicobar Islands (Blyth, 1863) etc. besides a couple of species from other parts of Indian subcontinent. Concurrently, Thomas Caverhill Jerdon, a Surgeon Major of Madras Army and a naturalist per excellence also worked on Indian mammals between 1841 to 1862. For the first time, he compiled an account of the Indian bats providing synonymy, description and distribution for each of the Indian species of bats known during that period (Jerdon, 1867).

In the subsequent period, George Edward Dobson, an army surgeon and a distinguished bat taxonomist published a series of works on various taxa of Indian bats, including a revision of the genus *Taphozous* and descriptions of several new taxa (Dobson 1871, 1872, 1874, 1876). New species described by Dobson from India include *Pipistrellus* (= *Myotis*) *annectans* from Naga Hills, *Vespertilio* (= *Myotis*) *longipes* from Kashmir, *Vesperugo*

(= *Eptesicus*) *pachyotis* from Khasi hills and *Miniopterus pusillus* from Nicobar Island etc. Towards the end of nineteenth century, Dobson published a monographic account of the Asiatic Chiroptera together with a catalogue of bat present in the collection of the Indian Museum, Kolkata (Dobson, 1876). This publication provided synonymy, description, measurements and distribution of all species of bats contained therein and also some illustrations and is still considered one of the most authoritative work on Asian chiroptera. Thereafter, while working in the British Museum, London, he authored a catalogue of chiroptera in the Museum's possession including many species from India (Dobson, 1878). In that catalogue, Dobson provided synonyms, descriptions, measurements, distribution and information of type specimen of the 400 bat species included therein. Concurrent to Dobson, W. Peters of Berlin Zoological Museum also described two species of tube-nosed bats namely *Murina huttonii* and *M. grisea* from the present day Uttarakhand state (Peters, 1872). During this period, Captain Thomas Hutton, an Englishman based in Mussoorie also published an account of the bats of northwestern Himalaya (Hutton, 1872). In that publication, he included 25 species from the region detailing morphological and mensural characteristics of the specimens in his possession.

Blanford-Anderson-Miller period (c. 1890 - 1910)

William Thomas Blanford, a British geologist cum naturalist provided the first consolidated account of Indian mammals in the form of Fauna of British India. He worked in India from 1855 to 1882 and was instrumental in the establishment of Indian Museum in Kolkata. The second part of his Fauna of British India containing bats was published in 1891. Blanford (1891) primarily followed Dobson (1876) for taxonomic arrangement and nomenclature of bats.

John Anderson was the first superintendent of Indian Museum, Kolkata and worked in India till 1888. Anderson (1881) published a catalogue of Mammalia including bats in the Indian Museum, Kolkata. In that catalogue, Anderson included 113 bat species present in the museum's collection (most of them also find mention in Dobson, 1878) including several extralimital

species. The last significant publication on Indian bats during the nineteenth century is credited to Robert Charles Wroughton, an Imperial Forest Service Officer pertaining to the bats of Konkan region wherein species like *Pipistrellus chrysothrix* and *P. mimus* were described (Wroughton, 1899).

At the beginning of the twentieth century, Gerrit Smith Miller of United State National Museum published a complete amount of mammals (including bats) of Andaman and Nicobar Islands (Miller, 1902). Thereafter, he published a book “The families and genera of bats” (Miller, 1907) covering all the families and genera of bats of the world known at that time. The publication provides a complete synonymy and keys for the identification, taxonomic characters, distribution etc. of different genera and also numerous illustrations of skulls and some other bones. This work is of paramount importance to the workers of Indian bats as well since it covers all known Indian bats at that time.

The Mammal Survey and the Subsequent Period: The Modern Era of Indian Chiropterology (c. 1911-1950)

Studies on Indian mammals gained impetus with the Mammal Survey of India organized by Bombay Natural History Society from 1911 to 1923 that was carried out in different parts of India, Pakistan, Myanmar and Sri Lanka. The aim of the Mammal Survey was to modernize taxonomic knowledge of Indian mammals based on large series of specimens collected from representative localities. The leading collectors of this survey were C. A. Crump, G. C. Shortridge, A.W. Mayer, J.M.D. Mackenzie, Captain Philips Gosse, C. Primrose, R. O. Bryan and H. W. Wells helped by S. H. Prater, C. McCann and N.A. Baptista of the Society. During this survey, about 25000 specimens were collected from various parts of India and neighbouring countries along with a huge amount of field data. Very significant information on biogeography, taxonomy and ecology of Indian bats were gathered during the survey. The scientific outcome of this series of systematic survey was subsequently reported by experienced mammalogists in British Museum like R.C. Wroughton, K.V. Ryley, O. Thomas, J.P. Mills, H. M. Lindsay, M. A. C. Hinton, and T. B. Fry, T. C. S. Morrison-Scott etc., between 1912 to 1929. These results were published under three principal

heading, viz, Reports, Scientific Results and Summery of Mammals Survey. Mid-way through the Mammal Survey, R.C. Wroughton started publishing a summary of the information gathered up to that period. Keys of identification of families, genera, species and subspecies of all the Indian bats together with their type-specimens, type-repositories and distribution were provided in three of these publications (1918a, 1918b, 1921). The publications under the principal heading Scientific Results mostly by O. Thomas and R. C.Wroughton were entirely devoted to the descriptions of new taxa or the revision of already known taxa (Thomas, 1915a, 1915b; Wroughton 1914, 1916a, 1916b). With successful completion of the Mammal Survey, the taxonomy of Indian mammals as a whole and bats in particular was placed on a firm footing. The revised edition of “Sterndale’s Mammalia of India” by Frank Finn also provided a good systematic account of Indian Chiroptera (Finn, 1929).

During the early forties, George Henry Tate, a mammalogist of the American Museum of Natural History published a series of papers on bats under the heading “Results of the Archbold Expeditions” (Tate 1941a, 1941b, 1941c, 1941d, 1941e, 1942a, 1942b 1943; Tate and Archbold, 1939). Although these revisionary papers dealt with specimens collected primarily from New Guinea and Madagascar, they contained a number of Indian taxa of bats and hence of significant relevance to the taxonomy of Indian bats.

Post-Independence Period (1950-Present)

Bat studies in the post-independence period can be subdivided under the following broad headings.

Taxonomy and Geographic Distribution

Studies on the taxonomy and distribution of Indian bats gradually picked up momentum during the post-independence period. In the early fifties, John Reeves Ellerman along with Terence Morrison-Scott of the British Museum produced an excellent account entitled “Checklist of Palaearctic and Indian Mammals 1758 to 1946” including up-dated information on taxonomy and geographical distribution of all the Indian bats known at that time (Ellerman and Morrison-Scott, 1951).

Thereafter, Hitopadesh Khajuria and co-workers of the Zoological Survey of India made substantial contributions to the field of taxonomy and geographical distribution of Indian bats (Khajuria, 1953, 1965, 1978, 1979, 1980, 1982; Khajuria *et al.*, 1977; Khajuria and Ghose, 1970). He also described an endemic hipposiderid *Hipposideros durgadasi* from central India (Khajuria, 1970). French zoologist André Brosset, provided a series of accounts on taxonomy, distribution and general biology of the bats of western and central India (Brosset 1962a, 1962b, 1962c, 1963). Gyogy Topal, a mammalogist from the Hungarian Natural History Museum reported the presence of *Ia io* from Meghalaya, India (Topal, 1970) Based on a specimen from the Theni district in Tamil Nadu in the BNHS collection, Kitti Thonglongya, a Thai zoologist described the rare and endemic fruit bat *Latidens salimalii* (Thonglongya, 1972). In the later part of 1970s, Gordon B. Corbet of the British Museum provided a detailed account entitled “The mammals of the Palaearctic region: a taxonomic review” (Corbet, 1978). This publication provided keys for the identification, distribution (with maps), and detailed taxonomic discussion including a handful of Indian bat species. Y. Chaturvedi of Zoological Survey of India (ZSI) also contributed to the taxonomy and zoogeography of Indian bats (Chaturvedi, 1964, 1969, 1980; Soota and Chaturvedi 1980). H. R. Bhat of National institute of Virology, Pune also made several contributions to the studies of Indian bats and added two species namely *Eonycteris spelaea* and *Sphaerias blanfordi* to the chiropteran fauna of India (Bhat, 1967, 1968, 1974).

Starting early sixties till the late eighties, John Edward Hill, an eminent mammalogist of the British Museum very significantly contributed to the studies of Southeast Asian bats, including India. His painstaking works spanning over a long period resulted in a large number of publications; many of these were of revisionary nature and have greatly enriched the knowledge about the taxonomy and biogeography of bats of the Indian Subcontinent (Hill, 1961, 1963a, 1963b, 1964a, 1964b, 1965, 1967, 1971, 1974, 1976, 1977a, 1977b, 1983, 1987; Hill and Harrison 1987; Hill *et al.*, 1986). Yadunath Pratap Sinha, another mammalogist from ZSI also contributed significantly to the taxonomy, zoogeography and general biology of different taxa of Indian bats since the 50s (Sinha, 1953, 1969, 1970, 1973, 1976a, 1976b, 1977, 1980, 1986, 1990a, 1990b, 1994, 1995, 1999; Sinha and Chakraborty, 1971). Sujit Chakraborty of ZSI provided a taxonomic assessment

of *Rhinolophus ferrumequinum* from India (Chakraborty, 1977). He also published an account of mammalian fauna of Jammu and Kashmir State including 26 species of bats (Chakraborty, 1983). Concurrently, Prafulla Kumar Das of Viswa-Bharati, Santiniketan also similarly contributed to the taxonomy, geographical distribution and biology of Indian bats (Das, 1986a, 1986b, 1990a, 1990b; Das, 2003; Das and Agrawal, 1973). A few other noteworthy contributions on taxonomy and distribution of Indian bats of that time include Mondal *et al.* 1993; 1997 and 2000. During early part of the nineties, Paul Bates of the Harrison Institute, UK and co-workers revisited the work of Brosset in the early sixties and provided an up to date account on taxonomy and ecology of bats of western India (Bates *et al.*, 1994a, 1994b, 1994c). Cock and Bhat (1994) described Indian endemic *Hipposideros hypophyllus* from Karnataka state of India. In the late nineties, Paul Bates and David L. Harrison of Harrison Zoological Museum published a detailed account of the bats of India and neighboring countries. In that account, the authors accorded detailed taxonomic treatment and provided information on distribution, ecology, biology of the 117 species found in the region which till date continues to be the most exhaustive taxonomic treatise of the bat fauna of the Indian subcontinent (Bates and Harrison, 1997). Recently, C. Srinivasulu of Osmania University and his co-workers provided a revised set of identification keys to the 128 species of bats occurring in South Asia including about 120 species from India (Srinivasulu *et al.*, 2010).

Starting the eighth decade of the twentieth century, certain mammalogy publications dealing with a broader geographic scope appeared which were also quite relevant to the study of Indian bats. For example, Corbet and Hill (1980) provided a systematic list of families, genera and species of the bats of the world and their distributional range, but it was short of descriptions and identification keys. J. H. Honacki and collaborators in their comprehensive compendium “Mammal species of the world: A Taxonomic and Geographic Reference” included information on the type-locality, distribution and reasons for taxonomic decisions arrived at for every species of bat known from India (Honacki *et al.*, 1982). In the beginning of 1990s, Corbet and Hill (1992) published the excellent account “Mammals of the Indomalayan Region: A Systematic Review” wherein all the species and subspecies of bats from India were also included with geographical range. This publication still continues to

be one of the most authoritative taxonomic accounts of mammals of this region.

In the last few years, some miscellaneous studies have also added to our understanding of taxonomy, diversity, distribution, demography of Indian bats *i.e.*, Srivastava *et al.*, 2000; Bhattacharyya, 2002; Dookia, 2004; Purohit and Senacha 2003, 2005; Vanitharani, 2005; Senacha, 2007; Korad and Yardi, 2004a, 2004b; Korad *et al.*, 2005, 2008, 2010a, 2010b; Korad, 2013; Saikia *et al.*, 2004, 2006, 2011, Boro *et al.*, 2013; Saikia and Boro, 2013; Boro and Saikia, 2015; Saikia *et al.*, 2017, Saikia *et al.*, 2018; Srinivasalu and Srinivasalu, 2004, 2005b, 2006, 2007a, 2007b, 2017; Gaikwad *et al.*, 2012; Srinivasulu *et al.*, 2011, 2013, 2016b; Tak and Dookia, 2004; Vanitharani *et al.*, 2003, Vanitharani, 2006; Thabah and Bates, 2002; Thabah, 2006; Ruedi *et al.*, 2012a, 2012b; Kaur *et al.*, 2014; Wordley *et al.*, 2014; Debata *et al.*, 2013, 2015, 2017; Devkar and Upadhaya, 2015; Wordley *et al.*, 2016; Chakravarty, 2017; Devkar *et al.*, 2017; Thong *et al.*, 2018; Srinivasulu *et al.* 2018; Srinivasulu and Srinivasulu, 2018 etc.

