



BAT NET NEWSLETTER

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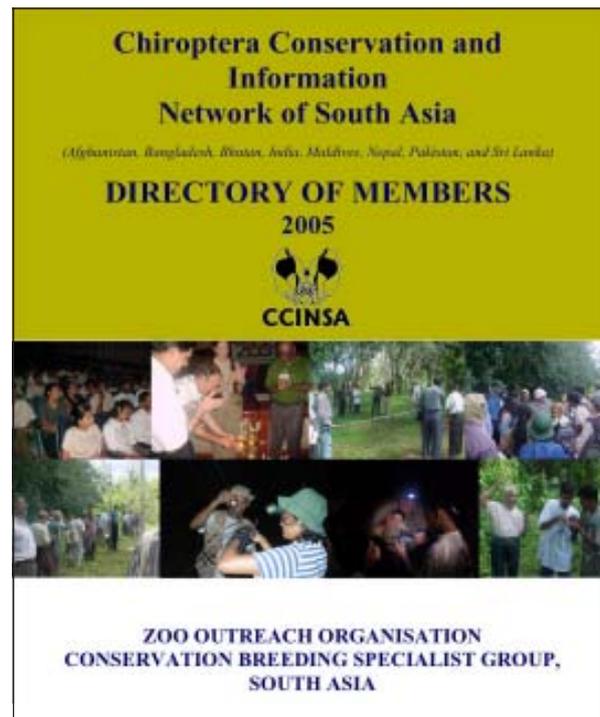
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Look for this outstanding CCINSA Directory of Members on the website www.zoosprint.org. Designed by B.A. Daniel "Directory" Deepa and Marimuthu, this web based volume will knock you out with its detail. Many members never got back with updated info so if your entry has mistakes please write to us. Everybody is responsible for their own entry. If you don't correct us then it will remain wrong. No printed versions available except at great cost. Network is sponsored by Chester Zoo.

Announcement -- New Scientific Chair of CCINSA

Dr. G. Marimuthu stepped down as Scientific Chair of CCINSA after five years of dynamic leadership and wise counsel. Dr. Sripathi Kandula has agreed to step into the empty Chair and is now the Scientific Chair of CCINSA. Dr. Sripathi Kandula is also from the Madurai Kamaraj University which is known throughout the country as the bat centre of India. Welcome to Sripathi Kandula from all of us at CCINSA.





Timing of exodus flight of Madurai bats

M.K. Chandrashekar*

In our very first paper on the bats of Madurai (9°58' N lat; 78°10'E long) R. Subbaraj and M.K. Chandrashekar (1977) had commented that the evening outflight of the emballonurid bat *Taphozous melanopogon* was timed precisely to began between 18.21 hrs and 18.42 hrs. This information was too good to be true for our friends in Europe. One of them Eberhard Gwinner, the discoverer of migratory restlessness (*zugunruhe*) in birds, and Director of the Max-Planck-Institute for Ornithology in Andechs, Germany, visited us in the summer of 1978 and asked to be taken to the Jain Hills caves where the colony of *Taphozous* bats roosted in a vertical rock crevice. Gwinner had the distinction of having worked with G. Kramer (sun as a compass in bird migration), J. Aschoff, Konrad Lorenz and Karl von Frisch. I told Ebo that observations have to be made fast for our twilight at Madurai does not last over a whole hour or more as in Germany. Here civil dawn and dusk lasted a little below 13 min. Since we had not yet acquired the jeep Subbaraj, Marimuthu, Ebo Gwinner, our animal procurer Raman and I took the 5 pm. Madurai-Bodinayakanur passenger train, which had the endearing quality of arriving in each station 5 min earlier than scheduled. A one-man ticket vending office gave away tickets 10 min prior to the arrival of the passenger. Our journey was for a stretch of 7 km. to the Nagamalai-Pudukkottai unmanned rail stop. Ebo told us this train reminded him of old wild west Hollywood movies. We were in the Jain Hill slopes by about 18.00 hrs and there was no time to lose. We lay back on the still hot rocky floor looking skyward to sight the bats. We had a pair of Zeiss binoculars. Gwinner had seen much field work and action in Central and Northern Africa. It was 18.30 hrs and no bat had stirred out but we heard the noisy pre-flight vocalizations of the bats which got louder by the minute. At 18.35 hrs Gwinner asked Subbaraj why nothing was happening. Subbaraj said that there were seven more minutes to go before we give up. As he was whispering this a batch of seven to eight *Taphozous* bats shot out into the darkening northerly sky. Ebo Gwinner broke into loud appreciative laughter. Then more and more batches of bats swiftly followed and by 18.42 hrs literally the last bat of the colony had departed. In places such as Panama which are on the equator, I am told that one can set the time of one's wrist-watch by the precision of bat emergence in the evening. Gwinner was fond of recalling this adventure of ours every time we met at conferences in Europe, USA and Japan. For those who knew Eberhard Gwinner, I must pass on the sad news that he suddenly passed away in September 2004 at the age of 65. R. Subbaraj (1951-2000), who had worked in Gwinner's laboratory for close to two years, alas is also no more.

Reference

Subbaraj R and Chandrashekar M K. 1977. 'Rigid' internal timing in the circadian rhythm of flight activity-in a tropical bat. *Oecologia (Berlin)* 29: 341-348.

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Occurrence of Lesser Mouse-tailed Bat *Rhinopoma hardwickii* Gray, 1831 and Black-bearded Tomb Bat *Taphozous melanopogon* Temminck, 1841 (Mammalia: Chiroptera: Rhinopomatidae and Emballonuridae) in Adilabad district, A.P.

Bhargavi Srinivasulu, C. Srinivasulu* & G. Ravinder**

While on a short-term study to document bat diversity of Kawal Wildlife Sanctuary (19°05'-19°20' N and 78°32'-79°12' E) in Adilabad district of Andhra Pradesh, we were informed by the people of a fringe village on the existence of a bat colony in a cave on a hillock nearby. We visited the hillock – Papammagutta near Chintagudem (19°04' N, 79°04' E) village on 27 September 2004 to collect bats. The bats were collected using mist nets spread at the cave mouth and hoop nets within the cave recesses. A total of 42 bats were captured that were identified as Black-bearded Tomb Bat *Taphozous melanopogon* Temminck, 1841 of which 6 vouchers (NHM.OU.2004 20-25) were deposited in the Natural History Museum of Department of Zoology, Osmania University, Hyderabad. We also sighted 6 individuals of the Lesser Mouse-tailed Bat *Rhinopoma hardwickii* Gray, 1831 but could not trap or collect any as they avoided flying and crept into narrow crevices.

Both the Lesser Mouse-tailed Bat *Rhinopoma hardwickii* and the Black-bearded Tomb Bat *Taphozous melanopogon* are widespread species ranging from Afghanistan, Pakistan and India in the former case and from Sri Lanka, Myanmar and India in the latter case within Indian subcontinent (Bates and Harrison, 1997; Molur *et al.*, 2002). In Andhra Pradesh the Lesser Mouse-tailed Bat *Rhinopoma hardwickii* is known from Palkonda (13°50' N, 79°00' E), Koduru (13°58' N, 79°14' E), Chintarajanpalli, Kondagoralapenta (13°50' N, 79°00' E), Siddavatam (14°43' N, 78°91'E) (Cuddapah District), Coringa (16°42' N, 82°15' E) (East Godavari district), Hyderabad (17°25' N, 78°50' E) (Hyderabad district), Jagtial (18°48' N, 78°56' E) (Karimnagar District), Borra Caves (18°19' N & 82°41' E) (Vishakapatnam District), and Nilapilam Cave (Kurnool District); while the Black-bearded Tomb Bat *Taphozous melanopogon* is known from Ballapali Range (13°50' N, 79°15' E), Hyderabad (17°25' N, 78°50' E), Secunderabad (17°27' N, 78°27' E), Koduru (13°58' N, 79°14' E), Kondagoralapenta (13°50' N, 79°00' E), Siddavatam (14°43' N, 78°91' E) (Cuddapah District), Borra Caves (18°19' N & 82°41' E) (Vishakapatnam District), and Hanmakonda (18°01' N, 79°38' E) (Warangal District) (Bates and Harrison, 1997; Molur *et al.*, 2002; Chakraborty *et al.*, 2004; Srinivasulu & Nagulu, 2002; Srinivasulu & Srinivasulu, 2004). Although widespread in their range both species are underrepresented from Andhra Pradesh and through this note we put on record for the first time their occurrence in Adilabad district, Andhra Pradesh.

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References

Bates, P.J.J. and D. L. Harrison (1997). *Bats of the Indian Subcontinent.* Harrison Zoological Museum, Sevenoaks, UK. xvi + 258 pp.

Chakraborty, S., T.P. Bhattacharyya, J.K. De, M.K. Ghosh, T.K. Chakraborty and A.K. Poddar (2004). Mammals. In: *Director (ed.) Fauna of Andhra Pradesh. Part 2. State Fauna Series 5.* Zoological Survey of India, Kolkata, 1-96 pp.

Molur, S., G. Marimuthu, C. Srinivasulu, S. Mistry, A. M. Hutson, P. J. J. Bates, S. Walker, K. Padma Priya & A. R. Binu Priya (eds.) (2002). *Status of South Asian Chiroptera – Conservation Assessment and Management Plan (C. A. M. P.) Workshop Report 2002.* Zoo Outreach Organisation, CBSG – South Asia and WILD, Coimbatore, India. viii + 141pp + CD-Rom.

Srinivasulu, B. and C. Srinivasulu (2004). Roost site characteristics of bats of Borra Caves, Vishakapatnam district, Andhra Pradesh. In: Shankaraiah, K. (ed.) *Proceedings of the National Symposium on Bioresources, Biotechnology and Bioenterprise.* Department of Zoology, Osmania University, Hyderabad. 65-72 pp.

Srinivasulu, C. and V. Nagulu (2002). Bats of Old Light House in Coringa Wildlife Sanctuary, Andhra Pradesh. *Bat Net – CCINSA Newsletter*, 3(1): 7.

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Declining population of Indian Flying Fox (*Pteropus giganteus*) at Rajmahal (Jharkhand), India

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The Indian Flying Fox (*Pteropus giganteus*) is common in Bihar. Sinha (1986) has done extensive taxonomical and ecological studies on the species in the erstwhile state. Sinha (1995) reported colonies consisting of 150 - 2000 individuals in different districts of the state. He observed a group of about 2000 individuals of the species on eight trees of four species; *Tamarindus indicus* (Tamarind), *Polyanthia longifolia* (Ashok), *Ficus religiosa* (Peepal), and *Azadirachta indica* (Neem) at Rajmahal (Sahebganj District, now in Jharkhand) on 9th April 1995.

Recently, senior author, in connection with the continuous census survey of Gangetic dolphin (*Platanista gangetica*) visited Rajmahal (situated on the right bank of the Ganga at

25°03'22" N and 87°50'25" E) and stayed there on 16th night and 17th Morning of December 2004. The place reported by Sinha (1995) was revisited and it was observed that about 1000 individuals of Indian flying fox were roosting on the trees. At 19:00 hrs on 16th December, the bat group was vocalizing like *kri - kri - krill* on ficus and tamarind trees. During night the calls reduced, a case when they might have gone for feeding. On 17th December at 05:00 hrs no calls of the bats were heard, but it re-started after 06:30 hrs. The senior author observed their activities for over one and a half hours. The adults took flight before the younger ones and hovered over the roosting trees before taking a long and directional flight. Sinha (1995) observed restlessness in the individuals in scorching sun of April during 12:30 hrs to 13:30 hrs, at the same site.

The most striking observation was decline in population of the species to almost half in a decade. Locals reported that some *Nata* people (trapeze artists) living in the area use harpoons to kill the resting bats. The community relishes their flesh. Its meat is supposed to cure rheumatic pains (Sinha and Advani, 1976), thus creating more demand for its flesh among other strata of the society, too. Skin and fur of the species is also used to make hand - gloves. However, orthodox people favour survival of the species, overlooking the damage caused in their orchards by the bats. It is concluded that indiscriminate killing of bats at Rajmahal is the main cause of their declined number in the last 10 years.

Acknowledgments

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References

Sinha, Y. P. and Advani, R. 1976. Meat of Indian flying fox *Pteropus g. giganteus* (Brunnich). *Newsletter Zoological Survey India, Vol. 2*, pp. 185.

Sinha, Y. P. 1986. The bats of Bihar: Taxonomy and ecology. Record of Zoological Survey of India, *Occ. Paper. 77*, pp. 1-60, pl. 1 - 7.

Sinha, Y. P. 1995. On some behavioural activities of Indian flying fox, *Pteropus giganteus giganteus* (Brunnich, 1782), in Bihar, India. *Cheetal*, 34 (3-4), pp. 55 - 57.

