BAT NET - Bits about Bats

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CCINSA and the IUCN SSC Chiroptera Specialist Group of South Asia CSGSA

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New Members of CCINSA, after January 2003

Ms. Bandana Aul
Research Scholar, ANET
Post Bag-1, Junglight, Port Blair
Andaman & Nicobar Is., India

Mr. T. Karuppudurai
Research Scholar
Madurai Kamaraj University
Madurai 625 021, T.N., India

Prof. Paul A. Racey
Regiys Professor of Natural History, Department of Zoology
University of Aberdeen
Tillydrone Avenue AB24 2TL
Aberdeen, U.K.

Mr. R. Rajasekar
Research Scholar
Madurai Kamaraj University
Madurai 625 021, T.N., India

Mr. Anand Pendharkar
Director, SPROUTS
68/4 Tarun Bharat Society,
Chakala, Sahar Road, Andheri
Mumbai 400099, MS, India

Dr. Devra G. Kleiman
7216, Delfield Street
Chevy Chase MD, USA 20815

Dr. MD.Sohrab Uddin Sarkar
Department of Zoology
University of Dhaka, Dhaka
1000, Bangladesh

Ms. A.R. Binu Priya
Zoo Outreach Organisation
PB 1683, Peelamedu
Coimbatore 641 004, T.N., India

Mr. G. M. Chandrakant
A/P – Nimblak, Tal-Phaltan
Dist – Satara 415 523

Mr. Kazi Ahmed Kabir
Dhaka University
Dhaka, Bangladesh

Mr. Shyamkant Sukhadeorao Talmale
Zoological Survey of India
Western Regional Station
Sector-29, Vidyanagar
Rawet Road, PCNT Post
Pune 411 044, MS

Mr. C. Vanlalnghaka
C/o. Dr. D.S. Joshi
Zoology Department
Ahmednagar College
Ahmednagar 414 001, MS

Dr. Feroz Md. Shafiqul Islam
Deputy Curator
Zoological Survey
Dhaka Zoo, Mirpur, Dhaka
Bangladesh

Mr. Shayer M. Ibney Alam,
Dept. of Zoology
University of Dhaka
Dhaka 1000, Bangladesh

Mr. Shahriar Mahmud,
Dept. of Zoology
University of Dhaka
Dhaka 1000, Bangladesh

Mr. Goutam Kumar
Dept. of Zoology
Jahangirnagar University
Savar, Dhaka, Bangladesh

Md. Hasibur Rahman,
Dept. of Zoology
Jahangirnagar University
Savar, Dhaka, Bangladesh

Dr. AHM Ali Reza,
Lecturer, Dept of Zoology
Jahangirnagar University
Savar, Dhaka 1342
Bangladesh

Dr. Yasantha Mapatuna
Samurdhi Authority of Sri Lanka
4th Floor, Sethsiripaya
Battaramulla, Sri Lanka

Mrs. M.R.M.P. Nandasena,
Research Assistant
Department of Zoology
University of Colombo
Colombo 3, Sri Lanka

Mr. James W.N. Andrews
14, MoretonTerrace
Frodsham, Cheshire WA6 7BP
U.K.

Abstracts of important papers

Abstract of the paper 'Mist net captures of the rarest fruit *Latidens salimalii*' by N. Singaravelan and G. Marimuthu (published in *Current Science* 2003, 84: 24-26)

The endemic Salim Ali's fruit bat *Latidens salimalii* is one of the three rarest bats in the world. The Kardana Coffee Estate in Tamil Nadu is its only habitat known so far. The habitat lies at an altitude of approximately 460 m above mean sea level in the High Wavy Mountains that are situated at Chinnamanur, near Madurai. Although the bat was first discovered 53 yesrs ago, its correct identification was made 30 years ago. Since *L. salimalii* occupies a secretive habitat, a detailed study on it is not yet made. We captured a total of 28 individuals of this enigmatic bat, using mist nets in two nights. They were 22 adult males and three females each of adult and juvenile. All bats were captured when they made attempts to enter into a wide-mouthed shallow rocky chamber. There was a large accumulation of remnants of fruits, ejecta pellets and fecal pellets on the floor of the chamber. Such accumulation suggests that these bats regularly use the chamber as feeding as well as night roosts. Forearm lengths and body masses of all bats were measured and they were released after marking. Soon after releasing, they resumed their foraging flights at a height of 25 m from the chamber. Twelve vespertilionid bats were also captured at the same site and released. Although our study confirms the continued existence of *L. salimalii* at the same habitat, its day roost is still unknown.