Biology, Ecology and Behaviour

Knowledge on certain aspects of Indian bats specially biology and ecology remain poor till the middle of 20th century. This was evident from a remark of Humayun Abdulali of the BNHS “Bats are abundant in India and of many kinds but so little is known about their habits that any information which members (Bombay Natural History Society) may be able to offer from their own experience will be of considerable interests” Abdulali (1948). However, in the ensuing period significant understanding on biology of Indian bat fauna was achieved especially during 1950-70 primarily through the studies of Abdulali 1948, 1949; Ramakrishna 1950, 1951; Prakash 1956, 1959a, 1959b, 1960, 1961, 1963 etc.

During post-independence period, considerable knowledge of reproductive biology and related aspects of some species of bats was generated through the works of Gopalkrishna 1947, 1948, 1949, 1955, 1964, 1969a, 1969b; Moghe, 1952, 1956; Vamburkar, 1958; Ramaswamy, 1961; Kumar, 1965; Gopalkrishna and Madhavan, 1970, 1971, 1977, 1978; Gopalkrishna *et al.*, (1976, 1992); Khajuria, 1972; Topal, 1974; Sinha and Advani, 1976; Gopalkrishna and Choudhary, 1977; Gopalkrishna and Rao, 1977; Ramakrishna, 1978; Sinha, 1978; Bhat *et al.*, 1980; Bhat and Sreenivasan, 1981; Ramakrishna *et al.*, 1981; Sapkal

and Bhandarkar, 1984; Sapkal and Kamre, 1984; Sapkal and Deshmukh, 1985; Sandhu, 1988a, 1988b; Sandhu and Gopalkrishna, 1984; Gopalkrishna and Badwaik, 1989; Isaac *et al.*, 1994; Isaac and Marimuthu, 1997 etc.

Field ecological studies on the bat species of India were very little. A few studies like Advani, 1981; Sinha, 1981a, 1981b, 1986 are worth mentioning.

The researchers led by Late Maroli K Chandrashekar and Ganapati Marimuthu at Madurai Kamraj University have been in the forefront in behavioural studies of bats in India. This school of research contributed immensely towards studies on bat **chronobiology** (Marimuthu *et al.*, 1978, 1981; Subbaraj and Chandrashekar, 1981; Joshi and Chandrashekar, 1982, 1984, 1985; Marimuthu, 1984; Marimuthu and Chandrashekar, 1983a, 1983b, 1985), **behavioral ecology** (Selvanayagam and Marimuthu, 1984; Marimuthu and Neuweiler, 1987; Balasingh *et al.*, 1988; Audet *et al.*, 1991; Isaac and Marimuthu, 1993; Marimuthu, 1997; Marimuthu *et al.*, 1998; Elangovan *et al.*, 1999; Rajan and Marimuthu, 1999; Whitaker *et al.*, 1999; Elangovan *et al.*, 2000, 2001; Elangovan and Marimuthu, 2001; Gopukumar *et al.*, 2003; Singaravelan and Marimuthu, 2004; Nathan *et al.*, 2005; Raghuram and Marimuthu, 2007; Singaravelan and Marimuthu, 2008; Karuppudurai *et al.*, 2008; Nathan *et al.*, 2009; Selvarathinam and Marimuthu, 2013 etc.; **Biology** (Elangovan *et al.*, 2002, 2003, 2004, 2007; Rajan and Marimuthu, 2006; Raghuram and Marimuthu, 2007 etc).

Storz *et al.*, (2000) investigated the social structure of fruit bat *Cynopterus sphinx* in western India. The same research group also investigated the genetic consequences of polygyny in these bats (Storz *et al.*, 2001a). Variation in body size and sexual dimorphism in *C. sphinx* has also been investigated by Storz *et al.*, (2001b). Garg *et al.* (2012) studied the promiscuous mating system in *Cynopterus sphinx* in relation to male reproductive success. They also demonstrated the differential gain in reproductive success in male and female members of *Cynopterus sphinx* colony depending on the length of residency.

Besides the above, some recent ecological studies on the bat fauna of India include role of fruit bats as pollinators and seed dispersers in Kalkad Mundantharai Tiger Reserve (Vanitharani, 2007); foraging ecology of bats of eastern Uttar Pradesh (Mathur, 2014), ecology and roosting behavior of the bats of Uttar Pradesh (Kumar, 2015) foraging and roosting ecology of *Cynopterus brachyotis* in Southern India (Karuppudurai and Sripathi, 2018) etc.

Genetics

Genetic studies on Indian bats are still in infancy and have got some impetus only recently. Thabah *et al.*, (2006) studied the genetic divergence among the cryptic species of *Hipposideros larvatus* complex in the Indo-Malayan region. Some of the recent works on this aspect include genetic diversity in *Cynopterus sphinx* in India (Karuppudurai *et al.*, 2007), *isolation and characterization of microsatellite loci in Megaderma lyra* (Rajan *et al.*, 2009), genetic analysis of some *Hipposideros* bats in Peninsular India (Kanagraj *et al.*, 2010), population genetics of *Hipposideros speoris* in Indian Subcontinent (Chinnasamy *et al.*, 2011) etc. Molecular genetic basis of group living in *Cynopterus sphinx* has been studied recently (Chottapadhaya *et al.*, 2011). Chottapadhaya *et al.*, (2012) demonstrated the presence two divergent lineages in *Rhinolophus rouxii* populations in southern India and recognized a sibling species *R. indorouxii*. Recently, Chottapadhaya *et al.*, (2016) conducted a detailed genetic study on two cynopterine species in India and demonstrated the existence of an unrecognized cryptic lineage within this species group. Genetic and phylogenetic methods also contributed to the discovery of two new species of *Murina* in Meghalaya (Ruedi *et al.*, 2012a).

Echolocation

The first publication on bat call characteristics in India is possibly of Jones *et al.*, 1994 who analysed individual variations in the call features of three *Hipposiderid* bats. Based on genetic data and echolocation call characteristics, Thabah *et al.*, (2006) described a cryptic hipposiderine *Hipposideros khasiana* from Meghalaya. Echolocation calls of *Ia io* from Meghalaya was also studied by Thabah *et al.* 2007. Deshpande and Kelkar (2015) studied the echolocation call characteristics of *Otomops wroughtoni* and other molossid bats species of India. Worldley *et al.*, (2014) studied the echolocation call characteristics of the bats of Anamalai Hills, southern Western Ghat. They developed a call library for acoustic identification of 15 species of bats in the region. In recent times, ultrasonic call characteristics have been studied for *Hipposideros lankadiva*, *H. speoris*, *H. fulvous* and *H. galeritus* in Peninsular India (Srinivasulu *et al.*, 2015) and also of the endemic *Hipposideros hypophyllus* and *H. durgadasi* in Karnataka (Srinivasulu *et al.*, 2016a).

Status Assessment and Conservation

Studies highlighting the conservation aspects of bats in India have been far and fewer. This apparent lack of conservation concern is also reflected in the most important wildlife management regulation of the country i.e., Indian Wildlife (Protection) Act, 1972 where all the fruit bat species have been placed under Schedule V (vermin) that can be killed with impunity. In 2002, under the auspices of Zoo Outreach Organization, a workshop was held in Madurai Kamraj University to assess the conservation status of South Asian bats. The outcome of the workshop (Molur *et al.*, 2002) provided up-to-date information on distribution, status and threat assessment and recommendation of research priorities for 123 species and subspecies of South Asian bats including 114 from India. Ramakrishna *et al.*, 2003 conducted a status survey of endangered *Otomops worughtonii* in the then only known locality and estimated a population of about seventy five individuals. Recently, Ruedi and co-workers (2014) discovered three additional roosting colonies of *Otomops* in Jaintia Hills of Meghalaya and enumerated about 100 individuals thus, giving a significant conservation boost to this rare bat. Conservation action plans have been drawn for bat species in Biodiversity Strategy and Action Plan of some states like Tamilnadu (Vanitharani, 2004). The International Conservation Union recently assessed the status of the two newly described bat species from India i.e., *Murina pluvialis* and *Murina jaintiana* and classified them as Data Deficient (Ruedi and Csorba, 2017a, 2017b).

Singervelan and co-workers highlighted the ecological services provided by the fruit bats and emphasized the need for removing them from the vermin list of Indian Wildlife (Protection) Act, 1972 and providing some protection under a legal framework (Singervelan *et al.*, 2009). Aul *et al.*, 2014 provided a report on the diversity and status of bat species of Andaman and Nicobar islands and rediscovery of endemic Nicobar flying fox *Pteropus faunulus*. This work has significant conservation implications since a number of bat species are endemic to Andaman and Nicobar group of islands and their exact status in the islands was not known earlier. Chakraborty (2016) conducted a status survey of bats in Uttarakhand state with the aim of rediscovering Peter's tube-nosed bat and recorded 31 species from the state. Srinivasulu *et al.*, (2014) reviewed the threat status of endemic and Critically Endangered *Hipposideros hypophyllus* and suggested conservation measure for

the same. Lately Debata and Palita (2017) assessed the population status and threat to the nationally threatened *Hipposideros galeritus* in eastern India.

Other Studies

Bhat *et al.*, (1983) studied bats of western Himalaya and parts of eastern Himalaya region in relation to ectoparasites. Bhat and Sreenivasan (1990) also studied bats in Karnataka in connection with its possible role of Kyasanur forest disease transmission.

Singarvelan and Marimuthu (2003) reported the use of cave as day roost by enigmatic fruit bat *Latidens salimalii*. They also evaluated the mitigation strategy for orchard damage by *Cynopterus sphinx* (Singarvelan and Marimuthu, 2006). Elangovan *et al.*, (2006) described the olfactory discrimination ability of *Cynopterus sphinx*. Kumar *et al.*, (2014) studied the ultrastructure of guard hairs of some fruit bats of India which can aid as supplementary evidence for taxonomic identification. Mani *et al.*, (2017) investigated the role of bats as carriers of certain viral disease and found serological evidence of lyssavirus infection in some bat specimens from Nagaland

In 2006, Chiroptera Conservation and Information Network of South Asia also initiated a project “PteroCount” for gathering and monitoring of population status of *Pteropus giganteus* throughout South Asia. Under the project, 186 roosting colonies of flying fox are identified throughout India and being monitored. (Molur, 2009)

The Checklist

The monographic work of Bates and Harrison (1997) continues to be the most comprehensive work on the

taxonomy and distribution of the bat species of Indian Subcontinent wherein 109 species were reported within the political boundary of India. However, in the light of recent developments in chiropteran systematics and biogeography including considerable revisions of species delimitation and geographic boundaries, this work warrant a systematic revision. The latest checklist of the bats of India listed 117 species and subspecies from the country (Talmale and Pradhan, 2009) although no distributional information was provided therein. In recent times, there have been significant revisions of the bat fauna of India including new species descriptions and new distributional records from the country (Douangboubpha *et al.*, 2011; Ruedi *et al.*, 2012a, 2012b; Senacha and Dookia, 2013, Saikia *et al.*, 2017; Kuo *et al.*, 2017 Thong *et al.*, 2018) or larger revisions with implications on the species diversity in India (Tu *et al.*, 2017). In view of the taxonomic revisions and new additions, a need has been felt for updating the Indian bat checklist with the latest distribution information. Thus, besides providing a brief overview of Indian chiropterology, this article includes an updated distributional checklist of the bats of India. The distribution information presented here is based on review of pertinent published literature current till August, 2018 and also supplemented by the chiroptera collection at Zoological Survey of India, Shillong (ZSIS). The list includes 127 species in 40 genera and nine families.

Since Bates and Harrison, 1997 already provided detailed distribution information of the species therein, the present account deals only with the distribution localities not mentioned therein or new localities recorded thereafter.