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Interactions between bats and plant species, *Prosopis juliflora*

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Bat-plant interactions are observed in the tropical parts of the world. Phytophagous bats depend on plants for their food resource such as fruits, flowers, pollen, nectar and leaves. In turn, plants species utilize bats for their seed dispersal and pollination. In some cases, the flowers are fully destroyed when bats visit the plant species or bats consume the entire flower. Bat and plant have co-evolved and co-existed for millions of years in tropical regions (Heithaus, 1982).

Our observations support the fact that interactions occur in nature between Megachiroptern bats and *Prosopis juliflora*. While studying the feeding habits of the short-nosed fruit bat *Cynopterus sphinx*, we came across the behaviour of this bat carrying the pods of *P. juliflora* from the tree to the feeding perch for chewing. Partially chewed pods were collected beneath a harem roost of *C. sphinx* at Tirunelveli during the months of March and April in 1996. This species feeding on the pods has been also observed during May, July, August, October and December 1998 as well as during October and November 2003 along with other fruit items. Biochemical analysis reveals that the pods of *P. juliflora* consist of protein (9.12%), carbohydrate (31.83 %) and lipids (4.0%) in addition to minerals such as potassium (2.28 mg/g), sodium (0.60mg/g), calcium (0.40%) and phosphorous (0.70mg/g).

While foraging, plant-visiting bats carry the pods to some distance from the source to eat, chew the pericarp, suck their juice and reject the seeds as well as fiber and thus the seeds are dispersed. *P. juliflora* provides nutritious food for bats during the fruiting season and in turn, fruit bats disperse the seeds of this plant while foraging. Marimuthu (2003) reported that fruits of *P. juliflora* also forms one of the food items of the Indian flying fox *Pteropus giganteus* and individuals of this species occupy stretches of *P. juliflora* as their day roost.

However, a few interactions are peculiar and unusual, this thorny plants *P. juliflora* may hinder their flight and can damage the wings of a few bat species and even leads to critical and fatal conditions. For instance, the individuals of the mouse-tailed bat *Rhinopoma hardwickei* gets entangled in the branches of the plant *Prosopis juliflora* during their emergence flight (Sanacha 2002). The Indian false vampire bat, *Megaderma lyra* occasionally get entangled in the thorny shrubs of *P. juliflora* at Tirunelveli while the young practice foraging flights. Since, *M. lyra* flies very close to the land surface (ca. 0.5 to 1.0 m above the ground) scanning the ground and water surface for small vertebrates and large insects (Neuweiler *et al*, 1984). Nevertheless, adults of the same species use thorny branches of *P. juliflora* as feeding roosts (Audet *et al*, 1991).

Thus, *P. juliflora* seems to be a boon to the fruit bats such as *P. giganteus* and *C. sphinx*. It is evident that interactions between these megachiropteran bats and plants have had a profound influence on the existence and evolution of both groups (Heithaus, 1982). On the other hand, some insectivorous bats occasionally get entangled in this thorny plant and this plant may be an unusual threat to microchiropteran bats under certain conditions.

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References:

- Audet, D., D. Krull, G. Marimuthu, S. Sumithran and J. Balasingh (1991). Foraging behaviour of the Indian false vampire bat, *Megaderma lyra* (Chiroptera: Megadermatidae). *Biotropica* 23:63-67.
- Heithaus, E.R. (1982). Co-evolution between bats and plants. Pp. 327-367. In: *Ecology of bats* (T.H.Kunz ed.). Plenum Press, New York.
- Marimuthu, G. (2003). Bats and *Prosopis juliflora*. *Bat Net* 4 (2):2.
- Senacha, K.R. (2002). A note on *Prosopis juliflora*: emerging threat for the microchiropterans of Thar desert. *Bat Net* 3(2): 7-8.
- Neuweiler, G., Satpal Singh and K. Sripathi (1984). Audiograms of a South Indian Bat Community. *J. Comp. Physio. A* 154:134-142.

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A review of chiropteran diversity of Bangladesh

C. Srinivasulu* and Bhargavi Srinivasulu**

Introduction

First account of bats of Bengal (including the present day West Bengal, India and Bangladesh – the then East Bengal and post 1947 the East Pakistan) was perhaps that by the early 19th century scientists who have described bats collected from this region (Buchanan, 1800; Blyth, 1841; 1852). Dobson's (1876) checklist provided a list of bats known to be occurring in this region. In the earlier 20th century more information was added as a result of the Mammal Survey of India, Myanmar and Sri Lanka conducted under the aegis of the Bombay Natural History Society between 1911 and 1930 (Wroughton, 1915, 1916a, 1916b, 1917a, 1917b). The most comprehensive list of bats of this region can be found in Ellerman and Morrison-Scott (1951) who listed all the known mammalian diversity providing details on their distribution. Post 1947 the work on bats in the Indian states adjoining Bangladesh was by and large taken up by the Zoological Survey of India (Agrawal *et al.*, 1992; Das *et al.*, 1995; Sinha, 1999; Mandal *et al.*, 2000; Das, 2003).

Work on the Bangladesh side was progressing albeit very slowly and perhaps Siddiqui (1961) could be credited as first to have provided a list of bats of Bangladesh (the then East Pakistan). Before Bangladesh attained its independence in 1971, Ahamed's (1968) work, and after independence, Khalil's (1975) work elaborately provided detailed accounts on bats of Bangladesh. Since these three works a few others have also attempted to contribute, but their works did not get enough recognition. Ahamed and Hussain (1982) provided the first comprehensive account of bats of Bangladesh. The same year Khan (1982) published the checklist of wildlife of Bangladesh that listed 31 species of bats. Sarker and Sarker (1988) listed 17 species of bats, while IUCN Bangladesh (2000) relying mostly on Khan (1982), listed 29 species of bats. Khan (2001) provided detailed accounts on 31 species of bats while Bates and Harrison (1997) listed 16 species. Molur *et al.* (2002) listed 34 species of bats while a recent list includes 29 species of bats (Sarker & Sarker, 2005).

While working on the chiropteran diversity of bats (Srinivasulu *et al.*, communicated) we found that as many as 38 species of bats were documented to be occurring in Bangladesh. Various list published so far (Ahamed & Hussain, 1982; Khan, 1982, 2001; Sarker & Sarker, 1988, 2005; Bates & Harrison, 1997; Molur *et al.* 2002) have either missed some the taxa that were collected from Bangladesh in past or provide invalid nomenclature for certain taxa. During a recently conducted "Training in field techniques for population and distribution studies, conservation management and public education for bats and rodents" held in Dhaka between 2nd to 6th March 2005 it was felt that the bat diversity of Bangladesh could be more than what we presently know due to lack of serious bat surveys in Bangladesh. A review of literature on bats documented from the neighbouring states in India indicates the possibility of richer diversity that could be occurring in Bangladesh. On the northern, northeastern, eastern and southeastern boundary of Bangladesh a total of 44 species of bats are recorded from the districts of Indian states of Meghalaya, Mizoram and Tripura (Das *et al.*, 1995; Sinha, 1999; Mandal *et al.*, 2000). While on the western side in West Bengal a total of 23 species of bats have been recorded (Agrawal *et al.*, 1992; Das, 2003). This review is an outcome of the proposal put forward by the first author in Dhaka and provides a list of 38 documented species of bats and an additional list of 28 species that could be also occurring in Bangladesh. Future collaborative systematic research by South Asian bat researchers in potential areas would provide us with a broader picture. The list provided is following Srinivasulu *et al.* (communicated).

List of bats known to occur in Bangladesh

Suborder: Megachiroptera Dobson, 1875

Family: Pteropodidae Gray, 1821

Subfamily: Pteropodinae Gray, 1821

Genus: Rousettus Gray, 1821

1. *Rousettus leschenaultii* (Desmarest, 1820) Fulvous fruit bat
Sources: Khan (1982, 2001), Sarker & Sarker (1988, 2005), Bates & Harrison (1997), Molur *et al.* (2002)
Remarks: Widespread, known from Chakma Village (Khan, 2001); Cox's Bazaar [21°25' N & 90°20' E] (Khan, 1982; Bates & Harrison, 1997); Ghazni, Shirpur District (Khan, 2001); Kudum Cave, Whykeong Forest Office [21°06' N & 92°11' E] (Khan, 2001); Sylhet [24°53' N & 91°51' E] (Khan, 2001); and Sunderbans [21°50' N & 89°00' E] (Khan, 2001).

Genus: Pteropus Brisson, 1762

2. *Pteropus giganteus* (Brünnich, 1782) Indian flying fox
Sources: Blyth (1863), Khan (1982, 2001), Sarker & Sarker (1988, 2005), Bates & Harrison (1997), Molur *et al.* (2002)
Remarks: Widespread, known from Barisal [22°41' N & 90°20' E] (Bates & Harrison, 1997); Shamgunj [24°45' N & 90°23' E] (Bates & Harrison, 1997); Madhupur (Kock, 1986; Bates & Harrison, 1997); Sunderbans [21°50' N & 89°00' E] (Khan, 2001); Ramna Park, Dhaka [23°42' N & 90°22' E] (C. Srinivasulu, *pers. obser.*).

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Genus: *Cynopterus* Cuvier, F., 1824

3. *Cynopterus sphinx* (Vahl, 1797) Greater short-nosed fruit bat
Sources: Khan (1982, 2001), Sarker & Sarker (1988, 2005), Bates & Harrison (1997), Molur *et al.* (2002)

Remarks: Widespread, known from Dhaka [23°42' N & 90°22' E] (Khan, 2001; Bates & Harrison, 1997); Jaintiapur [25°06' N & 92°08' E] (Bates & Harrison, 1997); Jalchatra [24°38' N & 90°04' E] (Bates & Harrison, 1997); Pabna District [24°09' N & 89°04' E] (Bates & Harrison, 1997); Savar Farm [23°53' N & 90°17' E] (Kock, 1986; Bates & Harrison, 1997); Sundarbans (Khan, 2001); Northern, Southern and Western Districts (Khan, 2001).

Suborder: Microchiroptera Dobson, 1875

Family: Emballonuridae Gervais, 1855

Genus: *Taphozous* E. Geoffroy, 1818

4. *Taphozous longimanus* Hardwicke, 1825 Long-winged tomb bat

Sources: Ahamed & Hussain (1982), Khan (1982, 2001), Sarker & Sarker (1988, 2005), Bates & Harrison (1997), Molur *et al.* (2002)
Remarks: No exact location (Khan, 2001).

5. *Taphozous melanopogon* Temminck, 1841 Black-bearded tomb bat

Sources: Khan (1982, 2001), Molur *et al.* (2002), Sarker & Sarker (2005)

Remarks: No exact location (Khan, 2001).

6. *Taphozous nudiventris* Cretzschmar, 1830-1831 Naked-rumped tomb bat

Sources: Siddiqui (1961), Khan (1982)
Remarks: Khan (1982) listed *Taphozous kachhensis* Dobson, 1872 as present in Bangladesh that has been synonymized with *Taphozous nudiventris* Cretzschmar, 1830-1831.

Genus: *Saccolaimus* Lesson, 1842

7. *Saccolaimus saccolaimus* (Temminck, 1838) Pouch-bearing tomb bat

Sources: Dobson (1876), Siddiqui (1961), Khan (1982, 2001), Sarker & Sarker (1988, 2005), Bates & Harrison (1997), Molur *et al.* (2002)

Remarks: Dobson (1876) puts on record from Sylhet [24°53' N & 91°51' E]. Khan (1982), Sarker & Sarker (1988, 2005) listed this taxon as *Taphozous saccolaimus* (Temminck, 1838). Khan (2001) opines it to be widespread but provides no locations as does Bates & Harrison (1997).

Family: Rhinopomatidae Bonaparte, 1838

Genus: *Rhinopoma* E. Geoffroy, 1818

8. *Rhinopoma hardwickii* Gray, 1831 Lesser mouse-tailed bat
Sources: Khan (1982, 2001), Sarker & Sarker (1988, 2005), Molur *et al.* (2002),

Remarks: Sunderbans [21°50' N & 89°00' E] (Khan, 2001).

9. *Rhinopoma microphyllum* (Brünnich, 1872) Greater mouse-tailed bat

Sources: Khan (1982, 2001), Molur *et al.* (2002), Sarker & Sarker (2005)

Remarks: Khan (1982) listed *Rhinopoma kinneari* Wroughton, 1912 as present in Bangladesh that has been synonymized with *Rhinopoma microphyllum* (Brünnich, 1872). Khan (2001) reports it from Northern, Eastern and Southeastern districts.

Family: Megadermatidae H. Allen, 1864

Genus: *Megaderma* E. Geoffroy, 1810

10. *Megaderma lyra* E. Geoffroy, 1810 Greater false vampire bat
Sources: Dobson (1876), Sinha (1980), Khan (1982, 2001), Sarker & Sarker (1988, 2005), Bates & Harrison (1997), Molur *et al.* (2002)
Remarks: Khan (2001) reports it from throughout Bangladesh. Bates & Harrison (1997) report it from Sylhet [24°53' N & 91°51' E] (Bates & Harrison, 1997).

11. *Megaderma spasma* (Linnaeus, 1758) Lesser false vampire bat
Sources: Khan (2001), Molur *et al.* (2002)

Remarks: Khan (2001) reports it from Sunderbans [21°50' N & 89°00' E].