Abstract of the paper 'Discovery of a cave as the day roost of a rarest fruit bat *Latidens salimalii*' by N. Singaravelan and G. Marimuthu (published in *Current Science*, 2003, 84: 1253-1256)

As a result of a survey made in the High Wavy Mountains complex, particularly surrounding the night roost of *L. salimalii*, we have located a cave harbouring this rare fruit bat. A stream was flowing through the cave. While entering into the cave, we heard faint audible screams that were similar to the vocalizations of megachiropterans. Most of the individuals of *L. salimaliii* roosted in clusters at dark areas of the cave. We mist- netted 24 individuals during their out flights and confirmed their identity. The dimension of the vertical mouth of the cave was 11.7 m length and 3.3 m width/ height. The depth of the cave was 22.9 m. Although the height of the ceiling varied at different locations, the maximum height was 13.8 m. The distance between this cave and the only known night roost was less than 1 km. The present study forms the first report on the discovery of the day roost of this endemic and endangered bat.

Bats and *Prosopis juliflora*

G. Marimuthu*

Senacha (2002) pointed out in one of the recent issues of *Bat Net* that *Prosopis juliflora* emerges as a threat to microchiropteran bats. He observed that individuals of the mouse-tailed bat *Rhinopoma hardwickei* entangled in the thorny plants during their exodus flights. The plants were shown adjacent to the entrance of the roosting site of the bats. He ascribed the entanglement to the obstruction caused by the thorny plants to the flight paths of the bats. Such inference led him to "believe that *P. juliflora* causes adverse effect on bat demography" and suggest "steps should be taken to eliminate *P. juliflora* …….".

Chandrashekaran frowned at this suggestion and remarked in the successive issue of Bat Net (2003), that bats and plants like *P. juliflora* have co-evolved and co-existed for millions of years in tropical regions. He argued that when microchiropteran bats avoid obstacles dexterously and employ the methods of detecting tiny insects immaculately by echolocation, they should also be able to avoid the thorny plants. At the end of his discussion he raised a question "how does one 'remove' *Prosopis*?"

It should be noted that the entanglement of *R. hardwickei* in the branches of *P. juliflora* observed by Senacha (2002) and his colleagues occurred mainly during the exodus flights of the bats from the low lying room (day roost) of the Open University convocation pandal in the JNV University, Jodhpur. They have observed 20 dead bats in total, hanging from the thorny branches of *P. juliflora*. However they have not indicated whether all those 20 individuals were trapped during a single evening or one after another on several evenings? It appears that they have only sighted the dead bats, but not visually observed the act of entanglement. Hence before jumping to the conclusion of 'removing' the plants, a systematic study may be conducted on the temporal pattern of emergence of the bats and number of entanglements that occurred, if any. Observations are to be made with the natural presence of *P. juliflora* over a specific duration, and then by slanting the branches of the plants using a long rope or steel wire in such a way to generate a green signal for the 'flights'. In addition one has to observe whether there are any dead bats hanging from the branches of *P. juliflora* at sites other than the vicinity of the day roosts, for example at their foraging areas.

In our long-term ongoing field ethological research on bats, since the year 1977, we have never come across entanglement of bats in *P. juliflora*, especially in their foraging areas. Actually in one of our earlier studies (Audet *et al.* 1991), I have observed that Indian False Vampire Bats *Megaderma lyra* routinely used the thorny branches of *P. juliflora* as feeding roosts to devour their prey (frogs and grasshoppers). Most recently S. Ezhilvendan (Elilvendan) during his post-graduate dissertation study found the presence of the fruits of *P. juliflora* as one of the food items of the Indian Flying Fox, *Pteropus giganteus* (one of the largest bats in the world). Interestingly again N. Singaravelan, one of my research students, observed that individuals of a colony of *P. giganteus* occupy stretches of *P. juliflora* trees as their day roost, near Karaikudi (about 120 km from Madurai towards east). The body size of *M. lyra* is more than two folds and that of *P. giganteus* is 60 folds than that of *R. hardwickei*.

Selection of thorny plants like *P. juliflora* both as day and feeding roosts may be an advantage for the bats to stay away from their conspecifics as well as predators. Similarly when bats feed on the fruits of *P. juliflora* they presumably aid in dispersal of the seeds of the exotic plant. Thus the interaction between bats and *P. juliflora* exemplifies their co-evolution.