Table 1. Distributional list of the bat species in India. Only the new distribution localities not mentioned and recorded after Bates and Harrison, 1997 have been included

Sl No	Family/ Species	New distribution localities	Reference
	Family Pteropodidae Gray, 1821		
1	<i>Cynopterus brachyotis</i> (Müller, 1838) Lesser Short-nosed Fruit Bat <i>Pachysoma brachyotis</i> Müller, 1838 <i>Cynopterus marginatus</i> var. <i>ceylonicus</i> Gray, 1871	Meghalaya: Umlyngsha; Maharashtra: Khandala, Mahabaleshwar; Tamilnadu: Kalakad Mundanthurai Tiger Reserve; Mizoram: Ngengpui, Andaman and Nicobar UT: Andaman Island, Nicobar Island	Aul <i>et al.</i> , 2014; Balasingh <i>et al.</i> , 1999; Mandal <i>et al.</i> , 2000; Pradhan and Kulkarni, 1997; Saikia <i>et al.</i> , 2018

2	<p><i>Cynopterus sphinx</i> (Vahl, 1797) Greater Short-nosed Fruit Bat <i>Vespertilio sphinx</i> Vahl, 1797 <i>Vespertilio fibulatus</i> Vahl, 1797 <i>Pteropus pusillus</i> Geoffroy, E., 1803 <i>Pteropus marginatus</i> Geoffroy, E., 1810 <i>Pachysoma brevicaudatum</i> Temminck, 1837 <i>Cynopterus brachysoma</i> Dobson, 1871 <i>Cynopterus marginatus</i> var. andamanensis Dobson, 1873 <i>Cynopterus marginatus</i> var. <i>elliotti</i> Gray, 1870 <i>Cynopterus angulatus</i> Miller, 1898</p>	<p>Andaman and Nicobar UT: Andaman Island, Nicobar Island; Assam: Balahati near Goreswar, Guijan; Lama, Majai, Siju Cave; Meghalaya: Khahnar, Kharkhana, Maharashtra: Pench National Park Mulshi, Velhe, Junnar, Bhor, Saswad; Malshej Dhakna, Semadoh in Melghat Tiger Reserve, Tadoba-Aandhari Tiger Reserve, Lakhani, Nalganga, Khandala, Dimbhe, Supe, Patas, Daund, Nimbalk, Baramati, Natepute, Indapur, Karmala, Nira-Narsingpur, Malshiras, Malinagar, Tembhorni, Maloli, Bhalavani, Pandharpur, Mangalvedha, Kati, Pangaon, Barshi, Kini, Jagji; Kerala: Kerala Agricultural University Campus at Thrissur; Andaman and Nicobar UT: Andaman Island, Nicobar Island Delhi NCT: Wazirabad; Kerala: Cherpu, Paralam, Kodanur, Chenam, Chirakkal, Venginissery</p>	<p>Aul <i>et al.</i>, 2014; Boro <i>et al.</i>, 2018; Cyriac <i>et al.</i> 2005; Gaikwad <i>et al.</i>, 2012; Korad, 2005, Korad <i>et al.</i>, 2006; Korad and Gaikwad, 2008; Madhavan, 2000; Pradhan, 2004, 2006; Pradhan and Talmale, 2012; Srinivasulu and Srinivasulu, 2007; Talmale, 2007; Saikia <i>et al.</i>, 2018</p>
3	<p><i>Eonycteris spelaea</i> (Dobson, 1871) Lesser Dawn Bat <i>Macroglossus spelaeus</i> Dobson, 1871</p>	<p>Meghalaya: Lakadong, Kharkhana, Lama; Mizoram: Dampa, Lungsen; Andaman and Nicobar UT: Andaman Island</p>	<p>Aul <i>et al.</i>, 2014; Mandal <i>et al.</i>, 2000; Saikia <i>et al.</i>, 2018</p>
4	<p><i>Latidens salimalii</i> Thonglongya, 1972 Salim Ali's Fruit Bat</p>	<p>Tamil Nadu: Kalakad-Mundanthurai Tiger Reserve, Valparai Plateau</p>	<p>Ghosh <i>et al.</i>, 1999; Vanitharani, 2005; Wordley <i>et al.</i>, 2016</p>
5	<p><i>Macroglossus sobrinus</i> K. Andersen, 1911 Greater Long-nosed Fruit Bat <i>Macroglossus minimus sobrinus</i> K. Anderson, 1911</p>	<p>Meghalaya: Tangsen, Kharkhana, Shnongrim</p>	<p>Saikia <i>et al.</i>, 2018</p>
6	<p><i>Megaerops niphanae</i> Yenbutra and Felten, 1983 Ratanaworabhan's Fruit Bat</p>	<p>Meghalaya: Khahnar, Kharkhana; Nagaland: Dimapur, Kohima, Mokochung</p>	<p>Srivastava <i>et al.</i>, 2000; Saikia <i>et al.</i>, 2018</p>
7	<p><i>Pteropus faunulus</i> Miller, 1902 Nicobar Flying Fox</p>	<p>No new record</p>	
8	<p><i>Pteropus giganteus</i> (Brünnich, 1782) Indian Flying Fox <i>Vespertilio gigantea</i> Brünnich, 1782 <i>Pteropus medius</i> Temminck, 1825 <i>Pteropus edwardsi</i> I. Geoffroy, 1828 <i>Pteropus leucocephalus</i> Hodgson, 1835 <i>Pteropus assamensis</i> McClelland <i>Pteropus kelaarti</i> Gray, 1870 <i>Pteropus ariel</i> G. Allen, 1908</p>	<p>Assam: Fakiragram area, Bilasipara; Gujarat: In and around Jambughoda Wildlife Sanctuary, Himachal Pradesh: Bilaspur, Dharampur, Dodour near Nehr Chawk, Mandi, Kunihar, Nalagarh, Nurpur; Madhya Pradesh: Bhagdehi village, Sadar Bazar, Betul, Kesala, Dolariya, Khamaria, Lapta village,</p>	<p>Ali, 2015; Cyriac <i>et al.</i>, 2005; Khatun and Ali, 2016; Korad, 2005; Gaikwad <i>et al.</i>, 2012; Korad and Gaikwad, 2008; Narasimmarajam, 2015; Pradhan, 2004; Saikia <i>et al.</i>, 2011, Saikia <i>et al.</i>, 2018; Srinivasulu and Srinivasulu, 2007; Talmale, 2007, 2014a, 2014b; Vyas and Upadhaya, 2014</p>

		Dhangawa, Kotma, Pushprajgarh, Lilatola, Kachharimal village, Gram Pindarai, Dungaria, Amarpur, Chhanta, Bilha village, Bondar, Kosamdih, Bajag, Lalpur, Khirala village, Khandwa Railway colony, Nimbola, Dhulkot, Burhanpur, Bhagaura village; Maharashtra: Pench National Park; Junnar, Khed, Maval, Mulshi, Haveli, Shirur, Daund, Indapur, Saswad, Velhe, Bhor, Poladpur, Raigad; Deola, Usgaon village, Gadkhangaon, Amalner, Natepute, Akluj, Malinagar, Maloli, Bhalvani, Pandharpur, Rambaug, Tembhorni, Karmala, Barshi, Pangaon, Solapur, Kati, Sindfal, Kini, Jagji, Mangalvedha; Meghalaya: Nongpoh, Tura; Kerala: Kerala Agricultural University Campus at Thrissur; Delhi NCT: Delhi; TamilNadu: Melselvanur-Keelselvanur WLS	
9	<i>Pteropus hypomelanus</i> Temminck, 1853 Variable Flying Fox <i>Pteropus geminorum</i> Miller, 1903 <i>Pteropus satyrus</i> Anderson, 1908	Andaman and Nicobar UT: Barren Island, in the Middle Andaman Group, Tillangchong Island and mangrove forest on Great Nicobar Island.	Aul <i>et al.</i> , 2014
10	<i>Pteropus melanotus</i> Blyth, 1863 Black-eared Flying Fox <i>Pteropus edulis</i> Blyth, 1846 <i>Pteropus nicobaricus</i> Zelebor, 1869 <i>Pteropus tytleri</i> Dobson, 1874	Andaman and Nicobar UT: Interview, North Reef, Paget and the Landfall Islands of the North Andaman Group, Havelock and Outram Islands in the South Andaman Group and in Dugong creek on Little Andaman Island.	Aul <i>et al.</i> , 2014
11	<i>Pteropus vampyrus</i> Linnaeus, 1758 Large Flying Fox	Andaman and Nicobar UT: Nicobar Islands (as seasonal migrants)	Rao <i>et al.</i> , 1994
12	<i>Rousettus aegyptiacus</i> (E. Geoffroy, 1810) (Egyptian Rousette) <i>Pteropus aegyptiacus</i> E. Geoffroy, 1890 <i>Rousettus arabicus</i> Anderson and de Wilson, 1902	No new records	

13	<i>Rousettus leschenaulti</i> (Desmarest, 1820) Leschenault's Rousette <i>Pteropus leschenaulti</i> Desmarest, 1820 <i>Pteropus pyrivorus</i> Hodgson, 1835 <i>Cynopterus marginatus</i> Gray, 1843 <i>Cynopterus affinis</i> Gray, 1843 <i>Pteropus seminudus</i> Kelaart, 1850 <i>Eleutherura fusca</i> Gray, 1870	Assam: Goreswar; Madhya Pradesh: Asirgarh Fort, Hatdol cave, Lamheta Ghat, Narwar fort, Karera Fort; Meghalaya: Darugiri, Songsak, Williamnagar, Mahesh-Khola, Siju cave, Lailad, Sumer, Pahamshken, Umkiag, Kharkhana; Himachal Pradesh: Gambhar, Solan; Maharashtra: Khindsi Maval, Mulshi, Junnar, Bhor, Saswad; Khopoli, Wai, Raigad Malshej Waterfall, Lonavala, Sinhgad, Purandar, Mendha village, Lakhani, Lonar Crater and Wildlife Sanctuary, Phaltan, Mangalvedha, Kegaon road, Naldurg Fort, Paranda Fort, Radhanagari WLS; Mizoram: Aibawk, North Khawbung, Dampa; Delhi NCT: Wazirabad; Kerala: Ernakulam,	Boro <i>et al.</i> 2018; Gaikwad <i>et al.</i> , 2012; Ghosh, 2005; Korad, 2005; Pradhan and Talmale, 2008, 2012; Mandal <i>et al.</i> , 2000; Madhavan, 2000; Saikia <i>et al.</i> , 2011; Saikia <i>et al.</i> , 2018; Srinivasulu and Srinivasulu, 2007; Talmale, 2007; 2011, 2017.
14	<i>Sphaerias blanfordi</i> (Thomas, 1891) Blanford's Fruit Bat <i>Cynopterus blandordi</i> Thomas, 1891	Mizoram: Murlen National Park, Sairep	Mandal <i>et al.</i> , 2000
	Family: Rhinolophidae		
15	<i>Rhinolophus affinis</i> Horsfield, 1823 Intermediate Horseshoe Bat <i>Rhinolophus andamensis</i> Dobson, 1872	Meghalaya: Cave Arwah in Sohra, Cave Mawsyrwait, Mawphlong, Mawsmi cave, Umnuih Tamar, Cave Bylliat, Cave Labit Kseh, Cave Umlawan; Himachal Pradesh: Barog tunnel, Happy valley near Solan town and Kot Beja near Kasauli	Saikia <i>et al.</i> , 2011; Saikia <i>et al.</i> , 2018
16	<i>Rhinolophus beddomei</i> K. Andersen, 1905 Bedomme's Horseshoe Bat	Maharashtra: Junnar, Maval, Mulshi, Mahad, Mahabaleshwar, Salsette; Kerala: Paralam, Pallipuram, Venginissery, Kotekkadu	Madhavan, 2000; Korad, 2005; Korad <i>et al.</i> , 2008, 2010a; Talmale, 2007
17	<i>Rhinolophus cognatus</i> K. Andersen, 1906 Andaman Horseshoe Bat <i>Rhinolophus famulus</i> Anderson, 1910	Maharashtra: Khireswar-Harishchandragad, Bhimashankar, Mulshi, Mahabaleshwar	Korad, 2005; Korad <i>et al.</i> , 2008
18	<i>Rhinolophus ferrumequinum</i> (Schreber, 1774) Greater Horseshoe Bat <i>Vespertilio ferrum-equinum</i> Schreber, 1774 <i>Rhinolophus tragatus</i> Hodgson, 1835	Himachal Pradesh: Barog Tunnel, Chakmoh, Ghannati, Lutru Cave near Arki, Mandi, Solan Town, Totu near Shimla	Ghosh 2008; Saikia <i>et al.</i> , 2011