Family: Rhinolophidae Bell, 1836

Genus: *Rhinolophus* Lacépède, 1799

12. *Rhinolophus affinis* Horsfield, 1823 Intermediate horse-shoe bat
Sources: Dobson (1876), Sinha (1973), Bates & Harrison (1997), Molur *et al.* (2002)

Remarks: Dobson (1876) and Bates & Harrison (1997) report its occurrence from Sylhet [24°53' N & 91°51' E].

13. *Rhinolophus lepidus* Blyth, 1844 Blyth's horse-shoe bat

Sources: Siddiqui (1961), Khan (1982, 2001), Molur *et al.* (2002), Sarker & Sarker (2005)

Remarks: Khan (2001) reports it as widely distributed in Bangladesh.

14. *Rhinolophus luctus* Temminck, 1835 Woolly horse-shoe bat

Sources: Khan (2001), Molur *et al.* (2002)
Remarks: Khan (2001) reports it from Sylhet [24°53' N & 91°51' E] and Chittagong [22°20' N & 91°48' E].

15. *Rhinolophus macrotis* Blyth, 1844 Big-eared horse-shoe bat

Sources: Sarker & Sarker (2005)
Remarks: Kudum Cave, Whykeong Forest Office [21°06' N & 92°11' E] (Sarker & Sarker, 2005).

16. *Rhinolophus pearsonii* Horsfield, 1851 Pearson's horse-shoe bat

Sources: Khan (1982, 2001), Molur *et al.* (2002), Sarker & Sarker (2005)

Remarks: No exact location known (Khan, 2001).

17. *Rhinolophus subbadius* Blyth, 1844 Little Nepalese horse-shoe bat

Sources: Khan (1982, 2001), Molur *et al.* (2002), Sarker & Sarker (2005)

Remarks: Khan (2001) reports it from Sylhet [24°15' N & 91°30' E] and Moulavi Bazar [24°29' N & 91°47' E] Districts.

Family: Hipposideridae Lydekker, 1891

Genus: *Hipposideros* Gray, 1831

18. *Hipposideros galeritus* Cantor, 1846 Cantor's roundleaf bat
Sources: Khan (1982, 2001), Sarker & Sarker (2005), Molur *et al.* (2002)

Remarks: Khan (2001) reports it to be widespread in Bangladesh.

19. *Hipposideros lankadiva* Kelaart, 1850 Kelaart's roundleaf bat

Sources: Khan (2001), Molur *et al.* (2002)
Remarks: Reported from Sunderbans [21°50' N & 89°00' E] (Khan, 2001).

20. *Hipposideros larvatus* (Horsfield, 1823) Intermediate roundleaf bat

Sources: Kurup (1968), Khan (1982, 2001), Sarker & Sarker (1988,



2005), Bates & Harrison (1997), Molur *et al.* (2002)
 Remarks: Reported from Sylhet [24°15' N & 91°30' E] (Kurup, 1968; Bates & Harrison, 1997; Khan, 2001) and Chittagong [22°20' N & 91°48' E] (Khan, 2001).

21. *Hipposideros pomona* Andersen, 1918 Pomona roundleaf bat
 Sources: Dobson (1876), Kurup, 1968; Sarker & Sarker (1988, 2005), Bates & Harrison (1997), Molur *et al.* (2002)
 Remarks: As *Phyllorhina fulva* by Dobson (1876). Sarker & Sarker (1988, 2005) listed *Hipposideros bicolor* (Temminck, 1834) as present in Bangladesh. Reported from Sylhet [24°15' N & 91°30' E] (Kurup, 1968; Bates & Harrison, 1997).

Genus: Coelops Blyth, 1848

22. *Coelops frithii* Blyth, 1848 Tail-less leaf-nosed bat
 Sources: Khan (1982, 2001), Sarker & Sarker (1988, 2005), Bates & Harrison (1997), Molur *et al.* (2002)
 Remarks: Reported from Sunderbans [21°50' N & 89°00' E] (Bates & Harrison, 1997; Khan, 2001). Das *et al.* (1995) opine that the type locality is in Bangladesh side of Sunderbans as the collector of the species was stationed at Mymensingh, Bangladesh.

Family: Molossidae Gill, 1872

Genus: Tadarida Rafinesque, 1814

23. *Tadarida aegyptiaca* (E. Geoffroy, 1818) Egyptian free-tailed bat
 Sources: Siddiqui (1961), Khan (1982, 2001), Molur *et al.* (2002), Sarker & Sarker (2005)
 Remarks: Siddiqui (1961) and Khan (1982) listed *Tadarida tragata* (Dobson, 1874) as present in Bangladesh that has been synonymized with *Tadarida aegyptiaca* (E. Geoffroy, 1818). No exact location is known (Khan, 2001).

Family: Vespertilionidae Gray, 1821

Subfamily: Vespertilioninae Miller, 1897

Genus: Eptesicus Rafinesque, 1820

24. *Eptesicus pachyotis* (Dobson, 1871) Thick-eared bat
 Sources: Khan (1982, 2001), Sarker & Sarker (1988, 2005), Molur *et al.* (2002)
 Remarks: Reported from Comilla [23°27' N & 91°12' E] and Sylhet [24°15' N & 91°30' E] Districts (Khan, 2001; Sarker & Sarker, 2005).

Genus: Hesperoptenus Peters, 1868

25. *Hesperoptenus tickelli* (Blyth, 1851) Tickell's bat
 Sources: Khan (1982), Sarker & Sarker (2005)
 Remarks: This seems to be common species in Bangladesh, observed in Dhaka [23°42' N & 90°22' E] (C. Srinivasulu, *pers. observ.*). Interestingly Khan (2001) did not list this species although his earlier checklist includes it (Khan, 1982)

Genus: Scotomanes Dobson, 1875

26. *Scotomanes ornatus* (Blyth, 1851) Harlequin bat
 Sources: Khan (1982, 2001), Molur *et al.* (2002), Sarker & Sarker (2005)
 Remarks: Reported from Sylhet [24°15' N & 91°30' E] (Khan, 2001).

Genus: Scotophilus Leach, 1821

27. *Scotophilus heathii* (Horsfield, 1831) Asiatic greater yellow house bat
 Sources: Hutton (1872), Kurup (1968); Khan (1982, 2001), Sarker & Sarker (1988, 2005), Bates & Harrison (1997), Molur *et al.* (2002)

Remarks: Sarker & Sarker (1988) listed *Scotophilus luteus* (Blyth, 1851) as present in Bangladesh that has been synonymized with *Scotophilus heathii* (Horsfield, 1831). Sarker & Sarker (2005) listed both *Scotophilus luteus* (Blyth, 1851) and *Scotophilus heathii* (Horsfield, 1831). Reported from Sylhet [24°15' N & 91°30' E] (Bates & Harrison, 1997). Khan (2001) did not provide exact location of its occurrence in Bangladesh.

28. *Scotophilus kuhlii* Leach, 1821 Asiatic lesser yellow house bat
 Sources: Blyth (1863), Khan (1982, 2001), Sarker & Sarker (1988, 2005), Molur *et al.* (2002)

Remarks: Khan (1982) and Sarker & Sarker (1988) listed *Scotophilus temminckii* (Horsfield, 1824) as present in Bangladesh that has been synonymized with *Scotophilus kuhlii* Leach, 1821. Reported from Jahazmara Ghat [22°06' N & 91°04' E], Hatia Island [22°19' N & 91°07' E] (Khan, 2001); Sylhet [24°15' N & 91°30' E] (Bates & Harrison, 1997); St. Martin's Coral Island [20°36' N & 92°20' E] (Khan, 2001); and Sunderbans [21°50' N & 89°00' E] (Khan, 2001).

Genus: Pipistrellus Kaup, 1829

29. *Pipistrellus ceylonicus* (Kelaart, 1852) Kelaart's pipistrelle
 Sources: Siddiqui (1961), Khan (1982, 2001), Bates & Harrison (1997), Molur *et al.* (2002)
 Remarks: Widespread, but no exact location known (Khan, 2001; Molur *et al.*, 2002).

30. *Pipistrellus coromandra* (Gray, 1838) Indian pipistrelle
 Sources: Khan (1982, 2001), Sarker & Sarker (1988, 2005), Bates & Harrison (1997), Molur *et al.* (2002)
 Remarks: Widespread, but no exact location known (Khan, 2001; Molur *et al.*, 2002).

31. *Pipistrellus javanicus* (Gray, 1838) Javan pipistrelle
 Sources: Thomas (1915), Kock (1996); Bates & Harrison (1997), Molur *et al.* (2002)
 Remarks: As *Pipistrellus babu* Thomas, 1915. Known from Boalkhali Thana [23°14' N & 92°04' E] (Kock, 1996; Bates & Harrison, 1997); Luskerpore [24°20' N & 91°30' E] (Bates & Harrison, 1997); and Purba Gomdandi [22°23' N & 91°55' E] (Kock, 1996; Bates & Harrison, 1997).

32. *Pipistrellus tenuis* (Temminck, 1840) Least pipistrelle
 Sources: Khan (1982, 2001), Sarker & Sarker (1988, 2005), Kock (1996); Bates & Harrison (1997), Molur *et al.* (2002)
 Remarks: Khan (1982) and Sarker & Sarker (1988, 2005) listed *Pipistrellus mimus* Wroughton, 1899 as present in Bangladesh that has been synonymized with *Pipistrellus tenuis* (Temminck, 1840). Reported from Habibganj [24°22' N & 91°25' E] (Bates & Harrison, 1997) and South western districts (Khan, 2001).

Genus: Scotozous Dobson, 1875

33. *Scotozous dormeri* Dobson, 1875 Dormer's bat
 Sources: Khan (1982, 2001), Molur *et al.* (2002), Sarker & Sarker (2005)
 Remarks: Khan (1982) listed *Pipistrellus dormeri* (Dobson, 1875) as present in Bangladesh that has been synonymized with *Scotozous dormeri* Dobson, 1875. Reported from Steamer Ghats (Khan, 2001); Rajshahi [25°00' N & 89°00' E] (Khan, 2001); Dinajpur [25°37' N & 88°45' E] (Khan, 2001) and Dakha [23°42' N & 90°22' E] (C. Srinivasulu, *pers. observ.*).



Genus: *Hypsugo* Kolenati, 1856

34. *Hypsugo savii* (Bonaparte, 1837) Savi's pipistrelle
Sources: Khan (1982, 2001), Molur *et al.* (2002), Sarker & Sarker (2005)

Remarks: Khan (1982, 2001) listed *Pipistrellus savii* (Bonaparte, 1837) as present in Bangladesh that has been synonymized with *Hypsugo savii* (Bonaparte, 1837). Reported from North eastern districts (Khan, 2001).

Genus: *Tylonycteris* Peters, 1872

35. *Tylonycteris pachypus* (Temminck, 1840) Flat-headed bat
Sources: Ahamed & Hussain (1982), Sarker & Sarker (1988, 2005), Bates & Harrison (1997); Molur *et al.* (2002)

Remarks: Das (2003) basing on the description of habitats, habits, pelage colouration, relative abundance etc as provided by Ahamed & Hussain (1982) opines that records of this taxon from Dhaka [23°42' N & 90°22' E] and Tangail [24°24' N & 90°00' E] Districts appears to be based on misidentified specimens of *Pipistrellus mimus* (= *Pipistrellus tenuis*). Furthermore, he records that this taxon may probably occur in Sylhet [24°53' N & 91°51' E] and Chittagong [22°20' N & 91°48' E]. Bates & Harrison (1997) report its occurrence from Luskerpore Valley [24°20' N & 91°30' E].

Subfamily: *Kerivoulinae* Miller, 1907

Genus: *Kerivoula* Gray, 1842

36. *Kerivoula hardwickii* (Horsfield, 1824) Hardwicke's woolly bat
Sources: Das (2003)

Remarks: Khan (1982, 2001), Molur *et al.* (2002) and Sarker & Sarker (2005) listed *Kerivoula papillosa* (Temminck, 1840) as present in Bangladesh. Currently the taxon *papillosa* (Temminck, 1840) is no more considered to be occurring in South Asia as the *nomen lenis* Thomas, 1916 has been resurrected (See Srinivasulu *et al.*, *in press*). Das (2003) opines that this taxon may probably be occurring in Bangladesh. No exact location given.

37. *Kerivoula picta* (Pallas, 1767) Painted bat

Sources: Jerdon (1867), Blanford (1891); Khan (1982, 2001), Bates & Harrison (1997), Molur *et al.* (2002), Sarker & Sarker (2005)

Remarks: Reported from Dhaka [23°42' N & 90°22' E] (Blanford, 1891; Bates & Harrison, 1997). Khan (2001) opines that it is found in all forests in Bangladesh.

Subfamily: *Myotinae* Tate, 1942

Genus: *Myotis* Kaup, 1829

38. *Myotis formosus* (Hodgson, 1835) Hodgson's bat
Sources: Khan (1982, 2001), Molur *et al.* (2002), Sarker & Sarker (2005)

Remarks: Reported from Sylhet [24°15' N & 91°30' E] (Khan, 2001).