When the emergence fights of *R. hardwickei* occur in *en masse*, it is likely that the plants accidentally obstruct one or two individuals. However it is unlikely that 20 individuals met with such an accident in a single evening, because all individuals of the populations (1500 and 3000 in Senacha's study) may not fly out simultaneously. Usually the gate of emergence flights of a colony of bats stretches into at least one hour. If the entanglement of bats in *P. juliflora* occurs frequently, pruning a few branches of the plants periodically may solve the problem.

Acknowledgements

The MoEF, DST and CSIR, Government of India are supporting the author's bat research for several years.

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Senacha, K.R. (2002). A note on *Prosopis juliflora*: emerging threat for the microchiropterans of Thar desert. *Bat Net* 3 (2): 7-8.

***Head, Department of Animal Behaviour and Physiology School of Biological Sciences, Madurai Kamaraj University Madurai 625 021, Email: gmari@eth.net**

Summary of the study on Roost Site Characteristics of Bats of Borra Cave in Visakhapatnam District, Andhra Pradesh

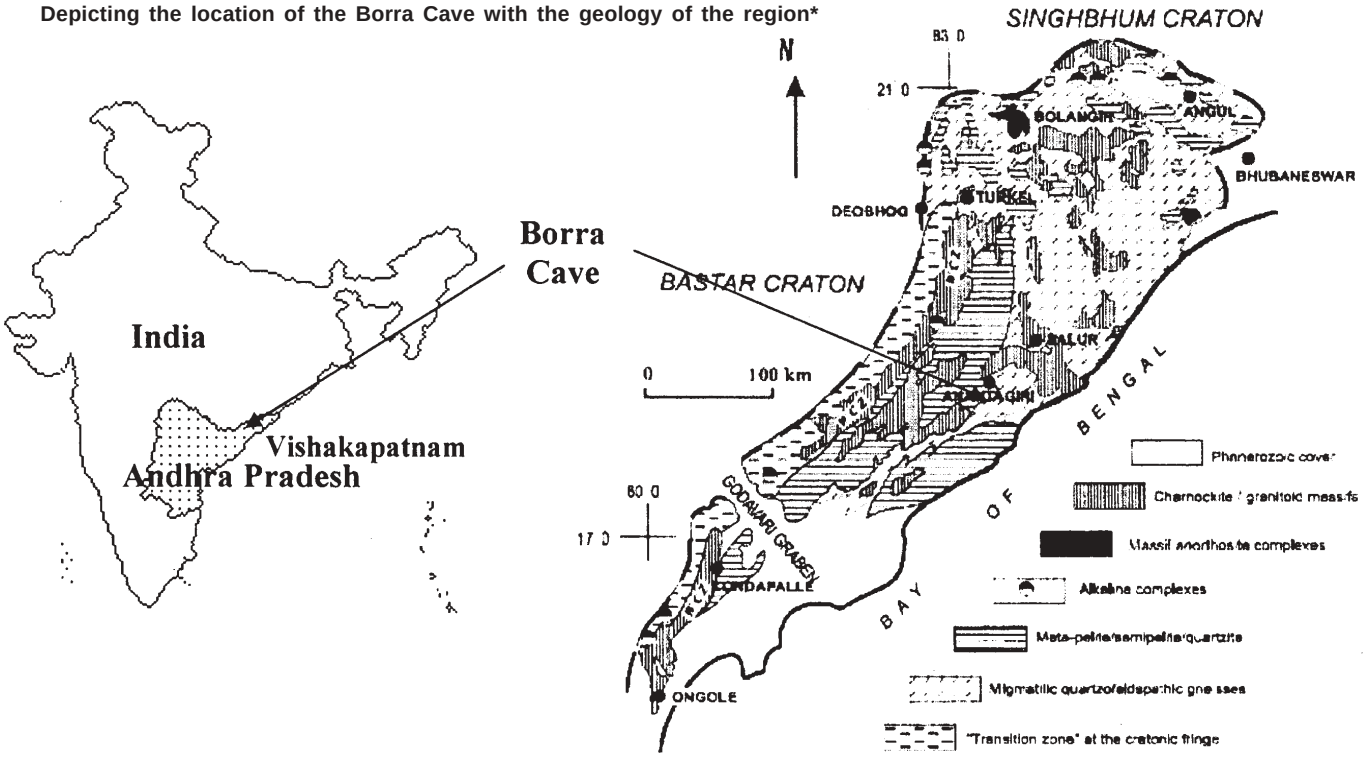
Bhargavi Srinivasulu* and C. Srinivasulu**