19	<i>Rhinolophus hipposideros</i> (Bechstein, 1800) Lesser Horseshoe Bat <i>Vespertilio hipposideros</i> Bechstein, 1800 <i>Rhinolophus midas</i> Anderson, 1905	No new record	
20	<i>Rhinolophus lepidus</i> Blyth, 1844 Blyth's Horseshoe Bat <i>Rhinolophus monticola</i> Anderson, 1905	Madhya Pradesh: Tauria Hill at Richhai, Jabbalpur, Gwarighat, Shivpuri; Meghalaya: Cave Arwah, Khandong dam site, Shnongpdeng, Cave Khung; Himachal Pradesh: Drang, Kullu; Maharashtra: Pundre, Lohogad Fort, Karnala, Ratnagiri, Panchgani, Mulshi, Junnar, Bhimashankar; Nagaland: Wokha; Delhi NCT: Aravali Biodiversity Park; Kerala: Kazhikode, Kollam	Srivastava <i>et al.</i> , 2000; Ghosh, 2008; Korad <i>et al.</i> , 2008; Madhavan, 2000; Srinivasulu and Srinivasulu, 2007; Talmale, 2007; Saikia <i>et al.</i> , 2018; Talmale, 2017.
21	<i>Rhinolophus luctus</i> Temminck, 1834 Woolly Horseshoe Bat <i>Rhinolophus perniger</i> , Hodgson, 1843	Meghalaya: Nongnah, Cave Labit Mynlin, Cave Lymke, Saipung, Pynurkba, Kharkhana, Umlatdoh, Cave Lymbait, Cave Sahiong I, Cave Khung; Himachal Pradesh: Arki, Shalaghat	Saikia <i>et al.</i> , 2011; Saikia <i>et al.</i> , 2018
22	<i>Rhinolophus macrotis</i> Blyth, 1844 Big-eared Horseshoe Bat <i>Rhinolophus episcopus</i> Allen, 1923	Meghalaya: Cave Arwah, Cave Madury, Mawsmi cave, Shella, Laitkynsew, Phut-jaut, Kharkhana, Umlingsha,	Saikia <i>et al.</i> , 2018
23	<i>Rhinolophus mitratus</i> Blyth, 1844 Mitre Horseshoe Bat	No new record	
24	<i>Rhinolophus pearsonii</i> Horsfield, 1851 Pearson's Horseshoe Bat	Meghalaya: Shangpung, Shnongrim, Cave Labit Mynlin, Cave Lumjingtep, Cave Lymke, Cave Khung, Cave Lymbait, - Cave Sahiong I, Lakadong, Kharkhana, Tangsen, Umlingsha, Umtong near Mawkynew, Laitkynsew, Cave Mawsyrwait, Shella, Cave Pam Skey in Mawlongbna, Cave Tylong Kobah, Cave Puri, Cave Mawphun, Cave Lum Shken, Cave Lew Long; Mizoram: Sairep	Mandal <i>et al.</i> , 2000; Saikia <i>et al.</i> , 2018
25	<i>Rhinolophus pusillus</i> Temminck, 1834 Least Horseshoe Bat <i>Rhinolophus minor</i> Horsfield, 1823 <i>Rhinolophus gracilis</i> Anderson, 1905 <i>Rhinolophus blythi</i> Anderson, 1918	Assam: Rani; Meghalaya: Shillong, Cave Pam Skey near Mawlongbna; Khulbolmagri, Mawshamok, Sohbar, Majai, Shangpung, Cave Lymbit, Cave Shalong, Cave Bylliat, Cave Umadoh in Lumshnong, Khanhar, Cave Poh Lakhar	Boro <i>et al.</i> 2018 Ruedi <i>et al.</i> , 2012b; Saikia <i>et al.</i> , 2018

26	<i>Rhinolophus rouxii</i> Temminck, 1835 Rufous Horseshoe Bat <i>Rhinolophus rubidus</i> Kelaart, 1850 <i>Rhinolophus fulvidus</i> Blyth, 1851 <i>Rhinolophus cinerascens</i> Kelaart, 1852 <i>Rhinolophus rammanika</i> Kelaart, 1852 <i>Rhinolophus petersii</i> Dobson, 1872	Arunachal Pradesh: Zemithang; Maharashtra: Sinhagad-Pune, Maval, Mulshi, Karjat, Harishchandragad, Bhimashankar, Raigad Fort, Poladpur, Bajire, Devrukh; Mizoram: Dampa, Lungsen; Kerala: Kottekaddu, Ernakulam	Korad <i>et al.</i> , 2008; Korad <i>et al.</i> , 2010a; Mandal <i>et al.</i> , 2000; Madhavan, 2000; Talmale, 2007; ZSIS 320
27	<i>Rhinolophus shortridgei</i> K. Andersen, 1918 Shortridge's Horseshoe Bat	No new record	
28	<i>Rhinolophus sinicus</i> K. Andersen, 1905 Chinese Rufous Horseshoe Bat <i>Rhinolophus rouxii sinicus</i> Anderson, 1905	Meghalaya: Shella, Cave Khleishnong in Lumshnong; Himachal Pradesh: Happy valley, Solan	Saikia <i>et al.</i> , 2011; Ruedi <i>et al.</i> , 2012b; Saikia <i>et al.</i> , 2018
29	<i>Rhinolophus subbadius</i> Blyth, 1844 Little Nepalese Horseshoe Bat <i>Rhinolophus garoensis</i> Dobson, 1872	No new record	
30	<i>Rhinolophus trifoliatu</i> s Temminck, 1834 Trefoil Horseshoe Bat	No new record	
31	<i>Rhinolophus yunanensis</i> Dobson, 1872 Dobson's Horseshoe Bat	Andaman and Nicobar UT: Andaman Island.	Aul <i>et al.</i> , 2014
32	<i>Rhinolophus siamensis</i> (Gyldenstolpe, 1917) <i>Rhinolophus macrotis siamensis</i> Gyldenstolpe, 1917	Meghalaya: Forest near cave Labit Kseh, cave Bylliat, cave Dieng Jem, East Jaintia Hills,	Ruedi <i>et al.</i> , 2012b
	Hipposideridae Lydekker, 1891		
33	<i>Coelops frithii</i> Blyth, 1848 East Asian Tailless Leaf-nosed Bat	Meghalaya: Nongnah	Thabah, 2006
34	<i>Aselia tridens</i> (Geoffroy, E., 1813) Trident Bat <i>Rhinolophus tridens</i> Geoffroy, E., 1831 <i>Phyllorhina tridens</i> var. <i>murraiana</i>	Rajasthan: Thar Desert	Sanecha and Dookia, 2013
35	<i>Hipposideros armiger</i> (Hodgson, 1835) Great Leaf-nosed Bat <i>Rhinolophus armiger</i> Hodgson, 1835	Meghalaya: Lawbah, Sohbar, Shella, Khulbolmagri, Siju cave, Khaddum cave, Cave Labit Kseh, Vatesuandung Bakhur (near Saipung), Cave Pedenglapiang, Cave Lakhon, Piel Klieng Pouk; Himachal Pradesh: Mount Karol	Thabah, 2006; Saikia <i>et al.</i> , 2011; Ruedi <i>et al.</i> , 2012b; Saikia <i>et al.</i> , 2018
36	<i>Hipposideros ater</i> Templeton, 1848 Dusky Leaf-nosed Bat <i>Hipposideros atratus</i> Kelaart, 1850 <i>Phyllorhina amboinensis</i> Peters, 1871	Maharashtra: Maval, Ambegaon, Junnar, Karjat, Mahad, Khopoli, Mahabaleshwar; Kerala: Kerala Agricultural University Campus at Thrissur Pazhayannur, Kodungallur, Mathilakom, Paralam, Pallipuram, Chenam, Alapad, Kozhikode, Ernakulam, Alapuzha	Madhavan, 2000; Cyriac <i>et al.</i> 2005; Korad, 2005, Korad <i>et al.</i> , 2010b

37	<i>Hipposideros nicobarulae</i> Miller, 1902 Nicobar leaf-nosed Bat	Andaman and Nicobar UT: Nicobar islands	Douangboubpha <i>et al.</i> , 2011
38	<i>Hipposideros cineraceus</i> Blyth, 1853 Ashy Leaf-nosed Bat <i>Phyllorhina micropus</i> Peters, 1872	Meghalaya: Cherrapunji, Shangpung, Cave Labit Lumshnong, Cave Bylliat, Kharkhana, Umium Umtru Stage III dam site,	Ruedi <i>et al.</i> , 2012b; Saikia <i>et al.</i> , 2018
39	<i>Hipposideros diadema</i> (E. Geoffroy, 1813) Diadem Leaf-nosed Bat <i>Phyllorhina nicobarensis</i> Dobson, 1871	Andaman and Nicobar UT: Baratang Island, Andaman and Nicobar Island	Srinivasulu <i>et al.</i> , 2016b
40	<i>Hipposideros durgadasi</i> Khajuria, 1970 Durga Das's Leaf-nosed Bat <i>Hipposideros cineraceus durgadasi</i> Khajuria, 1970	Karnataka: Hanumanahalli and Therahalli Village, Kolar district	Kaur <i>et al.</i> , 2014
41	<i>Hipposideros fulvus</i> Gray, 1838 Fulvus Leaf-nosed Bat <i>Hipposideros murinus</i> Gray, 1838 <i>Rhinolophus fulgens</i> Elliot, 1839 <i>Phyllorhina aurita</i> Tomes, 1859 <i>Phyllorhina atra</i> Fitzinger, 1870	Nagarjunasagar in Guntur district (collected in 1962) (Chakraborty <i>et al.</i> 2004) a Rajasthan: Daijar Village, 25km north of Jodhpur City; Andhra Pradesh: Nagarjunasagar, Vontimitta range, Hyderabad; Karnataka: Hanumanahalli Village, Kolar district; Maharashtra: Junnar, Ambegaon, Maval, Mulshi, Karjat, Mahabaleshwar, Pandharpur; Jammu and Kashmir: Mansad Lake; Kerala: Ernakulam	Chakraborty <i>et al.</i> , 2004; Dookia <i>et al.</i> , 2017; Kaur <i>et al.</i> , 2014; Korad, 2005; Madhavan, 2000; Pradhan and Talmale, 2012; Saikia <i>et al.</i> 2006; Srinivasulu <i>et al.</i> , 2013; Talmale, 2007; Korad <i>et al.</i> , 2010b
42	<i>Hipposideros galeritus</i> Cantor, 1846 Cantor's Leaf-nosed Bat <i>Phyllorhina brachyota</i> Dobson, 1874	Madhya Pradesh: Jabbalpur town; Maharashtra: Shivtharghal near Mahad; Odisha: Cave at Bonai Forest Division, Cave at Gupteswar; Kerala: Veliangad	Korad, 2005; Debata <i>et al.</i> 2015; Srinivasulu and Srinivasulu, 2017, Talmale, 2017.
43	<i>Hipposideros hypophyllus</i> Kock and Bhat, 1994 Leafletted Leaf-nosed Bat	Karnataka: Hanumanahalli Village, Kolar district	Kaur <i>et al.</i> , 2014
44	<i>Hipposideros lankadiva</i> Kelaart, 1850 Indian Leaf-nosed Bat <i>Hipposideros indus</i> Anderson, 1918 <i>Hipposideros schistaceus</i> Anderson, 1918	Madhya Pradesh: Janemara in Kanha National Park; Meghalaya: Cherrapunji, Laitkynsew, Shella, Shella, Sohbar, Nongthymmai, Prahng Karuh cave, Nongpoh, Umium Umtru Stage III dam site, Cave Labit Kseh, Cave Dieng Jem, Cave Khleishnong in Lumshnong, Cave Lakhon, Piel Klieng Pouk, Shnongrim, Khaddum, Chokpot; Maharashtra: Tadoba-Andhari Tiger Reserve	Das <i>et al.</i> , 1995; Molur <i>et al.</i> , 2002; Pradhan, 2006; Talmale, 2017; Thabah, 2006; Saikia <i>et al.</i> , 2018

45	<i>Hipposideros larvatus</i> (Horsfield, 1823) Intermediate Leaf-nosed Bat <i>Phyllorhina leptophylla</i> Dobson, 1874	Meghalaya: Shella, Nongtra, Sohbar, Lawbah, Umlatdoh, Thangsah, Cave Labit Mynlim, Cave Pdiem Dhare, Cave Dieng Jem, Shnongrim, Phlang Karuh cave; Andaman and Nicobar UT: Andaman Island	Ruedi <i>et al.</i> , 2012b; Ruedi <i>et al.</i> , 2014; Aul <i>et al.</i> , 2014; Saikia <i>et al.</i> , 2018
46	<i>Hipposideros khasiana</i> Thabah <i>et al.</i> 2006	Meghalaya: Phlang Karuh Cave	Thabah <i>et al.</i> 2006
47	<i>Hipposideros pomona</i> K. Andersen, 1918 Pomona Leaf-nosed Bat <i>Hipposideros gentilis</i> Anderson, 1918	Meghalaya: Shillong, Umium Umtru Stage III dam site, Cave Umadoh, Cave Labit, Cave Hartali, Lama, Lumshnong, Kharkhana, Umlingsha; Maharashtra: Mulshi, Maval, Junnar, Mahad; Andaman and Nicobar UT: Menchal Island (South Nicobar group); Kerala: Venginissery, Alapuzha	Aul <i>et al.</i> , 2014; Korad, 2005; Korad <i>et al.</i> , 2010b; Madhavan, 2000; Saikia <i>et al.</i> , 2018
48	<i>Hipposideros speoris</i> (Schneider, 1800) Schneider's Leaf-nosed Bat <i>Rhinolophus marsupialis</i> Desmarest, 1820 <i>Rhinolophus dukhunensis</i> Skykes, 1831 <i>Hipposideros apiculatus</i> Gray, 1838 <i>Hipposideros penicillatus</i> Gray, 1838 <i>Hipposideros templetonii</i> Kelaart, 1850 <i>Hipposideros aureus</i> Kelaart, 1852 <i>Hipposideros blythii</i> Kelaart, 1852	Karnataka: Hanumanahalli Village, Kolar district; Maharashtra: Bhuleshwar, Yavat, Bhimanagar, Indapur, Nira Narsingpur, Bhaje, Karle, Karjat, Junnar, Shirur, Matheran Pothare, Karmala, Bhalavani, Pandharpur, Osmanabad caves, Kurduwadi; Kerala: Kozhikode, Ernakulam	Gaikwad <i>et al.</i> , 2012; Kaur <i>et al.</i> , 2014; Madhavan, 2000; Korad, 2005; Talmale, 2007; Korad <i>et al.</i> , 2010b
	Megadermatidae H. Allen, 1864		
49	<i>Megaderma lyra</i> E. Geoffroy, 1810 Greater False Vampire Bat <i>Vespertilio (Megaderma) caranatica</i> Elliot, 1839 <i>Megaderma spectrum</i> Wagner, 1844 <i>Megaderma schistacea</i> Hodgson, 1847 <i>Eucheria lyra caurina</i> Anderson and Wroughton, 1907	Assam: Guijan, Tamulpur, Bornadi WLS, Bokakhat, Manas N.P.; Silbori Range Office in Orang N.P., Burachapari WLS; Madhya Pradesh: Survaya village on Shivpuri-Jhansi road, Bhoora Kho in Madhav National Park, Terahi Garhi near Ranood; Maharashtra: Samewada village, Lakhani, Tadoba-Andhari Tiger Reserve, Sindevahi, Ranidoh, Piparia, Pench National Park, Cave near Parud village, Mahabaleshwar; Meghalaya: Nongpoh, Sohbar, Cave Hartali, Kharkhana; Nagaland: Kohima, Dimapur; Delhi NCT: Humayun's Tomb; Kerala: Mathailakom, Paralam, Chenam, Thalikkulam, Urakam, Venginissery, Ernakulam	Boro <i>et al.</i> 2018; Madhavan, 2000; Srivastava <i>et al.</i> , 2000; Pradhan and Talmale, 2012; Srinivasulu and Srinivasulu, 2007; Ruedi <i>et al.</i> , 2012b; Talmale, 2017; Saikia <i>et al.</i> 2018