LIST OF BATS THAT MAY POSSIBLY BE OCCURRING IN BANGLADESH

Suborder: *Microchiroptera* Dobson, 1875

Family: Pteropodidae Gray, 1821

Subfamily: Macroglossinae Gray, 1866

Genus: *Eonycteris* Dobson, 1873

1. *Eonycteris spelaea* (Dobson, 1871) Dawn bat

Remarks: This taxon has been collected from South Garo Hill District (Sinha, 1994a); East Khasi Hill District (Das *et al.*, 1995); and Jaintia Hill District (Sinha, 1999) in Meghalaya, India. There is a

likelihood of finding this taxon in Mymensingh [24°45' N & 90°24' E] District, Bangladesh.

Genus: *Macroglossus* F. Cuvier, 1824

2. *Macroglossus sobrinus* (Andersen, 1911) Greater long-nosed fruit bat

Remarks: This taxon has been collected from Jaintia Hill District (Das *et al.*, 1995; Sinha, 1999) in Meghalaya and Koch Bihar District (Das, 2003) in West Bengal, India. There is a likelihood of finding this taxon in Dinajpur [25°37' N & 88°45' E], Rangpur [25°36' N & 89°15' E] and Mymensingh [24°45' N & 90°24' E] Districts, Bangladesh.

Suborder: *Microchiroptera* Dobson, 1875

Family: *Rhinolophidae* Bell, 1836

Genus: *Rhinolophus* Lacépède, 1799

3. *Rhinolophus pusillus* Temminck, 1834 Least horseshoe bat

Remarks: This taxon has been collected from South Garo Hill District (Sinha, 1973) in Meghalaya, India. There is a likelihood of finding this taxon in Mymensingh [24°45' N & 90°24' E] District, Bangladesh.

Family: *Hipposideridae* Lydekker, 1891

Genus: *Hipposideros* Gray, 1831

4. *Hipposideros armiger* (Hodgson, 1835) Greater round leaf bat

Remarks: This taxon has been collected from Jalpaiguri District (Inglis *et al.*, 1919) in West Bengal, India. There is a likelihood of finding this taxon in Dinajpur [25°37' N & 88°45' E] District, Bangladesh.

5. *Hipposideros ater* (Templeton, 1848) Dusky round leaf bat

Remarks: This taxon has been collected from East Khasi Hills District (Kurup, 1968) in Meghalaya, India. There is a likelihood of finding this taxon in Mymensingh [24°45' N & 90°24' E] District, Bangladesh.

6. *Hipposideros cineraceus* Blyth, 1853 Ashy round leaf bat

Remarks: This taxon has been collected from East Khasi Hill and Jaintia Hill Districts (Hinton & Lindsay, 1926; Das *et al.*, 1995; Sinha, 1999) in Meghalaya, and Lunglei District in Mizoram (Mandal *et al.*, 2000), India. There is a likelihood of finding this taxon in Mymensingh [24°45' N & 90°24' E] and Chittagong Hill Tracts [22°20' N & 91°48' E] Districts, Bangladesh.

7. *Hipposideros fulvus* Gray, 1838 Fulvus round leaf bat

Remarks: This taxon has been collected from East Khasi Hill District (Sinha, 1999) in Meghalaya, India. There is a likelihood of finding this taxon in Mymensingh [24°45' N & 90°24' E] District, Bangladesh.

Family: *Molossidae* Gill, 1872

Genus: *Chaerephon* Dobson, 1874

8. *Chaerephon plicatus* (Buchanan, 1800) Wrinkle-lipped free-tailed bat

Remarks: This taxon has been collected from East Khasi Hill District (Blyth, 1852) in Meghalaya, India. There is a likelihood of finding this taxon in Mymensingh [24°45' N & 90°24' E] District, Bangladesh.

Genus: *Otomops* Thomas, 1913

9. *Otomops wroughtoni* (Thomas, 1913) Wroughton's free-tailed bat
Remarks: This taxon has been collected from East Khasi Hill District (Thabab & Bates, 2002) in Meghalaya, India. There is a likelihood of finding this taxon in Mymensingh [24°45' N & 90°24' E] District, Bangladesh.

Family: *Vespertilionidae* Gray, 1821

Subfamily: *Vespertilioninae* Miller, 1897



Genus: *Arielulus* Hill and Harrison, 1987

10. *Arielulus circumdatus* (Temminck, 1840) Bronze pipistrelle
Remarks: This taxon has been collected from East Khasi Hill District (Dobson, 1878; Sinha, 1999) in Meghalaya, India. There is a likelihood of finding this taxon in Mymensingh [24°45' N & 90°24' E] District, Bangladesh.

Genus: *Pipistrellus* Kaup, 1829

11. *Pipistrellus kuhlii* (Kuhl, 1817) Kuhl's pipistrelle
Remarks: This taxon has been collected from East Khasi Hill District (Kurup, 1968) in Meghalaya, India. There is a likelihood of finding this taxon in Mymensingh [24°45' N & 90°24' E] District, Bangladesh.

Genus: *Barbastella* Gray, 1821

12. *Barbastella leucomelas* (Cretzschmar, 1826) Eastern barbestelle
Remarks: This taxon has been collected from East Khasi Hill District (Dobson, 1874; Anderson, 1881; Blanford, 1891; Kurup, 1968) and Jaintia Hills District (Hinton & Lindsay, 1926) in Meghalaya, and Lunglei District (Mandal *et al.*, 2000) in Mizoram, India. There is a likelihood of finding this taxon in Mymensingh [24°45' N & 90°24' E] and Chittagong Hill Tracts [22°20' N & 91°48' E] Districts, Bangladesh.

Genus: *Plecotus* E. Geoffroy, 1818

13. *Plecotus auritus* (Linnaeus, 1758) Brown long-eared bat
Remarks: This taxon has been collected from East Khasi Hill District (Dobson, 1876) in Meghalaya, India. There is a likelihood of finding this taxon in Mymensingh [24°45' N & 90°24' E] District, Bangladesh.

Genus: *la* Thomas, 1902

14. *la io* Thomas, 1902 Great evening bat
Remarks: This taxon has been collected from East Khasi Hill District (Topál, 1970) in Meghalaya, India. There is a likelihood of finding this taxon in Mymensingh [24°45' N & 90°24' E] District, Bangladesh.

Subfamily: *Miniopterinae* Miller, 1907

Genus: *Miniopterus* Bonaparte, 1837

15. *Miniopterus schreibersii* (Kuhl, 1819) Schreiber's long-fingered bat
Remarks: This taxon has been collected from South Garo Hill District (Sinha, 1994b) in Meghalaya, India. There is a likelihood of finding this taxon in Mymensingh [24°45' N & 90°24' E] District, Bangladesh.

Subfamily: *Murinae* Miller, 1907

Genus: *Murina* Gray, 1842

16. *Murina cyclotis* Dobson, 1872 Round-eared tube-nosed bat
Remarks: This taxon has been collected from East Khasi Hill District (Das *et al.*, 1995) and Jaintia Hills District (Hinton & Lindsay, 1926; Sinha, 1999) in Meghalaya, India. There is a likelihood of finding this taxon in Mymensingh [24°45' N & 90°24' E] District, Bangladesh.

17. *Murina huttoni* (Peters, 1872) Hutton's tube-nosed bat
Remarks: This taxon has been collected from East Khasi Hill District (Sinha, 1999) in Meghalaya, India. There is a likelihood of finding this taxon in Mymensingh [24°45' N & 90°24' E] District, Bangladesh.

18. *Murina tubinaris* (Scully, 1881) Scully's tube-nosed bat
Remarks: This taxon has been collected from Jaintia Hills District

(Hinton & Lindsay, 1926) in Meghalaya, India. There is a likelihood of finding this taxon in Mymensingh [24°45' N & 90°24' E] District, Bangladesh.

Genus: *Harpiocephalus* Gray, 1842

19. *Harpiocephalus harpia* (Temminck, 1840) Lesser hairy-winged bat
Remarks: This taxon has been collected from Jalpaiguri District (Das, 2003) in West Bengal, India. There is a likelihood of finding this taxon in Dinajpur [25°37' N & 88°45' E] District, Bangladesh.

20. *Harpiocephalus mordax* Thomas, 1923 Greater hairy-winged bat
Remarks: This taxon has been collected from East Khasi Hill District (Dobson, 1876; Sinha, 1999) in Meghalaya, and Lunglei District (Mandal *et al.*, 2000) in Mizoram, India. There is a likelihood of finding this taxon in Mymensingh [24°45' N & 90°24' E] and Chittagong Hill Tracts [22°20' N & 91°48' E] Districts, Bangladesh.

Subfamily: *Myotinae* Tate, 1942

Genus: *Myotis* Kaup, 1829

21. *Myotis annectans* (Dobson, 1871) Hairy-faced bat
Sources: Leakagul & McNeely (1977), Honacki *et al.* (1982), Nowak & Paradiso (1983)
Remarks: Leakagul & McNeely (1977) Honacki *et al.* (1982), Nowak & Paradiso (1983) included Bangladesh in the range of this taxon. However, no specimens could be traced from Bangladesh (Siddiqui, 1961, 1969; Ahamed & Hussain, 1982; Rashid *et al.*, 1990). There is strong possibility of its occurrence in northern Bangladesh.

22. *Myotis hasseltii* (Temminck, 1840) Van Hasselt's bat
Source: Das (2003)
Remarks: This taxon has been collected from Hasnabad, North Twenty-Four Parganas district in West Bengal, India near Bangladesh border by S.S. Saha on 20.08.1973. It is quite possible that this taxon may also occur in Bangladesh.

23. *Myotis horsfieldii* (Temminck, 1840) Horsfield's bat
Remarks: This taxon has been collected from East Khasi Hill District (Hinton & Lindsay, 1926) in Meghalaya, India. There is a likelihood of finding this taxon in Mymensingh [24°45' N & 90°24' E] District, Bangladesh.

24. *Myotis longipes* (Dobson, 1873) Kashmir cave bat
Remarks: This taxon has been collected from East Khasi Hill District (Sinha, 1994b, 1999) in Meghalaya, India. There is a likelihood of finding this taxon in Mymensingh [24°45' N & 90°24' E] District, Bangladesh.

25. *Myotis montivagus* (Dobson, 1874) Burmese whiskered bat
Remarks: This taxon has been collected from Lunglei District (Mandal *et al.*, 2000) in Mizoram, India. There is a likelihood of finding this taxon in Chittagong Hill Tracts [22°20' N & 91°48' E] District, Bangladesh.

26. *Myotis muricola* (Gray, 1846) Nepalese whiskered bat
Remarks: This taxon has been collected from Jaintia Hills District. (Kurup, 1968, reported as *Myotis mystacinus caliginosus* (Tomes, 1859)) in Meghalaya, India, and also from Akyab in Myanmar (Bates & Harrison, 1997). There is a likelihood of finding this taxon in Mymensingh [24°45' N & 90°24' E] and Chittagong Hill Tracts [22°20' N & 91°48' E] Districts, Bangladesh.



27. *Myotis nipalensis* (Dobson, 1871) Nepal myotis
Remarks: This taxon has been collected from Jalpaiguri District (Hill, 1983; Das 2003; reported as *Myotis mystacinus nipalensis* (Dobson, 1871)) in West Bengal, India. There is a likelihood of finding this taxon in Dinajpur [25°37' N & 88°45' E] District, Bangladesh.

28. *Myotis siligorensis* (Horsfield, 1855) Himalayan whiskered bat
Remarks: This taxon has been collected from Jaintia Hills District (Hinton & Lindsay, 1926) in Meghalaya, India. There is a likelihood of finding this taxon in Mymensingh [24°45' N & 90°24' E] District, Bangladesh.