Bats (Mammalia: Chiroptera) are the only true volant mammals. They are known from a wide variety of habitats. Of the 1001 species of bats known world over, 123 species are known from South Asia, of which 114 species are reported from India. About 26 species of bats are known to occur in Andhra Pradesh. Majority of the bats are known to use caves for daytime roosting and also for breeding purposes. They tend to aggregate in small to large clusters in favored roosting sites hence becoming vulnerable to disturbance. In India, bats have been long beleaguered due to superstition, misinformation, loss of habitat and other anthropogenic activities leading to their endangerment. In Western countries, caves are categorized into red caves, that are important with respect to

Entrance of the cave

Fig. 1

Depicting the location of the Borra Cave with the geology of the region*



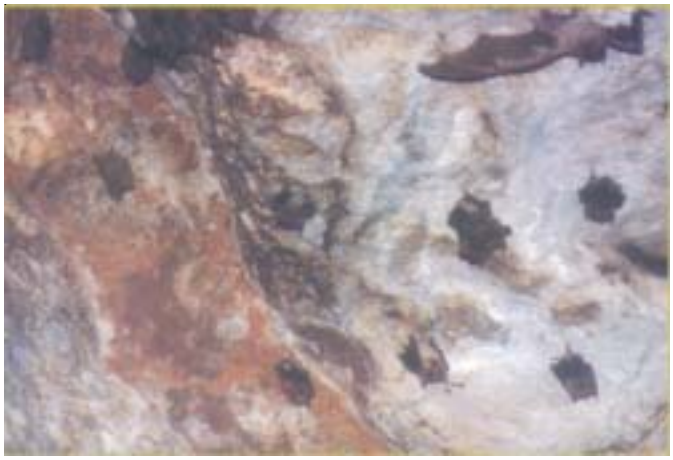
* After Ramakrishnan *et al.* (1998)

***Individual bat researcher, **CSIR Research Associate, Wildlife Biology Section, Department of Zoology, Osmania University, Hyderabad 500007, A.P.**

threatened fauna and wherein humans are not allowed, and the green caves that are not important from the point of view of threatened fauna, hence humans are free to visit such caves. No studies for categorization of caves has been done in India and most of the caves can be safely categorized as green caves as they do not fulfill the specific requirements of the bats.

Sri T.V.N. Rao, Executive Director (Eco-tourism), Andhra Pradesh Tourism Development Corporation Limited approached us for a thorough scientific faunal assessment of the Borra caves and any recommendations that could enable in improving the existing facilities at the cave. The study was undertaken to take scientific opinion on the problem regarding illumination in the cave to mitigate any ill-effects on the cave fauna. In order to study the bat population along the aforementioned needs, a study was taken up from the 2nd to 16th March of 3 days each with a gap of 10 days for analysis of data. The roost characteristics, factors affecting the roosts, the effect of illumination on the cave environment and bat behaviour were also studied. The Borra cave was first discovered by William King George of the Geological Survey of India in the year 1807. Before King George discovered the cave the story goes that a cowherd found that one of his cows had fallen down a gaping hole in the earth and when he went into the cave to retrieve the cow he found formations in the cave akin to shiva lingas nearby and associated the survival of the cow to the shiva lingas hence started to worship them. Later on King George discovered the Borra cave and revealed its presence to the world. It is located in the Ananthagiri hills of the Eastern Ghats in Vishakapatnam district of Andhra Pradesh. It is one of the major tourist destinations of the state for two major reasons: first, for religious purpose and secondly, people from all over the country (at times abroad) visit this cave to enjoy its beauty. It lies in the pre-cambrian granulite terrain and is a limestone (solution) cave. It can be classified as a multi-level cave hence called as Borra. Borra means a hole in the earth/ ground, earlier what existed was only the sinkholes in the ceiling, later the mouth was excavated. From cave mouth to

Bhargavi Srinivasulu holding a mist-netted bat.



***Taphozous melanopogon* colony**

the end it is 374 m (approx.) and 12 to 80 m in height. It can be divided into four major levels, namely Level 1, the entrance zone, near which is the Gosthani gorge that is at a depth of 50-60 m; Level 2, the twilight zone; Level 3, the threshold zone; and the Level 4, the dark zone. The cave is illuminated by mercury, sodium vapor and halogen lamps, 63 in all.