50	<i>Megaderma spasma</i> (Linnaeus, 1758) Lesser False Vampire Bat <i>Megaderma horsfieldi</i> Blyth, 1863	Andaman and Nicobar UT: Andaman Islands; Madhya Pradesh: Bheda Ghat 15 km West of Jabalpur; Maharashtra: Tarubanda in Samewada village, Lakhani, Tadoba-Andhari Tiger Reserve, Sindevahi, Ranidoh, Piparia, Pench National Park, Cave near Parud village, Melghat Tiger Reserve, Mahabaleshwar, Pundre; Odisha: Lulung of Similipal Biosphere Reserve, Gupteswar hills; Gujarat: Near Ratanmahal WLS; Kerala: Venginissery, Paralam; Meghalaya: Nongkhyllem WLS	Aul, 2014; Madhavan, 2000; Korad, 2005; Pradhan, 2005; Pradhan and Talmale, 2012; Sanecha, 2007; Talmale, 2007; Debta <i>et al.</i> , 2017; Devkar and Upadhyay, 2015; Saikia <i>et al.</i> , 2018
	Rhinopomatidae Bonaparte, 1838		
51	<i>Rhinopoma hardwickii</i> Gray, 1831 Lesser Mouse-tailed Bat	Madhya Pradesh: Khokhai math at Rannod; Karnataka: Hanumanahalli Village, Kolar district; Maharashtra: Tadoba-Andhari Tiger Reserve; Andhra Pradesh: Kawal Wildlife Sanctuary; Kerala: Akathethara section of Walayar range in Palghat; Delhi NCT: Quatab Miner Complex	Kaur <i>et al.</i> , 2014; Pradhan, 2006; Srinivasulu <i>et al.</i> , 2005; Gaikwad <i>et al.</i> , 2012; Srinivasulu and Srinivasulu, 2007, 2017; Talmale, 2017
52	<i>Rhinopoma microphyllum</i> (Brünnich, 1782) Greater Mouse-tailed Bat <i>Vespertilio microphyllus</i> Bürrnich, 1782	Madhya Pradesh: Khandwa city; Maharashtra: Apsinga, Tuljapur, Naldurg Fort; Delhi NCT: New Delhi	Srinivasulu and Srinivasulu, 2007; Gaikwad <i>et al.</i> , 2012, Talmale, 2017.
	Emballonuridae		
53	<i>Saccolaimus saccolaimus</i> (Temminck, 1838) Naked-rumped Pouched Bat <i>Taphozous saccolaimus</i> Temminck, 1838 <i>Taphozous crassus</i> Blyth, 1844 <i>Taphozous pulcher</i> Blyth, 1844	Madhya Pradesh: Motinala in Kanha Tiger Reserve; Maharashtra: Malvan; Assam: Balahati Village near Goreswar, Dhubri, Kerala: Venlangullar, Paralam, Pallipuram,	Ghose and Bhattacharya, 1995; Madhavan, 2000; Pradhan and Talmale, 2012; Talmale, 2007; Boro and Saikia 2015; Ali, 2016
54	<i>Taphozous longimanus</i> Hardwicke, 1825 Long-winged Tomb Bat <i>Taphozous fulvidus</i> Blyth, 1841 <i>Taphozous brevicaudatus</i> Blyth, 1841 <i>Taphozous cantori</i> Blyth, 1842	Assam: Salbari, Narikuchi village; Maharashtra: Raigad Fort area, Karjat, Wadgaon, Lonar, Patas, Dhamangaon, Solapur, Osmanabad, Apsinga, Naldurga, Ahmednagar; Kerala: Eranakulam; Nagaland: Dimapur	Boro <i>et al.</i> 2018; Sinha, 1999; Madhavan, 2000; Srivastava <i>et al.</i> , 2000; Korad, 2005; Talmale, 2007; Pradhan and Talmale, 2008; Gaikwad <i>et al.</i> , 2012
55	<i>Taphozous melanopogon</i> Temminck, 1841 Black-bearded Tomb Bat <i>Taphozous bicolor</i> Temminck, 1841	Andaman and Nicobar UT: Andaman islands; Madhya Pradesh: Asirgarh, Burhanpur; Andhra Pradesh: Kawal Wildlife Sanctuary; Delhi NCT: Qutab Minar complex, Delhi; Kerala: Eranakulam	Aul, 2014; Srinivasulu <i>et al.</i> , 2005; Madhavan, 2000; Srinivasulu and Srinivasulu, 2007; Talmale, 2017

56	<i>Taphozous nudiventris</i> Cretschmar, 1830 Naked-rumped Tomb Bat <i>Taphozous kachhensis</i> Dobson, 1872	Madhya Pradesh: Survaya ki Garhi on Shivpuri-Jhansi road, Khandwa city, Jabalpur city, Kharosa cave; Delhi NCT: New Delhi	Pradhan and Talmale, 2012; Talmale, 2007; Talmale, 2017; Srinivasulu and Srinivasulu, 2007
57	<i>Taphozous perforatus</i> E Geoffroy, 1818 Egyptian Tomb bat	No new record	
58	<i>Taphozous theobaldi</i> Dobson, 1872 Theobald's Tomb Bat	Madhya Pradesh: Asirgarh Fort	Talmale, 2017
	Molossidae Gervais, 1856		
59	<i>Chaerephon plicatus</i> (Buchanan, 1800) Wrinkle-lipped Free-tailed Bat <i>Vespertilio plicatus</i> Buchanan, 1800	Madhya Pradesh: Khandwa district; Maharashtra: Patas, Daund, Lonavla, Pune	Korad and Yardi, 2004a; Korad, 2005; Korad <i>et al.</i> , 2010a, Talmale, 2017
60	<i>Otomops wroughtoni</i> (Thomas, 1913). Wroughton's free-tailed Bat <i>Nyctinomus wroughtoni</i> Thomas, 1913	Meghalaya: Pynurkba, Umlatdoh, Thangseh and Nongtra village	Thabah and Bates, 2002; Ruedi <i>et al.</i> , 2014
61	<i>Tadarida aegyptiaca</i> (E. Geoffroy, 1818) Egyptian Free-tailed Bat <i>Nyctinomus aegyptiacus</i> E Geoffroy <i>Nyctinomua tragata</i> Dobson, 1874 <i>Tadarida sindica</i> Wroughton, 1919 <i>Tadarida thomasi</i> Wroughton, 1919 <i>Tadarida gossei</i> Wroughton, 1919	Andhra Pradesh: Hyderabad; Maharashtra: Pune, Khondai, Mulshi, Sinhagad, Dhamangaon, Solapur, Kunthalgiri, Osmanabad;; Kerala: Venginissery, Ernakulam	Madhavan, 2000; Korad and Yardi, 2004a; Korad, 2005; Pradhan and Talmale, 2012; Srinivasulu and Srinivasulu, 2007; Talmale, 2007; Korad <i>et al.</i> , 2010a; Gaikwad <i>et al.</i> , 2012
62	<i>Tadarida teniotis</i> (Rafinesque, 1814) European Free-tailed Bat <i>Cephalotes teniotis</i> Rafinesque, 1814 <i>Dysopes rupelii</i> Temminck, 1826 <i>Nyctinomus insignis</i> Blyth, 1862	Uttarakhand: Taapu Sera, FRI Campus, Dehradun	Chakravarty, 2017
	Vespertilionidae Gray, 1821		
63	<i>Arielulus circumdatus</i> (Temminck, 1840) Black gilded Pipistrelle <i>Vespertilio circumdatus</i> Temminck, 1840	Mizoram: Sairep, Lunglei district	Mandal <i>et al.</i> , 2000
64	<i>Eptesicus bottae</i> (Peters, 1869) Botta's serotine	No new records	
65	<i>Eptesicus gobiensis</i> Bobrinskii, 1926 Gobi Big Brown Bat	No new record	
66	<i>Eptesicus pachyotis</i> (Dobson, 1871) Thick-eared Bat <i>Vesperugo pachyotis</i> Dobson, 1871	Mizoram: Sairep, Lunglei district	Mandal <i>et al.</i> , 2000
67	<i>Eptesicus serotinus</i> (Schreber, 1774) Common Serotine <i>Vespertilio serotinus</i> Schreber, 1774 <i>Vespertilio turcomanus</i> Eversmann, 1840 <i>Scotophilus pachyomus</i> Tomes	No new record	

68	<i>Eptesicus tatei</i> Ellerman and Morrison-Scott, 1951 Sombre Bat	No new record	
69	<i>Hesperoptenus tickelli</i> (Blyth, 1851) Tickell's Bat <i>Nycticejus tickelli</i> Blyth, 1851	Maharashtra: Andheri, Salsette, Kamsheet; Andaman and Nicobar UT: Webi and Interview Island, Middle Andaman Group	Aul <i>et al.</i> , 2014; Pradhan and Talmale, 2012; Talmale, 2007
70	<i>Scotoecus pallidus</i> (Dobson, 1876) Desert Yellow Lesser House Bat <i>Scotophilus pallidus</i> Dobson, 1876	No new record	
71	<i>Scotomanes ornatus</i> (Blyth, 1851) Harlequin Bat <i>Nycticejus ornatus</i> Blyth, 1851 <i>Nycticejus nivicolus</i> Hodgson, in Horsfield, 1855 <i>Nycticejus emarginatus</i> , Dobson, 1871	No new record	
72	<i>Scotophilus heathii</i> (Horsfield, 1831) Greater Asiatic Yellow House Bat <i>Vespertilio belangeri</i> Geoffroy, 1834 <i>Nycticejus luteus</i> Blyth, 1851 <i>Scotophilus flaveolus</i> Horsfield, 1851	Madhya Pradesh: Forest Rest House Betul; Maharashtra: Sillari in Pench National Park, Semadoh in Melghat Tiger Reserve, Alandi, Khed-Shivapur, Bhor, Karjat, Poladpur, Kolsa in Tadoba Andhari Tiger Reserve, Sindewahi, Nira Narsingpur, Indapur, Bhima Koregaon, Daund, Nira Narsingpur, Jamb, Indapur, Dhamangaon, Solapur; Kerala: Kerala Agricultural University Campus, Thrissur	Cyriac <i>et al.</i> , 2005; Gaikwad, 2007; Korad, 2005; Talmale, 2007; Korad <i>et al.</i> , 2010a, Gaikwad <i>et al.</i> , 2012; Pradhan, 2004, 2005, 2006; Talmale, 2017
73	<i>Scotophilus kuhlii</i> Leach, 1821 Lesser Asiatic Yellow House Bat <i>Vespertilio temminckii</i> Horsfield, 1824 <i>Scotophilus fulvus</i> Gray, 1834 <i>Scotophilus wroughtoni</i> Thomas, 1897	Himachal Pradesh: Solan Town; Maharashtra: Sipna river near Semadoh in Melghat Tiger Reserve, Khed, Karjat, Mahabaleshwar; Kerala: Paralam, Ollur, Pallipuram, Venginissery, Chenam, Kandassankadavu, Palisseri, Venkitangu	Madhavan, 2000; Pradhan, 2005; Korad, 2005; Korad <i>et al.</i> , 2010a; Saikia <i>et al.</i> , 2011
74	<i>Nyctalus leisleri</i> (Kuhl, 1817) Leisler's Noctule <i>Vespertilio leisleri</i> Kuhl, 1890	No new record	
75	<i>Nyctalus montanus</i> (Barrett-Hamilton, 1906) Mountain Noctule <i>Pterygistes montanus</i> Barrett-Hamilton, 1906	No new record	
76	<i>Nyctalus noctula</i> (Schreber, 1774) Noctule <i>Vespertilio noctula</i> Schreber, 1774 <i>Vespertilio labiata</i> Hodgson, 1835	No new record	