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References

- Agrawal, V.C., P.K. Das, S. Chakraborty, R.K. Ghose, A.K. Mandal, T.K. Chakraborty, A.K. Poddar, J.P. Lal, T.P. Bhattacharyya and M.K. Ghosh (1992).** Mammalia. In: Director (ed.), *State Fauna Series 3: Fauna of West Bengal, Part 1*. Zoological Survey of India, Calcutta. pp. 27-169.
- Ahamed, S.K. (1968).** Bats of Bangladesh. M.Sc. Thesis (unpublished), submitted to University of Dhaka, Dhaka, Bangladesh.
- Ahamed, S.K. and K.Z. Hussain (1982).** Bats of Bangladesh. *Journal of the Asiatic Society of Bangladesh (Science)*, 8: 89-99.
- Anderson, J. (1881).** *Catalogue of Mammalia in the Indian Museum, Calcutta. Part 1*. Indian Museum, Calcutta.
- Bates, P.J.J. and D.L. Harrison (1997).** *Bats of the Indian Subcontinent*. Harrison Zoological Museum, Sevenoaks, Kent, U.K. 258 pp.
- Blanford W.T. (1891).** *The Fauna of British India, including Ceylon and Burma, Mammalia. Part II*. Taylor & Francis, London. 617 pp + xx.
- Blyth, E. (1841).** Description of three Indian species of bat, of the genus *Taphozous*. *Journal of the Asiatic Society of Bengal*, 10: 971-977.
- Blyth, E. (1852).** Notice of a collection of Mammalia, Birds, and Reptiles procured at or near the station of Cherrapunji in the Khasia hills, north of Sylhet. *Journal of the Asiatic Society of Bengal*, 20: 517-524.
- Blyth, E. (1863).** *Catalogue of the Mammalia in the Museum Asiatic Society*. Calcutta. 187 + xiii pp.
- Buchanan, F. (1800).** Description of the *Vespertilio plicatus*. *Transactions of the Linnean Society of London*, 5: 261-263 + 1 pl.
- Das, P.K. (2003).** Studies on some Indian Chiroptera from West Bengal. *Records of the zoological Survey of India, Occasional Paper No.*, 217: 1-164.
- Das, P.K., R.K. Ghose, T.K. Chakraborty, T.P. Bhattacharyya and M.K. Ghosh (1995).** Mammalia. In: Director (ed.), *State Fauna Series 4: Fauna of Meghalaya, Part 1*. Zoological Survey of India, Calcutta. pp. 23-128.
- Dobson, G.E. (1874).** List of chiroptera inhabiting the Khasia Hills, with description of a new species. *Journal of the Asiatic Society of Bengal*. 43(2): 234-236.
- Dobson, G.E. (1876).** *Monograph of the Asiatic Chiroptera and Catalogue of the species of bats in the collection of the Indian Museum, Calcutta*. Indian Museum, Calcutta & London.
- Dobson, G.E. (1878).** *Catalogue of the Chiroptera in the collection of the British Museum*. British Museum (Natural History), London. 567 pp.
- Ellerman, J.R. and T.C.S. Morrison-Scott (1951).** *Checklist of Palearctic and Indian Mammals – 1758 to 1946*. British Museum (Natural History), London. 810 pp.
- Hill, J.E. (1983).** Bats (Mammalia: Chiroptera) from Indo-Australia. *Bulletin of the British Museum (Natural History), Zoology Series*, 43: 103-208.
- Hinton, M.A.C. and H.M. Lindsay (1926).** Bombay Natural History Society's Mammal Survey of India, Burma and Ceylon. Report No. 41: Assam and Mishmi Hills. *Journal of the Bombay Natural History Society*, 31: 383-403.
- Honacki, J.H., K.E. Kinman and J.W. Koepl (eds.) (1982).** *Mammal species of the world: A taxonomic and geographic reference*. Allen Press, Inc. and The Association of Systematics Collections, Lawrence, Kansas. 694 pp.
- Inglis, C.M., W.L. Travers, H.V. O'Donel and E.O. Shebbeare (1919).** A tentative list of the vertebrates of the Jalpaiguri District, Bengal. *Journal of the Bombay Natural History Society*, 26: 819-825.
- IUCN Bangladesh (2000).** *Red Book of Threatened Mammals of Bangladesh*. IUCN Country Office, Dhaka, Bangladesh. Xii+71 pp.
- Jerdon, T.C. (1867).** *The Mammals of India: Natural History*. John Wheldon, London. 335 pp.
- Khalil, A. (1975).** Bats of Bangladesh (with notes on field observations). M.Sc. Thesis (unpublished), submitted to University of Dhaka, Bangladesh.
- Khan, M.A.R. (1982).** *Wildlife of Bangladesh: A checklist*. University of Dhaka, Bangladesh. 173 pp.
- Khan, M.A.R. (2001).** Status and distribution of bats in Bangladesh with notes on their ecology. *Zoos' Print Journal*, 16(5): 479-483.
- Kock, D. (1986).** Ektoparasiten von Fledermausen in Bangladesh (Insecta: Diptera: Nycteribiidae; Hemiptera: Cimicidae). *Senckenbergiana Biologica*, 67(1-3): 37-42.
- Kock, D. (1996).** Fledermause aus Nepal (Mammalia: Chiroptera). *Senckenbergiana Biologica*, 75(1/2): 15-21.
- Kurup, G.U. (1968).** Mammals of Assam and adjoining area. 2. A distributional list. *Proceedings of the Zoological Society, Calcutta*, 21: 79-99.
- Leakagul, B. and J.A. McNeely (1977).** *Mammals of Thailand*. Association for the Conservation of Wildlife, Sahakarnbhat Co., Bangkok.
- Mandal, A.K., A.K. Poddar and T.P. Bhattacharyya (2000).** Further new records of bats from Mizoram. *Records of the Zoological Survey of India*, 98(2): 147-154.
- Molur, S., G. Marimuthu, C. Srinivasulu, S. Mistry, A. M. Hutson, P.J.J. Bates, S. Walker, K. Padma Priya and A.R. Binu Priya (eds.) (2002).** *Status of South Asian Chiroptera – Conservation Assessment and Management Plan (C. A. M. P.) Workshop Report 2002*. Zoo Outreach Organisation, CBSG – South Asia and WILD, Coimbatore, India. viii + 141pp + CD-Rom.
- Nowak, R.M. and J.L. Paradiso (1983).** *Walker's Mammals of the World. 4th Edition Part 1*. The John Hopkins University Press, Baltimore and London.
- Rashid, S.M.A., A. Khan and M.A.R. Khan (1990).** Mammals of Cox's Bazar Forest Division (South), Bangladesh, with notes on



their status and distribution. *Journal of the Bombay Natural History Society*, 87: 62-67.

Sarker, S.U. and N.J. Sarker (1988). *Wildlife of Bangladesh – A systematic list*. The Rico Printers, Dhaka. xix+59 pp.

Sarker, S.U. and N.J. Sarker (2005). Bats of Bangladesh with notes on the status, distribution and habitat. *BatNet, CCINSA Newsletter*, 6(1): 19-20.

Siddiqui, M.S.U. (1961). Checklist of mammals of Pakistan with particular reference to the mammalian collection in the British Museum (Natural History), London. *Biologia (Lahore)* 7: 93-225.

Siddiqui, M.S.U. (1969). *Fauna of Pakistan*. Agricultural Research Council, Government of Pakistan, Karachi.

Sinha, Y.P. (1973). Taxonomic studies on the Indian horseshoe bats of the genus *Rhinolophus* Lacépède. *Mammalia*, 37: 603-630.

Sinha, Y.P. (1980). The bats of Rajasthan: taxonomy and zoogeography. *Records of the Zoological Survey of India*, 76(1-4): 7-63.

Sinha, Y.P. (1994a). Occurrence of Dobson's Long-tongued Fruit Bat *Eonycteris spelaea* (Dobson, 1871) in Manipur and Nagaland, India. *Geobios New Reports*, 13: 186-187.

Sinha, Y.P. (1994b). Occurrence of Kashmir Cave Bat *Myotis longipes* (Dobson, 1873) in Meghalaya, India. *Geobios New Reports*, 13: 72-73.

Sinha, Y.P. (1999). Contribution to the knowledge of bats (Mammalia: Chiroptera) of North East Hills India. *Records of the zoological Survey of India Occasional Paper No. 174*: 1-52 pp.

Srinivasulu, C., Bhargavi Srinivasulu and Y.P. Sinha (in review). Checklist of bats (Mammalia: Chiroptera) of South Asia. *Zoos'Print Journal*.

Thabah, A. and P.J.J. Bates (2002). Recent record of *Otomops wroughtoni* (Thomas, 1913) (Chiroptera: Molossidae) from Meghalaya, north-east India. *Acta Zoologica Academiae Scientiarum Hungaricae*, 48(3): 251-253.

Thomas, O. (1915). Scientific Results from the Mammal Survey No. XI A - On *Pipistrellus* of the genera *Pipistrellus* and *Scotozous*. *Journal of the Bombay Natural History Society*, 24: 29-34.

Topál, G. (1970). On the systematic status of *Pipistrellus annectans* Dobson, 1871 and *Myotis primula* Thomas, 1920 (Chiroptera: Vespertilionidae). *Annales Historico-Naturales Musei Nationalis Hungarici (Budapest)*, 62: 373-379.

Wroughton, R.C. (1915). Bombay Natural History Society's Mammal Survey of India, Burma and Ceylon. Report No. 19. Bengal, Bihar and Orissa. *Journal of the Bombay Natural History Society*, 24: 96-110.

Wroughton, R.C. (1916a). Bombay Natural History Society's Mammal Survey of India, Burma and Ceylon. Report No. 23. Sikkim & Bengal Terai. *Journal of the Bombay Natural History Society*, 24: 468-493.

Wroughton, R.C. (1916b). Bombay Natural History Society's Mammal Survey of India, Burma and Ceylon. Report No. 26. Darjiling District. *Journal of the Bombay Natural History Society*, 24: 773-782.

Wroughton, R.C. (1917a). Bombay Natural History Society's Mammal Survey of India, Burma and Ceylon. Report No. 27. Bhutan Duars. *Journal of the Bombay Natural History Society*, 25: 63-71.

Wroughton, R.C. (1917b). Bombay Natural History Society's Mammal Survey of India, Burma and Ceylon. Report No. 28. Kalimpong (Darjiling). *Journal of the Bombay Natural History Society*, 25: 274-279.

G. Marimuthu's election as a Fellow of the Indian National Science Academy (FNA)

Dr. G. Marimuthu, School of Biological Sciences, Madurai Kamaraj University, Madurai, has been elected as a Fellow of the Indian National Science Academy, New Delhi during the year 2005, for his rich contribution to the study of biology and behaviour of bats.

Dr. Marimuthu's research on basic aspects enables us to understand the various behavioural repertoire of both microchiropteran and megachiropteran bats. Majority of his research relied on natural field conditions. His contributions are in the areas of seasonal changes in the activity pattern, behavioural expressions of circadian rhythms, breeding and mother-young relations, ontogeny of echolocation sounds, foraging, prey detection and capture, postnatal growth and age estimation and development of wing morphology.



Dr. G. Marimuthu (right) receives the citation of his election as a Fellow of the INSA, from Dr. M.S. Valiathan, the President of the INSA, in a function held at Chennai during December 2004.

He made a detailed study on Biospeleology (i.e. study on caves and cave-dwelling organisms). He has isolated 62 species of mesophilic fungi, 13 species of thermophilic fungi, seven species of algae and 3 species of bacteria from cave soils. A set of experiments conducted deep inside a cave on a troglotic millipede *Glyphiulus cavernicolus* showed that it is in the process of regression of circadian rhythms. He has collected several other organisms such as insects, spiders, centipedes, lizards, snakes and mammals that live in caves.

In addition to bat-research, Dr. Marimuthu involved in the experiments on human circadian rhythms, by recording sleep-wakefulness, rectal temperature, 2-hour time estimation, menstrual cycle, etc. of human subjects. He himself volunteered for the experiment and was the first subject to stay for three weeks in the human isolation chamber.

Dr. Marimuthu has supplicated his detailed study on the diversity and behaviour of bats of south India for a D.Sc. degree of the Madurai Kamaraj University. The degree was awarded during the year 2001. His publications are being quoted in national and international journals and books on animal behaviour and physiology.

Dr. Marimuthu is one of the founder members and the first Scientific Chair of the CCINSA.



Diversity of Bats in Kerala Agricultural University Campus, Thrissur, T. Ritto Cyriac, P.O. Nameer, S.R. Radhakrishnan and R. Hari*

A study was conducted in Kerala Agricultural University (KAU) campus, Thrissur district Kerala, from September 2002 and continued till May 2003 to find out the diversity of bats of the campus. Seven species of bats were recorded from the KAU campus during the study period. These include representatives from three families in two sub-orders. Both the sub-orders Megachiroptera and Microchiroptera are represented in the KAU campus. Family Vespertilionidae represented the maximum number of species (five) followed by Rhinolophidae (two) and Pteropodidae (one). The *Cynopterus sphinx* was found to be the most abundant species of bat in the KAU campus.

Introduction

Bats are the second largest group of mammals in the world. They are distributed all round the globe except in Polar Regions and in some remote islands in Eastern Pacific. At present there are about 1200 recognized species in the world in 17 families (Koopman, 1993). In India, 113 species of bats are present in seven families (Bates & Harrison, 1997; Nameer, 2000). Western Ghats are the abodes of about 46 species of bats. Six of which are fruit bats, six sheath tailed bats, two mouse tailed bats, two false vampire bats, 11 horse shoe bats, 16 evening bats and three free tailed bats, out of which four are endemic to Western Ghats (Nameer, *et al.* 2000). From Kerala 31 species of bats are reported of which 12 are evening bats, eight horse shoe bats, four fruit bats, three sheath tailed bats, two false vampire bats, one mouse tailed bat, and one free tailed bat (Nameer, 2003).