77	<i>Pipistrellus abramus</i> (Temminck, 1838) Japanese Pipistrelle <i>Vespertilio abramus</i> Temminck, 1838	Arunachal Pradesh: Rotung; Uttar Pradesh: Allahabad; Andhra Pradesh: Hyderabad	Das and Sinha, 1995; Srinivasulu <i>et al.</i> , 2012
78	<i>Pipistrellus ceylonicus</i> (Kelaart, 1852) Kelaart's Pipistrelle <i>Scotophilus ceylonicus</i> Kelaart, 1852 <i>Vesperugo indicus</i> Dobson, 1878 <i>Pipistrellus chrysothrix</i> Wroughton, 1899	Assam: Sisuwati village, near Burachapari WLS; Madhya Pradesh: Bajani in Singhori WLS, Jabbalpur city, Shivpuri; Himachal Pradesh: Ghanatti; Maharashtra: Maval, Mulshi, Ambegaon, Khed, Karjat, Mahad, Nalganga, Kopargaon, Talegaon, Dabhade; Kerala: Kerala Agricultural University Campus Thrissur, Paralam, Pallipuram, Kodanur, Venginissery, Chirrakal, Chenam, Thanniyam, Ernakulam	Boro <i>et al.</i> 2018; Cyriac <i>et al.</i> , 2005; Korad, 2005; Korad, 2009; Korad <i>et al.</i> , 2010a; Pradhan and Talmale, 2012; Madhavan, 2000; Saikia <i>et al.</i> , 2011; Talmale, 2007, 2017.
79	<i>Pipistrellus coromandra</i> (Gray, 1838) Indian Pipistrelle <i>Scotophilus coromandra</i> Gary, 1838 <i>Myotis parvipes</i> Blyth, 1853 <i>Scotophilus coromandelianus</i> Blyth, 1863	Assam: Tamulpur Goreswar, Naokata, Goalpara, Rongjuli Madhya Pradesh: Jabbalpur city; Himachal Pradesh: Bakloh, Narkanda, Shaur in Pangi Valley; Maharashtra: Pune, Pimpri-Chinchwad; Kerala: Kerala Agricultural University Campus, Thrissur; Delhi NCT: Wazirabad	Boro <i>et al.</i> 2018; Cyriac <i>et al.</i> , 2005; Korad and Yardi, 2004a; Korad, 2005; Ghosh, 2008; Korad <i>et al.</i> , 2010a; Sinha, 1999; Sharma and Saikia, 2013; Srinivasulu and Srinivasulu, 2007; Talmale, 2007, 2017.
80	<i>Pipistrellus javanicus</i> (Gray, 1838) Javan Pipistrelle <i>Scotophilus javanicus</i> Gray, 1838 <i>Pipistrellus camortae</i> Miller, 1902 <i>Pipistrellus babu</i> Thomas, 1915 <i>Pipistrellus peguensis</i> Sinha, 1969	Andaman and Nicobar UT: Andaman islands; Himachal Pradesh: Arki; Maharashtra: Pune City, Khed, Karjat, Matheran,	Aul, 2014; Korad and Yardi, 2004a; Korad, 2005; Korad <i>et al.</i> , 2010a; Saikia <i>et al.</i> , 2011
81	<i>Pipistrellus paterculus</i> Thomas, 1915 Mount Popa Pipistrelle	No new records	
82	<i>Pipistrellus tenuis</i> (Temminck, 1840) Least Pipistrelle <i>Vespertilio tenuis</i> Temminck, 1840 <i>Pipistrellus mimus</i> Wroughton, 1899 <i>Pipistrellus principulus</i> Thomas, 1915	Assam: Goreswar, Mahuripara; Madhya Pradesh: Jabalpur city; Himachal Pradesh: Bhunter, Manikaran, Majothu, Simbalwara WLS; Maharashtra: Mulshi-jambe farm, Wai, Hiware tank; Delhi NCT: Wazirabad; Kerala: Paralam, Pallipuram, Venginissery, Chirrakai, Ernakulam	Boro <i>et al.</i> 2018; Ghosh, 2008; Madhavan, 2000; Pradhan and Talmale, 2012; Sharma and Saikia 2009; Srinivasulu and Srinivasulu, 2007; Talmale, 2007, 2017.
83	<i>Scotozous dormeri</i> Dobson, 1875 Dormer's Pipistrelle	Himachal Pradesh: Solan town, Majothu near Barotiwala; Maharashtra: Pune city, Mulshi, Gangakhed, Mandangadh; Mizoram: Lungsen; Nagaland: Kohima; Kerala: Paralam, Pallipuram, Venginissery, Chenam,	Srivastava <i>et al.</i> , 2000; Korad and Yardi, 2004a; Korad, 2005; Korad <i>et al.</i> , 2010a; Mandal <i>et al.</i> , 2000; Madhavan, 2000; Pradhan and talmale, 2012; Saikia <i>et al.</i> , 2011; Talmale, 2007

84	<i>Barbastella darjelingensis</i> Hodgson, 1855 Eastern Barbastelle <i>Plecotus darjelingensis</i> Hodgson, in Horsfield, 1855	Tamil Nadu: Valparai Plateau; Meghalaya: Shillong,	Saikia <i>et al.</i> , 2018; Wordley <i>et al.</i> , 2014
85	<i>Otonycteris hemprichii</i> Peters, 1859 Hemprich's Desert Bat <i>Otonycteris cinereus</i> Satunin, 1909	No new records	
86	<i>Plecotus homochrous</i> Hodgson, 1847 Brown winged bat <i>Plecotus puck</i> Barrett-Hamilton, 1907	No new records	
87	<i>Plecotus wardi</i> Thomas, 1911 Ward's Long-eared Bat	No new record	
88 ^b	<i>Hypsugo affinis</i> (Dobson, 1871) Chocolate Pipistrelle <i>Vesperugo affinis</i> Dobson, 1871 <i>Falsistrellus affinis</i> (Dobson, 1871)	Maharashtra: Pune, Dehu, Bhimashankar, Shivneri, Bhaje, Saswad, Mahabaleshwar	Korad and Yardi, 2004a; Korad, 2005; Korad <i>et al.</i> , 2010a
89	<i>Hypsugo cadornae</i> (Thomas, 1916) Cadorna's Pipistrelle <i>Pipistrellus cadornae</i> Thomas, 1916	No new records	
90 ^c	<i>Hypsugo savii</i> (Bonaparte, 1837) Savi's Pipistrelle <i>Vespertilio savii</i> Bonaparte, 1837 <i>Pipistrellus austenianus</i> Dobson, 1871	Maharashtra: Pune city, Ranjangaon, Mulshi Nimblak, Phaltan, Satara, Kodoli, Baramati, Solapur city, Apsinga, Tuljapur, Osmanabad caves	Gaikwad <i>et al.</i> , 2012; Korad and Yardi, 2004b; Korad, 2005; Korad <i>et al.</i> , 2010a
91	<i>Hypsugo joffrei</i> (Thomas, 1915) Joffre's Pipistrelle <i>Pipistrellus joffrei</i> Thomas, 1915	Meghalaya: Shillong; Sikkim: Hee Gyathang	Saikia <i>et al.</i> , 2017
92	<i>Ia io</i> Thomas, 1902 Great Evening Bat	Meghalaya: Cherrapunji, Phrang Karuh cave, Cave Ramong, Syllang village, Cave Mawphun Cave Rongdangngai Mondil, Cave Labit Mynlin, Cave Khleishnong, Cave Shalong,	Gebauer, 2011; Ruedi <i>et al.</i> , 2012b; Saikia <i>et al.</i> , 2018; Thabah <i>et al.</i> , 2007
93 ^d	<i>Tylonycteris fulvida</i> (Blyth, 1859) Lesser Bamboo Bat <i>Vespertilio pachypus</i> Temminck, 1840 <i>Scotophilus fulvidus</i> Blyth, 1859 <i>Tylonycteris aurex</i> Thomas, 1915	Assam: Balahati near Goreswar; Kerala: Cherpu, Ollur, Paralam, Pallipuram, Kodanur, Venginissery, Urakam, Taniyam, Mannuthy; Andaman and Nicobar UT: Karmatang, North East of Middle Andaman	Aul, 2014; Boro <i>et al.</i> , 2018; Madhavan, 2000
94 ^e	<i>Tylonycteris malayana</i> Chasen, 1940 Greater Bamboo Bat	Andaman and Nicobar UT: Bamboo Tekri, North Andaman; Meghalaya: Kharkhana	Saikia <i>et al.</i> , 2018 Srinivasulu <i>et al.</i> 2018
95	<i>Myotis altarium</i> Thomas 1911	Meghalaya: Cave Arwah and cave Khung	Thong <i>et al.</i> , 2018

96	<i>Myotis annectans</i> (Dobson, 1871) Hairy-faced Myotis <i>Pipistrellus annectans</i> (Dobson, 1871) <i>Myotis primula</i> Thomas, 1920	No new record	
97	<i>Myotis blythii</i> (Tomes, 1857) Lesser Mouse-eared Myotis <i>Vespertilio blythi</i> Tomes <i>Vespertilio murinoides</i> , Dobson, 1837 <i>Myotis africanus</i> Dobson, 1875	Himachal Pradesh: Mount Karol near Solan,	Saikia <i>et al.</i> , 2011
98	<i>Myotis formosus</i> (Hodgson, 1835) Hodgson's Myotis <i>Vespertilio eschen</i> Hodgson, 1835 <i>Kerivoula esche</i> Blyth, 1863 <i>Vespertilio auratus</i> Dobson, 1871 <i>Vespertilio dobsoni</i> Anderson, 1881	Himachal Pradesh: Drang; Mizoram: Sairep	Chakraborty <i>et al.</i> 2014; Ghosh 2008; Mandal <i>et al.</i> , 2000
99	<i>Myotis hasseltii</i> (Temminck, 1840) Lesser Large-footed Myotis <i>Vespertilio hasseltii</i> Temminck, 1840	No new records	
100	<i>Myotis horsfieldii</i> (Temminck, 1840) Horsfield's Myotis <i>Vespertilio horsfieldii</i> Temminck, 1840 <i>Myotis dryas</i> Anderson, 1907 <i>Leuconoe peshwa</i> Thomas, 1915	Maharashtra: Lonavla, Lonikalbhor, Shirur, Mahad, Mahabaleshwar; Andaman and Nicobar UT: Nicobar Island; Kerala: Kozhikode; Assam: Barangabari, Near Manas National Park	Aul <i>et al.</i> , 2014; Korad, 2005; Korad <i>et al.</i> , 2010a; Boro and Saikia 2015; Madhavan, 2000
101	<i>Myotis laniger</i> (Peters, 1871) Chinese Water Myotis <i>Vespertilio laniger</i> Perets, 1871	No new locality	
102 ^f	<i>Myotis longipes</i> (Dobson, 1873) Kashmir Cave Myotis <i>Vespertilio macropus</i> Dobson, 1872 (pre occupied by <i>V. Macropus</i> Gould, 1854) = <i>Vespertilio longipes</i> Dobson, 1873	Meghalaya: Cave Shallong, Cave Labit Kseh, Cave Bylliat, Umkyrpong, East Jaintia Hills district, Mawsmi cave, East Khasi Hills district, cave Lawbah, West Khasi Hills district	Ruedi <i>et al.</i> , 2012a, 2012b; Saikia <i>et al.</i> , 2018
103	<i>Myotis peytoni</i> Wroughton and Ryley, 1913 Peyton's Whiskered Myotis	Maharashtra: Mahabaleshar Kerala: Kozhikode, Silent Valley National Park	Madhavan, 2000; Korad <i>et al.</i> , 2005 (as <i>M. montivagus</i>); Srinivasulu and Srinivasulu, 2017
104	<i>Myotis montivagus</i> (Dobson, 1874) Burmese whiskered bat <i>Vespertilio montivagus</i> Dobson, 1874	Mizoram: Lunglei	Mandal <i>et al.</i> , 2000
105	<i>Myotis muricola</i> (Gray, 1846) Nepalese Whiskered Myotis <i>Vespertilio muricola</i> Gray, 1846 <i>Vespertilio caliginosus</i> Tomes, 1859 <i>Vespertilio blandfordi</i> Dobson, 1871	Meghalaya: No exact locality, reported as an old record from East Khasi Hills district; Mizoram: Lungsen, Sairep	Mandal <i>et al.</i> , 2000; Ruedi <i>et al.</i> , 2012b
106	<i>Myotis nipalensis</i> Dobson, 1871) Whiskered Myotis <i>Vespertilio nipalensis</i> Dobson, 1871 <i>Myotis meinertzhageni</i> Thomas, 1926	No new record	