Most of the studies on the fauna of India were mostly centered on charismatic mega vertebrates such as, tiger, lion, leopard, elephant, rhinoceros and other large mammals. Little attention was given the small mammals of the order such as insectivores, chiropterans and rodents, which account for about 60% of Indian mammals. This has resulted in a gap in our knowledge about the very basic information about the distribution pattern and status of these mammals, not to say about the ecology, ethology and other biological traits (Walker, 1999). Such studies are very much essential for adopting conservation measures to these small mammals.

Perhaps the most detailed ecological study on the bats of the country was that of Brosset (1962 a, b, c and 1963), who studied the bats of central and western India. Bates *et al.* (1994 a, b and c) revisited and resurveyed the locations studied by Brosset. Though Kerala has a very rich diversity of bats, very little studies have been done on the bats of Kerala and hence the present study. The objective of present study is to understand the diversity and abundance of the bats in KAU campus, Vellanikkara, Thrissur district, Kerala.

Study Area and Methods

The study was carried out in Kerala Agricultural University

campus, Vellanikkara, Thrissur district, Kerala, South India. The campus has an area of 391.44 ha. (76° 13' E and latitude of 10° 14' N). The altitude of the campus varies between 60 to 50 meters M.S.L. The campus has wide variety of habitats such as orchards, botanical garden, arboretum, plantations of coconut, areca nut, rubber, banana, vegetables, grasslands, and scattered small patches of natural forest.

Climate

The KAU main campus enjoys a moderate climate. The main source of atmospheric precipitation is the South-West monsoon from June to September and North-East monsoon from November to December. The mean annual rainfall is 3012 mm with 104 rainy days. The mean monthly maximum temperature varies from 29°C (July) to 36.2°C (March) and mean monthly minimum temperature varies from 21.2 °C (July) to 23.9°C (April, May). The mean monthly maximum humidity varies from 96% (July and August) to 79% (February) and mean monthly minimum humidity varies from 85% (July) to 35% (March). (KAU meteorological station, Vellanikkara, 2003).

Methods

Representative areas of various habitats present in campus such as orchards, plantations, water bodies, and natural forest patches were selected. The mist netting was commenced in September 2002 and continued till May 2003. Bats were studied using mist nets. During this period a total of 60 mist netting hours were spent. The number of individuals of a given species captured is expressed as the number of bats per net hour to facilitate comparison of capture efforts among different habitats. The same is estimated by dividing the number of bats caught by total time for which the net was kept open in each of the habitat type in the campus.

Results and discussion

Diversity of bats at KAU, campus: Seven species of bats were recorded from the KAU campus during the present study (Table 1). KAU campus support nine (29.03%) out of the 31 species of bats of Kerala, in three families. Out of which four belong to the family Vespertilionidae, while two from Rhinolophidae and one from Pteropodidae. The different habitats of the KAU campus play a crucial role in the diversity of bats in the campus. The presence of large number of dead and dying trees with hollows, and old buildings with crevices can act as an ideal site for the roosting of bats (Grindal, 1999). The mixed pattern of cropping will help the bats to exploit the area efficiently (Verboom, and Spoelstra, 1999). The mixed cropping pattern, the patches of natural vegetation along with old and dilapidated buildings could be the factors that support the

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Table 1. Bats collected from Kerala Agricultural University campus, Thrissur, Kerala

Scientific name	Common name	Family
<i>Pteropus giganteus</i>	Flying Fox	Pteropodidae
<i>Cynopterus sphinx</i>	Short-nosed Fruit Bat	Pteropodidae
<i>Hipposideros ater</i>	Dusky Leaf-nosed Bat	Rhinolophidae
<i>Scotophilus heathii</i>	Asiatic Greater Yellow House Bat	Vespertilionidae
<i>Pipistrellus coromandra</i> ,	Little Indian Bat	Vespertilionidae
<i>Pipistrellus ceylonicus</i>	Keelarts Pipistrelle	Vespertilionidae
<i>Kerivoula picta</i>	Painted Bat	Vespertilionidae

History Society. Part II. 91(2): 224-240

Bates, P.J.J., Harrison, D.L. and Muni, M. 1994c. The bats of western India. Revisited. *Journal of Bombay Natural History Society*. Part III. 91(3): 360-380

Bates, P.J.J. and Harrison, D.L. 1997. Bats of Indian subcontinent. Harrison Zoological Museum.

Brosset, A. 1962a. Bats of central and western India. Part I. *Journal of Bombay Natural History Society*. 59: 1-57

Brosset, A. 1962b. Bats of central and western India. Part II. *Journal of Bombay Natural History Society*. 59: 583-624

Brosset, A. 1962c. Bats of central and western India. Part III. *Journal of Bombay Natural History Society*. 59: 707-746

Brosset, A. 1963. Bats of central and western India. Part IV. *Journal of Bombay Natural History Society*. 60: 337-355

Grindal, S.D. 1999. Habitat use by bats, *Myotis* sp. In Western Newfoundland. *Canadian Field Naturalist*. 113(2): 258-263

Helman, P. and Churchill, S. 1986. Bat captures techniques and their use in surveys. *Macroderma* 2: 32-53

Koopman, K.F. 1993. Chiroptera. In: *Mammal species of the world: a taxonomic and geographic reference*. (eds.) Wilson, D.E. & Reeder, D.M. 2nd edition. Smithsonian Institution Press, Washington. pp.137-241

Nameer, P.O. 2000. Checklist of Indian Mammals. Kerala Forest Department. 90 + xxv pp.

Nameer, P.O., Sanjay Molur, Sally Walker. 2000. Mammals of Western Ghats; A simplistic overview. *Zoos, Print Journal*. 16(11): 629-639.

Nameer, P.O. 2003. Overview of bats of Kerala. (Ed.) Pramod G Krishnan. Proceedings of the Annual Research Seminar at Periyar Tiger Reserve, Thekkady, Kerala from 19-20th March 03.

Walker, S. 1999. Mammals in need of attention. Rodentia and Insectivora of India: Conservation needs. Part IV. *Zoos' Print*. I – XIV (2-11): 5-14.

Verboom, B. and Spoelstra, K. 1999. Effects of food abundance and wind on the use of tree lines by an insectivorous bat, *Pipistrellus pipistrellus*. *Canadian Journal of Zoology*. 77(9): 1393-1401.

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rich abundance of bats in the KAU campus.

Abundance of bats at KAU, campus:

The details of mist nettings and the number of bats caught are given below in Table 2. It indicates that the orchard caught more bats per net hour, followed by bamboo thicket, then by moist deciduous forest patch. The

accounted for 22.03% each. The abundance ratings for the various species of bats collected from KAU campus is given in Table 3. The *Pteropus giganteus* and *Kerivoula picta* were reported accidentally. The former though common species in the campus was collected from an electrocuted specimen and the later

Table 2. Details of mist nettings done at various habitats at KAU campus

Habitat	No: of mist netting per habitat (a)	No: of individuals caught (b)	Bats caught per net hour (a / b)
Orchard	4	8	2.00
Bamboo	8	11	1.38
Moist deciduous	14	17	1.21
Teak	6	5	0.83
Coconut	18	14	0.77
Pond	6	3	0.50
Banana	4	1	0.25
Total (for KAU campus)	60	59	0.98

Table 3. Mist netting success of various species of bats at KAU Campus, Thrissur, Kerala.

Species	Netting success
<i>Cynopterus sphinx</i>	45.76%
<i>Hipposideros ater</i>	22.03%
<i>Scotophilus heathii</i>	22.03%
<i>Pipistrellus ceylonicus</i>	5.09%
<i>Pipistrellus coromandra</i>	5.09%
	<hr/> 100.00%

different plantations were found supporting fewer numbers of bats. During the study period from 60 hours of mist-netting 59 specimens of bats were collected. *Cynopterus sphinx* was the commonest species of bat at KAU campus. Out of the total 59 specimens obtained 45.76% were *Cynopterus sphinx*, which was followed by *Hipposideros ater* and *Scotophilus heathii* each of which

was caught from roost among the foliage of banana.

References

Bates, P.J.J., Harrison, D.L. and Muni, M.M. 1994a. The bats of western India. Revisited. *Journal of Bombay Natural History Society*. Part I. 91(1): 1-15

Bates, P.J.J., Harrison, D.L. and Muni, M. 1994b. The bats of western India. Revisited. *Journal of Bombay Natural*



Report on training in Field techniques on population and distribution studies, Conservation Management and Public Education of Bats and Rodents, 2-6 March 2005, Dhaka, Bangladesh.

P. O. Nameer *

Last issue we reported training in Pakistan for non-volant small mammals. The Chiroptera Conservation Information Network of South Asia (CCINSA) and the Rodent, Insectivore, Lagomorph and Scandent Conservation and Information Network of South Asia (RILSCINSA) since its inception have been very keen in capacity building activities and thereby making sure that there is sufficient scientifically trained man-power in the biodiversity-rich South Asian countries to take up the uphill task of documentation and conservation of small mammals of the region. Training in field techniques and taxonomy of bats was held at Madurai Kamraj University, Tamil Nadu in 2000. In 2002 there were two trainings, one each on bats and rodents at Kerala Agricultural University, Kerala. Combined training studying both bats and rodents in the same field visit was an experiment which was put up at the Non-volant Small Mammal CAMP held in 2004 February in Coimbatore. In August 2004 there was a series of three trainings on small mammals (both volant and non-volant) in Karachi, Lahore and Islamabad in Pakistan.

In March 2005, in continuation of these training series CCINSA and RILSCINSA organised a training workshop on "Training in Field Techniques on Population and Distribution Studies, Conservation, Management and Public Awareness of bats and rodents" at Dhaka from 2-6 March 2005. The Wildlife Trust of Bangladesh and Asiatic Society of Bangladesh hosted the workshop organised by ZOO and WILD. More than 30 field biologists from about 10 institutions participated in the workshop, most of whom were zoology research students from Dhaka and Jahangirnagar University, Bangladesh. Apart from Bangladesh there were participants who also played a big role in the training from India.

This Report will cover only the training done for volant small mammals, while the non-volant training will be covered in *Rat-a-Tattle*.

2nd March 2005 : Inaugural function

The programme started with a brief inaugural function in which Prof. Anwarul-Islam of Wildlife Trust of Bangladesh and local host welcomed all participants and resource persons. Sanjay Molur of ZOO/WILD/CBSG explained about the background of the workshop. Dr Mike Jordan, Curator of higher vertebrates, Chester Zoological Garden, UK and Dr. Shahrokh Mistry, Associate Professor in the Biology Department, Westminster College, New Wilmington, Pennsylvania, USA, were the main resource persons for the workshop. The workshop started after a brief inaugural. The training programme was scheduled in such a way that the lectures were followed by hands on training demonstrations in the field, which in turn was followed by lectures.

Introduction to Chiroptera by Sharoukh Mistry — Bats are the only mammals with the ability of true flight. They have long hand and finger bones. Pelvic girdles are small and leg bones are thin, which are adaptations for the bats to lead an aerial mode of life. The bats vary in size from the large Pteropus to small Pipistrelle. The oldest fossil record of bats is from the Eocene period, 40 million years back, and they are believed to have originated from flying lemurs of the order Dermoptera. Bats are known to produce high frequency calls, (ultrasonic sounds) for echolocation. The echolocation, which is resorted to insectivorous bats has resulted in modification in shape of nose, mouth and ears.

The order Chiroptera is broadly divided into Megachiroptera, the large-sized fruit bats, and the small-sized insect eating suborder Microchiroptera. Bats are the second most diverse group of mammals after rodents. There are about 1100 species of bats in the world and are distributed in all parts of the world except Antarctica.

South Asia has 123 species of bats of which 25% are threatened; two are Critically Endangered; nine are Endangered, 20 Vulnerable, and 32 Near Threatened.

Insectivorous bats eat many million tonnes of insects every night, while the fruit bats help in pollination of flowers and seed dispersal. More than 114 species of trees are visited by three species of fruit bats of the genus Pteropus, Cynopterus and Rousettus. Many of them are of economic value, for example banana.

Techniques for studying bats

In the case of bats also very little can be said without catching them. Capturing bats is more difficult. Bats are caught using different types of nets such as mist nets, harp nets, butterfly nets and funnel traps. Out of these the most popular one is the mist net. The placement of mist nets is important to ensure capture success. Ideally, the mist nets should be placed over water, paths, near fruiting trees, near roosting sites etc. Dusk and dawn are the best times for capturing bats. When using multiple nets arranging the nets in "T" or "Y" fashion is better than arranging them in straight lines. Canopy net is similar to the mist net but is kept vertically in the canopy. Canopy nets help catching the high-flying bats. Harp net is 6ft high and 6ft wide. Harp nets are good for catching large number of bats and it also enables quick handling, taking measurements, marking etc and releasing the bats faster. Butterfly nets are ideal for catching bats at the roosts.

The participants were divided into smaller groups of four to five members and were given a chance to get themselves familiarize with the mist nets. They were then explained about the handling, unrolling, and rolling of the mist net.



Field session - Setting the mist nets.

Four mist nets were set. By about 6.10 pm the first bat was caught. The method of removing the bat from the mist net, without causing injury, neither to the bat nor to the man, was demonstrated. The bat immediately after removing from the net was transferred to a cloth bag. Within a span of about 30 minutes another two more bats were caught, they were also carefully removed from the mist nets and transferred to separate cloth bags.

Handling the bats and the method of taking various measurements were then explained. The important measurements to be taken include forearm length, hind foot length, ear length, tail length, head to body length, and weight. Apart from these the sex of the bat, age and reproductive condition were also recorded. The length measurements were taken using digital caliper. The morphometric details of the bats collected on the first day are given in Table 1.

Day 2

Field data collection on bats

Shahrukh once again explained about different measurements to be recorded on bats collected such as forearm length, hind foot length, ear length, tail length, head to body length and weight. Apart from these measurements sexing, reproductive status, determination of age, the ectoparasites present if any, collection of tissue sample for genetic studies were explained.

In the case of fruit bats immediately after capture, wipe the facial region of the bat using a fresh tissue paper to collect the pollen if any on the head region of the bat. This gives important ecological information about the bats.

Collection and analysis of feces of bats collected could give very valuable information about the diet of the bats. Faeces of insectivorous bats could contain remnants of insect parts. The faeces of the frugivorous bats provide pollen and seeds of the flowers and fruits that they feed.

Guidelines for studying bats

- While studying the bats one should be aware of the conservation status, biology of the mammals and threats to the species being studied. (Latidens for eg.).
- The researcher should be trained enough or should be working under the supervision of a trained personnel
- The study should not cause any harm to the roost site,

population and habitat of the bat

- As far as possible use passive monitoring methods, such as use of bat detectors should be resorted to.
- Hibernating animal roosts should not be disturbed
- In bats the marking is done on the forearm and never on the ears
- One of the widely used method of marking is fixing the reflective tapes and is good for monitoring the bats at night
- Plastic colour bands are another way of marking the bats
- RFID/PIT tags are good for monitoring the bats activity at the roosts

Resources for the study of bats

Shahrukh explained about the important organisations that could be of help in conducting the bat field studies. The important organisations within India are Zoo Outreach Organisation (ZOO), Chiroptera Conservation Information Network of South Asia (CCINSA), Bombay Natural History Society (BNHS), Zoological Survey of India (ZSI), and Madurai Kamraj University. The important international organisations are Bat Conservation International, USA, who brings out the newsletter called 'BATS', Wildlife Conservation Society, New York, Conservation International, Chiroptera Specialist Group of IUCN, World Wide fund for Nature (WWF), US Fish and Wildlife Service, Flora and Fauna International, Bat Conservation International & Lubee Foundation.

Important reference books on bats

- Bats of Indian sub-continent - Bates and Harrison
- Ecology of bats – Tom Kunz
- Mega and Microchiroptera Conservation Action Plans IUCN
- Status of South Asian Chiroptera — Molur *et al.*, ZOO

Important museums with good collection of bat specimens

- Bombay Natural History Society
- Zoological Survey of India
- Harrison Museum, UK
- British Museum of Natural History, London
- American Museum of Natural History, New York
- Field Museum of Natural History, Chicago
- Natural Museum of Natural History, Washington

Writing proposal for the bat studies

Different aspects of writing a proposal for the scientific study of bats were explained. A research project proposal

Table 1

Variable	Specimen # 1	Specimen # 2	Specimen # 3
Fore arm length (mm)	32.81	33.67	34.29
Hind foot length (mm)	7.16	7.73	6.69
Ear length (mm)	12.64	10.63	9.84
Tail length (mm)	28.49	26.29	32.73
Head to body length (mm)	47.40	48.08	49.08
Weight (g)	7	7	9
Sex	Male	Male	Female



should have a brief introduction, hypothesis, objective, significance of the study, brief review of similar studies in the region, detailed methodology, time frame of the work and budget. Afterwards all the participants were asked to make a 'mock-project proposal'. The same was later evaluated and discussed. Suggestions were also given as how to improve the project proposal.

The 'dry preservation' is not preferred for the bats, because the same results in shrinkage of the facial features of the bats, many of which are important identification characters of the bats. So in the case of the bats the 'wet preservation' technique is preferred, which was explained by C. Srinivasulu. He also demonstrated the preparation of the skull of the bat specimen.

Ecological studies on bats: Insectivory, Pollination and Seed Dispersal by Shahrukh Mistry — Ecological studies in the bats examine the relationship between the bat and the environment, such as habitat preference, roost preference, elevation preference of the bats.

Insectivory: The diet preference of the insectivorous bats can be studied by the examination of the faecal samples for insect remains. The same can then be compared using a sample of the insects collected from the study area to know the diet preference of the insectivorous bats. Faecal samples can be collected either from the day roosting sites, or by keeping the bat in a cloth bag immediately after catching the same using a mist net. The bat would defecate in the bag after some time and the faeces thus collected can be used for faecal analysis studies.

Pollination biology: The relationship between bats and the flowers are mutually beneficial. As the bats get nectar and pollen, former of which is rich in sugar, lipids and amino acids, while the latter is rich in protein. In return bats help the cross pollination in the plants which they visit for feeding on nectar and pollen. Whether the visitation of the bat results in pollination or not can be studied by checking the seed production of the plant. Movement of pollen between the flowers can be studied using 'fake pollen'. Put the 'fake pollen' on to the flowers, and then search for the same on flowers of other plants. If the other plants also have the 'fake pollen', in their flowers it indicates that cross-pollination is taking place. To understand whether bats are involved in the cross-pollination activity, the flowers may be covered using mesh bags during daytime and later open it at dusk.

Pollen can be collected from the bats also. When the bats are caught in the mist nets, check the bats for pollens. Pollens may be seen around the facial regions of the fruit bats, and if present the same can be wiped out using tissue paper. Pollen may also be present in the faeces and can be collected and studied. There are several flowers that are exclusively pollinated by bats. *Haplofragma quadriloculare*, is an example, which opens only in the night

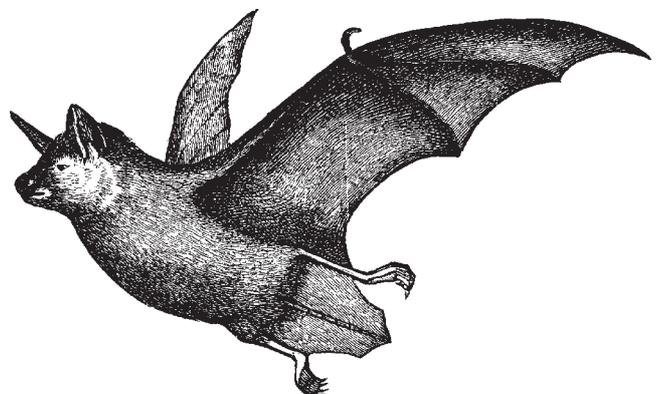
and only once. *Oroxylon indicum*, *Kigelia pinnata* are couple of other examples of bat-pollinated trees.

Seed dispersal: It is important for the plants to distribute the seeds as far as possible from the mother plant. The farther the seeds are distributed from the mother plant the greater will be the chance for the germination and survival of the seedlings. Seed dispersal thus reduces the competition between the parents and the siblings.

Seed dispersal ability of the bats can be studied by the examination of the faeces, for the seeds. The seeds if any collected from the faeces can be put into germination trials to know the effectiveness of the same being passed through the gut of the bats. The germination studies also help in the identification of the plant species. The dispersal behaviour can be studied by selecting a focal tree, then mark, say 100 fruits on the tree and look at the removal rate of the fruits.

Visited the Pteropus roost at Ramna Park, Dhaka — The Ramna Park has a small roost of *Pteropus giganteus*. There were about 400 to 500 bats, roosting on four trees. We set two mist nets near the roosting trees. But could not catch any bats. The participants were given an exercise to count the number of bats in the roost. Shahrukh explained about the proposed project on the monitoring the *Pteropus giganteus* roost in South Asia. No rodent traps were set on this day.

During the valedictory function all participants were asked to give commitment to take up some activities towards conservation of bats and rodents. All participants received a certificate of appreciation and a CD containing all presentations of the resource persons and related literature. Prof. Anwarul Islam thanked all the participants for their interest shown in attending the workshop. He also thanked Zoo Outreach Organisation and resource persons for their effort in organizing a workshop which is a need for Bangladesh at this point.





Nepal bat community emerging after a long time !

Survey of Bats of Pokhara valley, Nepal”

Abstract:

This study “**The Survey of Bats of Pokhara valley, Nepal**” is a beginning study and starting up of the bat conservation activity in the research virgin place of South Asia, Nepal. It has aimed to provide the baseline information for bat conservation in the study area. However, the specific objectives of the study are to identify and map out the bat habitat, list species richness, know the abundance and analyze the current threats to bats on the study area. The study results will be useful to generate recommendations for the conservation of bat for further actions. It provides a compass by which the conservation actions can be planned and put into practice. This study also inaugurates the scientific survey of bat in the country. It is designed to interview residents and examine sparse records to initially identify bat habitats, and then follow that with on-site surveys to identify species, estimate numbers and assess existing threats. The study uses simple methodologies such as interview, review of secondary literature, direct observation and field survey. On the basis of these collected data, recommendation will be made and a volume of report will be produced and circulated to concerning bodies as a major output. The management recommendations which the study intends to provide will be useful to slot in carrying future actions. This study is very important not only to provide baseline information but also to sustain constructing the clear picture within South Asia to lead to bat conservation actions. **Submitted by Rajesh Rajchal, Institute of Forestry, Office of the Dean, Pokhara, P.O.Box: 203, Nepal**

Dear CCINSA Colleagues:

It is my pleasure to inform you that a wall magazine of Bat named ‘Mero Chamero’ (My Bat) has been published in Institute of Forestry, Pokhara Campus, Pokhara. In the beginning of the publication, a few students are very interested to be members of the club in order to contribute efforts in the field of bat conservation. A F.M. radio Host (Annapurna F. M. 93.4 M Hz), Ms. Anjana Shrestha, requested me for an article on Bats so that she can present that in the F.M. I have prepared that and she will probably present it in the coming Friday or the next Friday.

I would like to form a bat club in Pokhara so that pro-grammes can be organized under the club. So I need your kind support and help. would like to request you for publications about bats. Also due to lack of field bat book we are getting difficulties in identifying bats. So we would like to request for a field bat book too. We don’t mind if have to pay for the cost. Moreover if we get membership cards from you, we will be able to distribute them to the interested students. We would be glad if you could help us. Can you please share these requests to other bat organizations or can you please provide me their addresses so that we can get greater help.

I would also like to inform you that I (with cooperation with CBEC, Centre for Biodiversity and Environment Conservation) am going to organize a ‘creative research’ programme in 20 different schools in Pokhara Valley with the support of World Vision International, Pokhara and during the programme I am going to include a game echolocation (related to bat) and a bat watching programme in Bat Cave, Pokhara for each school. The duration of the programme is 6 months. We will be pleased to get materials about bats as well as

other wildlife to aware the students and strengthen the articles and I would be happy to provide any additional information about the wall magazine and myself. **Submitted by Rajesh Rajchal**

Other batters in Nepal

Sujas Prasad Phuyal is also located at the Institute of forestry at P.O. Box- 43 in Kaski, Pokhara, Nepal (Email: sujas@mail.com). His research interests and species of special interest are simply every aspect of bat ecology. He has reported sighting of large numbers of bats dwelling in the Chamere Cave of Pokhara valley, Nepal and also sighting of of bats in great number resting in tall trees around Royal square in Kathmandu, Nepal

Nabin Baral is a student who is interested in listing bats in central Nepal, their status and raising conservation awareness among college students through specimen collection for college museum. He reports an interest in a population status survey of macrochiroptera in Pokhara in August 04 and an inventory of natural caves as habitat for microchiroptera in Pokhara. Nabin thinks one of the potential areas to develop a professional career for Nepal biologists is in bat studies as, despite richness of Nepal’s biodiversity, most research has been on large mammals.

From the Editor, BAT NET

We have had a very hard time finding people actually doing chiroptera field studies or even recording sightings in Nepal. There were no individuals who could pass for bat students until now. In addition to Rajesh, Sujas, and Nabin there are two university teachers who are interested and possibly going to take up studies or at least encourage students.

Many thanks to Geetha Shrestha and her kid’s bat club who searched for these fellows and directed them our way.

Incidentally Rajesh has informed that the Institute of Forestry (IoF) is the only national level academic institution which has been producing skilled, technical and professional manpower to work in the field of natural resource management in Nepal; forestry, wildlife and watershed are the major courses. IoF is affiliated by the Tribhuvan University, the first and the biggest university in Nepal. The Institute was started as the ‘Nepal Forestry Institute’ in 1947 and until the late 1970s, it produced only technician-grade foresters (Ranger Course) and it expanded its bachelor’s academic programme in 1981. Since 2002, a two years master programme has been started. Currently, at Institute of Forestry, Pokhara, there are about 285 students studying in different levels.