107	<i>Myotis sicarius</i> Thomas, 1915 Mandelli's Mouse-eared Myotis	No new record	
108	<i>Myotis siligorensis</i> (Horsfield, 1855) Himalayan Whiskered Myotis <i>Vespertilio siligorensis</i> Horsfield, 1855 <i>Vespertilio darjilingensis</i> Horsfield, 1855	Himachal Pradesh: Solan town; Meghalaya: Malki Forest, Shillong, Cave Bsein I	Saikia <i>et al.</i> , 2011; Ruedi <i>et al.</i> , 2012b; Saikia <i>et al.</i> , 2018
109	<i>Myotis pilosus</i> (Peters, 1869) Rickett's Big-footed Myotis <i>Myotis ricketti</i> (Thomas, 1894)	Meghalaya: Phrang Karuh cave	Saikia <i>et al.</i> , 2018; Thabah, 2006;
110	<i>Harpiocephalus harpia</i> (Temminck, 1840) Lesser Hairy-winged Bat <i>Vespertilio harpia</i> Temminck, 1840 <i>Harpiocephalus rufus</i> Gray, 1842 <i>Noctulinia lasyura</i> Hodgson, 1847 <i>Lasiurus pearsoni</i> Horsfield, 1851	No new record	
111	<i>Harpiocephalus mordax</i> Thomas, 1923 Greater Hairy-winged Bat	Distribution localities unclear. Possibly in the NE Indian states	Csorba <i>et al.</i> , 2008; Molur <i>et al.</i> , 2002
112	<i>Murina aurata</i> Milne-Edwards, 1872 Little Tube-nosed Bat	No new record	
113	<i>Murina cyclotis</i> Dobson, 1872 Round-eared Tube-nosed Bat <i>Murina eileenae</i> Philips, 1932	Mizoram: Sairep; Andaman and Nicobar UT: Andaman Island, Nicobar Island; Meghalaya: Krem Labit Kseh	Aul <i>et al.</i> , 2014; Mandal <i>et al.</i> , 2000
114	<i>Harpiocephalus grisea</i> (Peters, 1872) Peters's Tube-nosed Bat <i>Murina grisea</i> Peters, 1872	Mizoram: Lunglei district	Bhattacharyya, 2002
115	<i>Murina huttoni</i> (Peters, 1872) Hutton's Tube-nosed Bat <i>Harpiocephalus huttonii</i> Peters, 1972	No new record	
116	<i>Murina leucogaster</i> Milne-Edwards, 1872 Greater Tube-nosed Bat <i>Murina rubex</i> Thomas, 1916	No new record	
117	<i>Murina tubinaris</i> (Scully, 1881) Scully's Tube-nosed Bat <i>Harpiocephalus tubinaris</i> Scully, 1881	Himachal Pradesh Keylong; Mizoram: Sairep	Das, 2003; Mandal <i>et al.</i> , 2000
118	<i>Murina jaintiana</i> Ruedi <i>et al.</i> , 2012a Jaintia Tube-nosed Bat	Meghalaya: Cave Bylliat	Ruedi <i>et al.</i> , 2012a
119	<i>Murina pluvialis</i> Ruedi <i>et al.</i> , 2012a Rainforest Tubenosed Bat	Meghalaya: Laitkynsew, Mawphlang, Mawryngkneng, Shillong, Tangsen near Cave Lanshat	Ruedi <i>et al.</i> , 2012a, 2012b; Saikia <i>et al.</i> , 2018
120	<i>Kerivoula hardwickii</i> (Horsfield, 1824) Hardwicke's Woolly Bat <i>Vespertilio hardwickii</i> Horsfield, 1824 <i>Kerivoula fusca</i> Dobson, 1871 <i>Kerivoula depressa</i> Miller, 1906 <i>Kerivoula crypta</i> Wroughton and Ryley, 1913 <i>Kerivoula malpasi</i> Philips, 1932	No new record	

121	<i>Kerivoula lenis</i> Thomas, 1916 Lenis Woolly Bat	Tamil Nadu: Therkumalai Estate	Vanitharani <i>et al.</i> , 2002
122	<i>Kerivoula picta</i> (Pallas, 1767) Painted Woolly Bat <i>Vespertilio pictus</i> Pallas, 1767	Assam: Kaziranga N.P.; Kerala: Kerala Agricultural University Campus Thrissur, Paralam, Pallipuram, Venginissery, Kottayam; Gujarat: Vadodara, Tapi; Maharashtra: Santacruz, Juhu, Goregaon, Dahanu, Patan, Hamadabad village, 3kms from NW of Satara city, Thoseghar village.	Boro <i>et al.</i> 2018; Cyriac <i>et al.</i> , 2005; Devakar <i>et al.</i> , 2017; Madhavan, 2000; Mahabal <i>et al.</i> , 2015; Patel <i>et al.</i> , 2017; Talmale, 2007
123	<i>Kerivoula kachinensis</i> Bates <i>et al.</i> 2004 Kachin Woolly bat	Meghalaya: Laitkynsew, Sakwa	Ruedi <i>et al.</i> , 2012b; ZSIS454
124	<i>Kerivoula furva</i> Kuo <i>et al.</i> 2017 Family: Miniopteridae Dobson, 1875	Meghalaya: Jaintia Hills	Kuo <i>et al.</i> , 2017
125	<i>Miniopterus magnater</i> Sanborn, 1931 Western Long-fingered Bat	Meghalaya: Kseh area, Lumshnong and nearby areas, Shnongrim, Siju Cave,	Ruedi <i>et al.</i> , 2012b, Saikia <i>et al.</i> , 2018
126	<i>Miniopterus pusillus</i> Dobson, 1876 Small Long-fingered Bat	No new record	
127	<i>Miniopterus fuliginosus</i> Hodgson, 1835 <i>Vespertilio fuliginosa</i> Hodgson, 1835	Himachal Pradesh: Barog tunnel, Brewri Tunnel, Chambaghat; Maharashtra: New Karanje, Kolhapur, Kerala: Silent Valley National Park	Pradhan and Talmale, 2012; Srinivasulu and Srinivasulu, 2017; Talmale, 2007

Remarks: ^aProposed new species from Khasi Hills, Meghalaya, North-East India primarily based on a different peak frequency of echolocation calls (85 kHz) as compared to closely related species *Hipposideros larvatus* (Horsfield) with 98 kHz (Thabah *et al.*, 2006). The specific status of this taxon still needs some clarification.

^bThe Maharashtra records of *Hypsugo savii* are doubtful and need reassessment.

^cAsian members of the genus *Falsistrellus* has been recently assigned to the genus *Hypsugo* (Görföl and Csorba, 2018).

^dFollowing Tu *et al.*, 2017 all Indian population of *Tylonycteris pachypus* (Temminck 1840) considered here as *T. fulvida*. The records of *Tylonycteris pachypus* (Temminck, 1840) from Western Ghats of India need scrutiny and might represent distinct taxa (Tu *et al.* 2017).

^eContinental bats of *Tylonycteris pachypus* complex are referable to *T. fulvida* (Tu *et al.*, 2017)

^fThe records of *Myotis longipes* from Meghalaya (Sinha, 1994; Ruedi *et al.* 2012b; Srinivasulu & Srinivasulu 2012 and Saikia *et al.* 2018) possibly represent *M. laniger* and needs further investigations

Future Directions

From the above discussions it is abundantly clear that the bat fauna of India is far from satisfactorily documented. Diversity and distribution information for most of the bat species are inadequate. Besides, systematic status of many of the species occurring in the country is not clear and there is also high probability of many cryptic species within the known species. Although progress in understanding the current species diversity has been made, several difficult groups such as the *pipistrelles* or *Myotis* still need critical evaluation for proper taxonomic

treatment. In this backdrop, the foremost priority is to fill that information gap which can be attained by systematic field studies coupled with critical re-examination of the already collected bat specimens in different institutions of the country. Since, many of the existing taxonomic uncertainties can not be resolved by traditional morphological approach alone, a combination of molecular tools and echolocation call data will be helpful to clarify these questions. DNA barcoding is rapidly evolving as a much useful taxonomic tool (Francis *et al.*, 2010). It would be a fascinating scientific endeavour to develop a DNA barcode library for the Indian bats with

each barcode attached to a voucher specimen. Besides, developing an echolocation call library for Indian bats could be another interesting goal which will have immense utility in rapid biodiversity surveys.

Finally, information on the population status, population trend and threats for a great majority of the bat species in India is non-existent which effectively hampers effort to prioritize any conservation action or to accord legal protection to the bat species in India. A majority of the bat species in the country are undoubtedly facing serious risk of extinction including some rare and

endemic species. Therefore, status survey especially of the endemic and threatened species is also required to be carried out on a priority basis.

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Geographic Gazetteer of the localities mentioned in the text

Locality	Co-ordinates
Ahmednagar	19.0952°N, 74.7496°E
Aibawk	23.5591°N, 92.7065°E
Alandi	18.6726°N, 73.8894°E
Allahabad	25.4358°N, 81.8463°E
Amarpur	22.7880°N, 80.9506°E
Ambegaon	19.1132°N, 73.7327°E
Andheri	19.1136°N, 72.8697°E
Apsinga	18.0601°N, 76.0428°E
Arki	31.1521°N, 76.9686°E
Asirgarh Fort	21.4714°N, 76.2897°E
Bajag	22.6736°N, 81.3498°E
Bakloh	32.45°N, 77.9166°E
Balahati	26.4995°N, 91.7092°E
Bamboo Tekri	13.373°N, 92.999°E
Baramati	18.1841°N, 74.6108°E
Barren Island	12.2792°N, 93.8604°E
Bilha village	23.2359°N, 80.9593°E
Bilasipara	26.23°N, 90.23°E
Bhagdehi Village	23.1099°N, 78.2538°E
Bhagaura village	25.4188°N, 77.7607°E
Bheda Ghat	25.3187°N, 90.4408°E
Bhimashankar	19.0720°N, 73.5357°E
Bhor	18.1458°N, 73.8430°E
Bhoora Kho, Madhav NP	25.5785°N, 77.6666°E
Bhunter	31.8843°N, 77.1456°E
Bilaspur	31.3407°N, 76.6875°E
Bondar near Sunpuri	22.8216°N, 81.2580°E
Bokakhat	26.6215°N, 93.6116°E
Bornadi WLS C.	26.7809°N, 91.7553°E
Burachapari WLS C.	26.4891°N, 92.6778°E
Burhanpur	21.3120°N, 76.2294°E
Chhanta	22.8534°N, 81.0987°E
Chokpot	23.1130°N, 99.8458°E
Cherrapunji	25.2717°N, 91.7308°E
Darugiri	c25.6333°N, 90.75°E
Drang	31.8041°N, 76.9449°E
Hanumanhalli	15.3481°N, 76.4660°E
Karjat	18.9192°N, 73.3277°E

Khahnar	25.2200°N, 92.3706°E
Kharkhana	25.1588°N, 91.1919°E
Kosamdih	22.7842°N, 81.2883°E
Cave at Bonai	21.7602°N, 85.1138°E
Cave at Gupteswar	18.8208°N, 82.1672°E
Cave Arwah	25.2717°N, 91.7308°E
Cave Pamskei in Lawbah	25.2359°N, 91.5577°E
Cave Mawsyrwait	25.2544°N, 91.6558°E
Cave Bylliat	25.4283°N, 92.6016°E
Cave Ramong	25.1228°N, 91.3010°E
Cave Tylong Kobah	25.1518°N, 91.3524°E
Cave Puri	25.15°N, 91.33°E
Cave Mawphun	25.1535°N, 91.3357°E
Cave Piel Klieng Pouk	25.1025°N, 92.2650°E
Cave Madury	25.1632°N, 91.3324°E
Cave Lum Shken	25.1616°N, 91.3115°E
Cave Lymke	25.22'28°N, 92.34'47°E
Cave Khung	25.2321°N, 92.3448°E
Cave Poh Lakhari	25.2304°N, 92.3710°E
Cave Sahiong I	25.2349°N, 92.3723°E
Cave Dieng Jem	c.25.4088°N, 92.5572°E
Cave Labit Shnongrim	25.3508°N, 92.5035°E
Cave Labit Lumshnong	25.1828°N, 92.3768°E
Cave Labit Kseh	25.4313°N, 92.6016°E
Cave Umlawan	25.1688°N, 92.3825°E
Cave Umadoh	25.1913°N, 92.3733°E
Cave Umshor	25.1038°N, 92.2230°E
Cave Khleishnong	25.1808°N, 92.3941°E
Cave Lymbait	25.1908°N, 92.2686°E
Cave Lumjingtep	25.2008°N, 92.2719°E
Cave Pedenglapiang	25.1805°N, 92.2013°E
Cave Pdiem Dhare	25.1572°N, 92.2008°E
Cave Hartali	25.1941°N, 92.1880°E
Cave Labit Mynlin	25.4197°N, 92.5877°E
Cave Shalong,	25.4083°N, 92.6113°E
Cave Rongdangngai Mondil	25.1236°N, 90.0037°E
Cave Tem-Dibai	25.1833°N, 91.6166°E
Cherpu	10.4324°N, 76.2045°E
Chirakkal	11.9101°N, 75.3616°E
Daijar Village	26.3969°N, 73.0522°E
Dahanu	19.9811°N, 72.7452°E
Dampa TR	c. 23.5666°N, 92.3666°E