Level Academic Years No. of Students

- I. Sc. Forestry 2 90
- B. Sc. Forestry 4 160
- M. Sc. 2 35

The major courses related to wildlife are forest zoology, eco-tourism, wildlife management, protected area management, ornithology and mammology.

We are glad to have Nepal on our Bat Map at last.



CCINSA NATURE Boudha School Bat Club Nepal, Field Trip Report, (Third Meeting) Geeta Shrestha*

The members of the CCINSA NATURE Boudha School Bat Club along with a teacher and three members of NATURE visited two bat sites in Bhaktapur, located approximately 15 kms east of the Kathmandu valley and Lazimpat Keshar Mahal side located at the heart of the city on 2nd January, 2005. First the Bat club coordinator Mr. Krishna had visited some sites where bats used to be found and these two sites were identified.

Bhaktapur Site:

At the Bhaktapur site members were lucky enough to sight the commonly found fruit bats hanging from dried/dead tree branches even on a cold winter morning, inside premises of a school belonging to the army. The local people said that the bats had begun hibernation from the previous month. It was only those withstanding the cold were hanging in their roosts until now. A bat that had unfortunately been caught up in an electric wire had been electrified and was seen stuck to the wire.

At the beginning NATURE member briefed about the common habitats of bats. An army personnel who was taking care of that area since long time, made the club trip more interesting by informing more about the frequently observed behaviors of these bats. According to him, these bats seem to have moved to the present location after their roosts were destroyed elsewhere. About two feet long in width and black in color, these fruit bats have hook like claws allowing for a tight grasp. There is a fishpond for them to drink water from. They usually travel as night falls in search of food, leaving about 6 or 7 p.m. in the evening and flying back to their roosts in the wee hours of the morning (4 a.m.). These bats are very sensitive and protective about their territory, they do not allow anyone even other species of bat to invade it. Their shrieking shrills make them sound like monkeys.

The hibernating season for bats starts as winter comes in and by February/March they are all gone. They go to warmer places eg. caves and they fly as far as 50/60 kms. away from their roosts. The hibernation period is mainly used up in reproduction. With the advent of warm seasons they travel back to their roosts with their newborn babies. They carry around the babies like monkeys do until they are fit enough to fly on their own.

These bats are protected in their roosts as it falls within the limits of the army school ground. Often kids use catapults to stone the bats down from the trees but now that have stopped. Often people come in search of bats to be used as medicines but the personnel says they do not allow that. Therefore these bats do not have threats of being displaced from their present place of living.

After finishing the Bhaktapur site the lunch packets were served to the members inside the bus because the trip was getting late to reach other site.

Lazimpat Keshar Mahal site

This site was in the middle of the city and it is around the West gate area of Royal palace. Lots of bats were seen on the necked trees even it was heavy traffic during the daytime. There were no any local people who can explain about bat as in Bhaktapur site. It was a very busy road so students had to be very careful while watching the bats. Students watched the bats and wrote their observation report in their passports.

At the end of the field trip NATURE member briefed about what the bat club members have to prepare for next meeting.

Extra Activity of Bat club

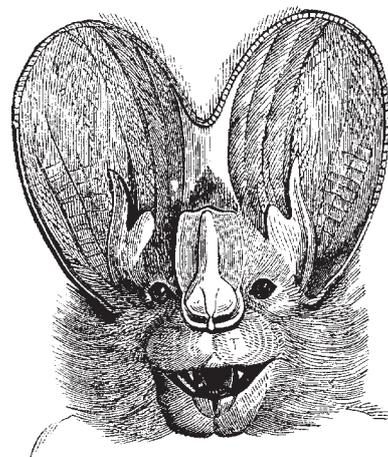
Club coordinator visited Bat Cave in Pokhara

Bat Club Coordinator Mr. Krishna had visited Pokhara for his personal work. He also managed to visit Bat cave in Pokhara. There is one picture taken by him inside the Bat cave. He was not aware about bats and bat cave in Pokhara before he joining the NATURE Bat club. During the discussion of our bat club meeting bat sighted spots were discussed and after that meeting he came to know about Bat cave in Pokhara and it encouraged him to visit that place even it was his personal visit. He shared all the information and experience with other club members in the meeting.

Donation collection for the victims of Sri Lanka by the club

members: As all of us are aware about Asia Quake, which has affected Asian countries. Some schools, clubs and NGOs in Nepal are doing some activities to collect donation to help victims of devastating tidal waves. So our Bat Club members also collected NRs 2000/- within the area of one and half kilometer and they have submitted the money to the main local club which will be sending to Sri Lanka.

* **Executive Chairperson, NATURE, 138, Baniya Marga, Bijuli Bazar, New Baneshwor, P.Box 20543, Kathmandu, Nepal. Email: <rabigeeta@hotmail.com>**





Angels of the Dark -- ZOOWATCH watches bats in Thiruvananthapuram Zoo

On April 5 the captive wildlife welfare organization ZOOWATCH conducted a workshop on bats in cooperation with the Thiruvananthapuram Zoo at the Museum Auditorium, Thiruvananthapuram Zoo. The title of the ZOOWATCH workshop was: "BATS – ANGELS OF THE DARK". This was a one-day programme aimed primarily at teachers and environmental volunteers in the Thiruvananthapuram District. Mr. Aravind Raajkaran conducted the workshop, from 10 a.m - 5 p.m.

The registration formalities were followed by the inauguration and a talk by the Director Mr. Yalakki. Mr. Raajkaran began the workshop with an interactive session during which the awareness of the participants about bats as well as the local superstitions and attitudes of the general public were discussed in detail. From 11.45 a.m. – 12.30 p.m. Mr. Raajkaran used a Power Point Slide Show presentation using materials garnered from various sources to demonstrate the participants the fact that bats, far from being vermin, actually play a crucial role in the environment.

Unfortunately, bats as a species have a very negative image. They are usually regarded as either a nuisance or as a danger to human beings. For this reason, they are frequently hunted and killed, with the result that many species are now threatened and also face loss of their normal habitats. The ZOOWATCH presentation stressed the fact that bats are not pests or vermin. Bats play a crucial role in our natural environment, since they act as pollinators and also help to control pests. In this way, bats help our forests to survive. For example, without the humble fruit bat, cross-pollination would soon end and our forests to and harvests would suffer. Insectivorous bats eat mosquitos and crop destroying pests. Without them, our health would be endangered by a sharp increase in harmful insects. The aim of this ZOOWATCH workshop was to educate the educators and also the general public on the essential ecological role that bats play in our environment.

After the presentation Mr. Gangadharan, Education Officer, summarized the basic facts about the role of a modern Zoo which is no longer to provide entertainment but to promote conservation of endangered species and education of the public on important issues affecting wildlife and the environment. Following lunch provided by Thiruvananthapuram Zoo, workshop members were taken to visit two major bat colonies inside the Zoo. The main characteristics of Chiroptera were pointed out and this became a golden opportunity for the workshop delegates to observe bats and study at first hand their behaviour in a natural environment. On returning to the auditorium the posters and kits supplied by Zoo Outreach were distributed and discussed in detail. In addition, data on amazing facts about bats were handed out.

The workshop came to a close with the members expressing their appreciation of the unusual and fascinating information on bats provided by ZOOWATCH and the Thiruvananthapuram Zoo in the course of this one day programme. They also expressed their interest in attending other similar workshops and in spreading the message about the positive role of bats among their students, neighbours and friends.

The coverage by the press was also quite extensive, both in the English language dailies and the Malayalam papers. The success of the ZOOWATCH programme was indicated when we received a follow up request by one of the participants to conduct a similar workshop, this time for school children

Shri Sebastian, who had attended our workshops, is a teacher at Kiriroor Government Higher Secondary School. On April 12, 2005, Shri Sebastian brought a group of school children -- 26 pupils in the age group of 8 to 12 and four teachers. Mr. Arvind Raajkaran (Assistant by Mr. Palalayam Babu and Mr. Praveen Murali of ZOOWATCH) conducted a programme on bats for this group. Mr. Gangadharan, the Education Officer of the Thiruvananthapuram Zoo began the programme with an explanation of the role of modern zoos and the importance of conservation efforts. At 11.30 a.m., Mr. Raajkaran of ZOOWATCH used a slide show to conduct an interactive session during which the importance of bats was discussed in detail. Subsequently the necessity of protecting bats was further stressed by the distribution of the bat tool kits supplied by Zoo Outreach and the tying of rakhis by the school children as a pledge of their willing-ness to disseminate the message about bats – the angels of the dark. Then children were given a tour of the Zoo and could view for themselves the two large bat colonies which are thriving in this protected area. Mr. Raajkaran used these colonies to point out the major characteristics of the order of Chiroptera, the techniques of bat counting, how bats use echolocation to fly at night, etc. By the time the programme finally concluded at 5.00 p.m., these school children had absorbed a great deal of valuable information about the essential role played by bats and about the functions of a modern zoo.

We at ZOOWATCH would like to express our special thanks to the Thiruvananthapuram Zoo authorities, Director, Mr. Yalakki and Education Officer, Mr. Gangadharan, for their help and cooperation. These two programmes are proof of the surprising success that can be achieved in public education when the staff of the zoo and an animal welfare organization work together to achieve a common goal.

We would also like to thank Zoo Outreach Organisation for the materials provided which were sponsored by Chester Zoo, UK, Flora and Fauna Intl. UK produced by ZOO and CCINSA. **Submitted by Latha Thamphi, Vice-President, ZOOWATCH, T.C.14/1028, Voltas Lane, Thiruvananthapuram 695 014.**





Report of Bat Education Programme Organized by Rwdwmsa

Rwdwmsa is a bio-diversity conservation organization and on 23rd November 2004 a Bat Education Programme was organized by Rwdwmsa in Tangla M.S. School premises. In this programme there were 28 participants from 12 different schools and colleges of this area. The main aim was to highlight the importance of bats and to create an awareness about the conservation of bats. We advised all the participants to propagate whatever they had learnt in this programme to other students of their respective institutions during the daily assembly and other times.

The day long programme was conducted by Mr. Debanga Mahalia, Director of Rwdwmsa and was inaugurated by Mr. Sarat Das (Principal I/C, Tangla H.S. School). Das said that, "Mankind will be the loser if they do not stop the killing of bats". Next to this in a jolly atmosphere zoo's 'Rakhi' was tied to the participants by Mrs. Anima B. Baruah (Head, Dept. of Zoology, Tangla college) and Mrs. Nalni Boro (subject Teacher, Tangla M.S. School). Md. Sariful Hussain (Rtd. Forest officer and member of Rwdwmsa) flash backed to the Holy Koran Sarif and said, "When Saint Ibrahim was praying to Allah he was engulfed by fire. Then ABABI (BAT) tried to save him by pouring water on him carried from the sea". The Koran has a high esteem for bats; but now a days some people act to eradicate bats. Prof. Anima B. Baruah (member of Rwdwmsa) said, "It will be a great mistake if we think that the world is only for man kind. Extinction of even a small creature from earth will have great effect on our environment. An element of nature is the bat. This element has been offering such valuable contribution to human being that we cannot imagine. Bats have been helping the human race just like BATMAN". Prof. Samarjit Boro (research scholar and co-ordinator of Rwdwmsa) said, "Some people have been taking advantage of the loopholes of law and are freely destroying forests. In the name of development works unwanted forest destruction is going on". CCINSA member Mr. Debanga Mahalia dwelt at length about bats and why we should protect them.

Bat packets, posters, books provided by Zoo Outreach Organisation and Rwdwmsa Assamese leaflets about bats was given to participants who were given 30 minutes to study them. Next Mr. Dinesh Singh and Mr. Ajoy Rabha conducted a quiz and essay writing competition among the participants. In this competition the first prize was won by Mr. Prasanta Swargiyari (student of Tangla college), Second prize went to Mr. M. P. Kashyap (student of Tangla English Medium School) and third was Miss Kankana Kumar (student of Maharshi Vidya Mandir). With the vote of thanks delivered by Mr. Biswajit Deka (Office Secretary, Rwdwmsa) the day long encouraging and fruitful Bat Education programme was concluded.

Submitted by Mr. Debanga Mahalia, Rwdwmsa, Ward no. 2, Tangla 784521, Assam, India
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BAT NET & CCINSA

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Chiroptera Conservation and Information Network of South Asia (CCINSA)

CCINSA is a network of South Asian Chiroptera specialists and enthusiasts. The network aims to enhance communication, cooperation and collaboration among chiroptera specialists of this region and thereby create a chiroptera conservation "community" for better biodiversity conservation.

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IUCN SSC Chiroptera Specialist Group

CCINSA represents the IUCN SSC Chiroptera Specialist Group in the region of South Asia. CSG utilises the CCINSA Network to locate specialists in different subject areas, to organise technical as well as conservation assessment workshops and other activities to assist the CSG in their mission.

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Note : ZOOS' PRINT Magazine, Journal, Newsletters and a variety of reports can be found on our new website <www.zoosprint.org>. Due to limitations in our printing technology we have stopped including photographs in the printed version of our publications. Please consult the website for photographic illustrations in colour.