Daund	18.4593°N, 74.5873°E
Devrukh	17.0686°N, 73.6242°E
Dhamangaon	20.7933°N, 78.1393°E
Dhangawa	23.0302°N, 81.8369°E
Dharampur	30.8994°N, 77.0190°E
Dimapur	25.8630°N, 93.7537°E
Dolariya	22.5905°N, 77.6339°E
Dulkot	21.4934°N, 76.1792°E
Dungaria	23.0852°N, 80.8300°E
Dungong Creek	c.10.7666°N, 92.6166°E
Ernakulam	9.9816°N, 76.2999°E
FRI, Dehradun	30.3437°N, 77.9995°E
Forest RH, Madhav NP	25.4201°N, 77.705°E
Gambhar	31.0166°N, 76.9666°E
Ghanatti	31.1385°N, 77.0838°E
Golapara	26.0876°N, 90.5636°E
Gram Pindarai	23.0654°N, 80.6825°E
Goregaon	19.1551°N, 72.8679°E
Goreswar	26.5355°N, 91.7186°E
Guijan	27.5680°N, 95.3286°E
Hamadabad	17.7174°N, 74.0093°E
Harichandragad	19.3913°N, 73.7798°E
Hatdol cave	23.0511°N, 80.7076°E
Havelock island	11.9761°N, 92.9876°E
Hee Gyathang	27.5°N, 88.5°E
Hirawe	19.0681°N, 74.6012°E
Hyderabad	17.3850°N, 78.4867°E
Indapur	18.1140°N, 75.0319°E
Interview Island	12.8953°N, 92.6884°E
Jabbalpur	23.1815°N, 79.9864°E
Jamb	20.6159°N, 78.9302°E
Jambughoda WLS	22.3333-22.5°N, 78.5833-73.75°E
Juhu	19.0988°N, 72.8321°E
Junar	19.2032°N, 73.8743°E
Fakiragram	26.3649°N, 90.1862°E
Kachharimal village	23.4397°N, 80.6764°E
Kamshet	18.7518°N, 73.5514°E
Kawal WLS	c.19.0833°N, 78.5333°E
Kalakad-Mundanthurai TR	8.3333-8.85°N, 77.2666-77.65°E

Kaziranga N.P.	26.5-26.75°N, 93.13-93.6°E
Kerara Fort	25.4617°N, 78.144°E
Kesala	22.4758°N, 77.8393°E
Khamaria	23.0930°N, 79.5481°E
Khindsi	C.21.4040°N, 79.3635°E
Khongsnong	25.5238°N, 92.5016°E
Khandong dam site	c.25.5030°N, 92.6102°E
Khaddum cave	25.1708°N, 92.5061°E
Khandwa Rail Station	21.8283°N, 76.3525°E
Khed	17.7196°N, 73.3968°E
Khirala village	21.4714°N, 76.2897°E
Khopoli	18.7890°N, 73.3414°E
Kho Khai Math	25.0857°N, 77.8802°E
Kodanur	10.4665°N, 76.1842°E
Kodoli	16.8752°N, 74.1902°E
Kohima	25.6586°N, 94.1053°E
Kolhapur	16.7050°N, 74.2433°E
Koregaon Bhima	18.6486°N, 74.0623°E
Kotma	23.2112°N, 81.9732°E
Kot Beja	30.8833°N, 76.95°E
Kottayam	9.5916°N, 76.5222°E
Kozhikode	11.2588°N, 75.7804°E
Kunihar	31.0666°N, 76.95°E
Lailad	25.8963°N, 91.7684°E
Lalpur	22.7769°N, 81.3351°E
Lama	c.25.1591°N, 92.2591°E
Lakadong	25.5307°N, 92.5310°E
Laitkynsew	25.2202°N, 91.6672°E
Lamheta Ghat	23.1118°N, 79.8356°E
Landfall Island	13.6587°N, 93.0026°E
Lapta village	22.9817°N, 81.9086°E
Lawbah	25.2359°N, 91.5577°E
Lilatala	22.9261°N, 81.4786°E
Lonar Crater and Wildlife Sanctuary	19.9726°N, 76.5083°E
Lonavala	18.7546°N, 73.4062°E
Loni Kalbhor	18.4879°N, 74.0234°E
Lunlung of SBR	21.9337°N, 86.5488°E
Lungsen	22.8745°N, 92.5879°E
Mahesh-Khola	c.25.1823°N, 90.7925°E
Mahabaleswar	17.9307°N, 73.6477°E

Mahad	18.0820°N, 73.4224°E
Mahuripara	26.5842°N, 91.7309°E
Majai	25.1594°N, 91.7452°E
Majothu	30.9°N, 76.85°E
Mansar Lake	32.6966°N, 75.1443°E
Manikaran	32.0268°N, 77.3511°E
Matheran	18.9887°N, 73.2712°E
Mathilakam	10.2923°N, 76.1653°E
Mannuthy	10.5285°N, 76.2682°E
Maval	18.7552°N, 73.4445°E
Mawsmi cave	25.2988°N, 91.7086°E
Mawphlang	25.4666°N, 91.7666°E
Mawshamok	25.2271°N, 91.7014°E
Mawryngkneng	25.5566°N, 92.0641°E
Melselvanur-Keelselvanur WLS	9.2166°N, 78.5333°E
Melghat TR	c.21.4458°N, 77.1972°E
Mokokchung	26.3220°N, 94.5135°E
Mount Karol	30.9415°N, 77.1098°E
Mulshi	18.5011°N, 73.5138°E
Musalpur	26.6628°N, 91.3641°E
Nagarjunasagar	16.5760°N, 79.3124°E
Nalagarh	31.0446°N, 76.7048°E
Naldurg Fort	17.8154°N, 76.2863°E
Narwar Fort	25.6456°N, 77.9062°E
Narkanda	31.2625°N, 77.1181°E
Nehr Chawk near Mandi	31.5833°N, 76.9166°E
New Karanje	c.17.6999°N, 73.9953°E
Nimbola	21.3734°N, 76.2582°E
Nira-Norsinghpur	17.9849°N, 75.1166°E
Nongtraï village	25.2207°N, 91.6116°E
Nongnah	25.2675°N, 91.3240°E
Nongpoh	25.8699°N, 91.8337°E
North Reef Island	13.0879°N, 92.7009°E
Nurpur	32.3001°N, 75.8853°E
Ollur	10.4807°N, 76.2421°E
Osmanadab	18.1861°N, 76.0419°E
Outram island	12.2348°N, 93.0802°E
Paget island	13.4296°N, 92.8328°E
Pahamshken	25.9301°N, 91.9535°E
Palisseri	10.4758°N, 76.2262°E
Pallippuram	10.1630°N, 76.1813°E
Panchgani	17.9236°N, 73.7983°E

Pandharpur	17.6746°N, 75.3237°E
Patan	17.3735°N, 73.8992°E
Patas	18.4344°N, 74.4614°E
Paralam	10.4481°N, 76.1871°E
Patas	18.4344°N, 74.4614°E
Pench NP	c.21.6716°N, 80.3366°E
Phaltan	17.9845°N, 74.4360°E
Phrang Karuh cave	25.1874°N, 92.3768°E
Phulbari	c.25.9°N, 90.0333°E
Phut-Jaut	25.1928°N, 91.3114°E
Poladpur	17.9843°N, 73.4646°E
Pune	18.5204°N, 73.8567°E
Pushprajgarh	22.9341°N, 81.6085°E
Pynurkba	25.25°N, 92.2833°E
Quatab Minar Complex	28.5252°N, 77.1853°E
Raigad Fort	18.2347°N, 73.4464°E
Ranjangaon	18.7539°N, 74.2473°E
Rani	27.7905°N, 91.2626°E
Ratanmahal WLS	22.5763°N, 74.1185°E
Ratnagiri	16.9902°N, 73.3120°E
Rongrengiri	25.8166°N, 90.3666°E
Rodhanagiri WLS	16.3848°N, 73.9553°E
Rongmachok	c.25.8161°N, 90.0997°E
Rotung	c. 28.1333°N, 95.2°E
Sadar Bazar, Betul	21.9092°N, 77.9908°E
Saipung	25.35°N, 92.5333°E
Sairep	22.8241°N, 92.8206°E
Sakwa	25.2061°N, 92.4619°E
Salbari	26.6085°N, 91.5770°E
Salsette	19.2000°N, 72.9000°E
Santacruz	19.0843°N, 72.8360°E
Saswad	18.3521°N, 74.0329°E
Satara	17.6805°N, 74.0183°E
Semadoh	21.5023°N, 77.3245°E
Shalaghat	31.1833°N, 76.9833°E
Shaur	32.9°N, 76.45°E
Shillong	25.5666°N, 91.8833°E
Shirur	18.8272°N, 74.3730°E
Shnongrim	25.3505°N, 92.5167°E
Siju cave	c.25.3577°N, 90.6613°E
Sibbari,	25.1987°N, 90.5547°E
Silent Valley NP	c.11.1333°N, 76.4666°E

Silbori, Orang National Park	26.5863N, 92.3041E
Simbalbara WLS	c.30.4666°N, 77.5333°E
Sindewahi	20.2879°N, 79.6580°E
Sinhagad	18.3663°N, 73.7559°E
Sisuwati village	26.5443N, 92.7641E
Solan town	30.9045°N, 77.0967°E
Songsak	25.6512°N , 90.6074°E
Sumer	25.6791°N , 91.9069°E
Survaya ki Garhi	25.4113°N, 77.6747°E
Shangpung	25.4813°N , 92.3493°E
Shnongpdeng	25.2072°N , 92.0096°E
Syndai	25.1879°N , 92.1427°E
Stage III dam site	25.7313°N , 91.7944°E
Stage IV dam site	25.7947°N , 91.7783°E
Shella	25.1734°N , 91.6519°E
Shobar	25.1784°N , 91.7323°E
Tadoba Andhari TR	20.1938°N, 79.3400°E
Tamulpur	26.6952N, 91.6418E
Tangsen	25.3316°N , 92.5138°E
Taapu Sera	30.3829°N , 78.1758°E
Tapi	20.95°N , 73.4°E
Tarubanda	21.4654°N, 77.1446°E
Terahi Garhi	25.0445°N, 77.9591°E
Thangsah	25.1833°N , 92.2°E
Therhalli	13.1436°N, 78.1007°E
Tillangchong island	8.4976°N, 93.6294°E
Totu	31.0975°N, 77.1241°E
Tuljapur	18.0100°N, 76.0711°E

KAU, Thrissur	10.5484°N, 76.2857° E
Thosegarh	17.5991°N, 76.8673°E
Therkumalai Estate	8.50°N, 77.21°N
Thlu Shrieh cave	25.1217°N , 92.2235°N
Thanniyam	10.4097°N, 76.1262° E
Tangsen near Cave Lanshat	25.3316°N, 92.5138°N
Thosegarh	17.6031°N, 73.8478°E
Tuljapur	18.0100°N, 76.0711°E
Umkiang	25.0587°N, 92.3826°N
Umlingsha	25.2077°N, 92.2619°N
Umlatdoh	25.2°N , 92.2666°E
Umkyrpong	25.4284°N, 92.5782°N
Umnuih Tamar	25.1956°N, 91.8310°N
Urakam	10.4274°N, 76.2160°E
Vadodara	22.3072°N, 73.1812°E
Valpari Plateau	10.3055°N, 76.8371°E 10.2684°N, 76.8973°E 10.3705°N, 76.9154°E
Vatesuandung Bakhur	c.25.3047°N, 92.7013°N
Vellangallur	10.3031°N, 76.2090°E
Veliangad	11.779°N, 75.765°N
Venginissery	10.4639°N, 76.2030°E
Venkitangu	10.5166°N, 76.0833°N
Vontimitta	c. 14.3833°N, 79.0333°E
Wadgaon	18.7381°N, 73.6389°E
Wai	17.9487°N, 73.8919°E
Williamnagar	c.25.5314°N, 90.5920°N
Wokha	26.0910°N, 94.2590°E