***Rousettus leschenaulti* male**

Light intensity, temperature and relative humidity were measured at different points in all the levels to ascertain the ill effects of illumination and other human induced activities to the cave environment and the biota therein. A significant variation was noted with respect to light intensity in the twilight, threshold and the dark zones. It varied between between no light, generator-powered lights or the AC-powered lights showing that illumination of any kind is detrimental to the cave environment and the biota therein. Significant variations were noted with respect to temperature between no light and different light conditions in all the levels. In the twilight to dark zones when compared to the entrance zone significant variations in temperature were noted under different illuminated conditions. A significant variation in relative humidity was seen in different illuminated conditions at different time

Rhinolophus lepidus

Team members interact with APTDC Officials

periods. The cave authorities put on lights for the benefit of tourists which results in a significant decrease in humidity. This is harmful for the sensitive speleothems – the stalactites and stalagmites, which have taken millions of years to form are subjected to this and other such disturbance, such as increase in temperature. The increase in temperature results from bright light ranging from 18W-400W and unrestricted number of tourists who may visit the cave in a given period of time. The tourists start pouring in from 10.00 a.m. onwards, and so the lights are put on at times even an hour or so before. This leads to decrease in humidity levels, coupled with increase in temperature. We could not do any studies on other fauna of the cave due to paucity of time however we found that the bats dispersed further into the recesses of the cave i.e. the dark zone areas wherever there was no illumination of any kind as against the clumping behaviour they exhibited in bright light conditions. Same was the case with the *Heteropoda* spp. and the cave crickets that could be heard and were also detected dispersed in many parts of the dark zone in non-illuminated conditions. However with increasing human disturbance and illumination they became concentrated only near the spring of the Gosthani river.

During the study period, seven species of bats were encountered of which five species could be identified. They were *Rousettus leschenaulti*, the Fulvous Fruit Bat (2,500-3,000 individuals) found to occupy the dome in the threshold zone; *Eonycteris spelaea*, the Dawn Bat (200-300 individuals) observed along with the Fulvous Fruit Bat and also dispersed in the dark zone; *Rhinopoma hardwickii*, the Lesser Mouse-tailed Bat, observed on the ceiling at the entrance and at the Gostahni gorge area; *Taphozous melanopogon*, the Black-bearded Tomb Bat, majority observed near the sinkholes and also the ceiling at the entrance level of the cave; and *Rhinolophus lepidus*, Blyth's Horseshoe Bat (1-5 individuals), observed only in the dark zone. Of the two unidentified species, one probably belongs to genus *Hipposideros* and another to family *Vespertilionidae*. The light-tolerant hardy species namely *Rhinopoma hardwickii* and *Taphozous melanopogon* did not show any changes in behaviour under illuminated conditions. However, with relative increase in the light intensity and in temperature the behaviour of the bats found in the twilight to dark zones was altered as they exhibited clumping behaviour and increased agitation leading to the death of young falling down from the nursing colonies. The relative humidity decreased drastically during illuminated conditions signifying the extent of detrimental effect on the bat colonies and the fragile cave environment. The speleothems are gradually getting dried up and cracks are beginning to form. Other fauna encountered in the cave were Spiders (*Heteropoda* spp.), Cave Cricket (unidentified spp.) that were found in the dark zone; The Forest Calotes, *Calotes rouxii*; the Bark Gecko, *Hemidactylus leschenaultii* and numerous Rhesus Macaques, *Macaca mulatta* were encountered near the cave entrance. Keeping the above mentioned facts and also the visitors response to our queries, we formulated some recommendations to the management. The revenue to the tourism department has increased manifold after illumination was taken up.

Since the year 1992, we suggested path directional soft lighting instead of the existing harsh and bright lights. Regulation of tourists with non-penetrable guard rails would be useful for the people to hold and walk on the pathway safely and also prevent the over enthusiastic ones from jumping over and trying to climb the speleothems and further damaging them (hence non-penetrable) and hand-rails all along the pathway and also compulsory guided tours to prevent any further vandalism. There is not one kind but many kinds of vandalism taking place in the cave. Tourists tend to scratch their names on the fragile rocks with pieces of stones-the rocks are so fragile that even a finger pressure is enough for the crust to fall like powder! They tend to climb the formations for the sake of adventure and also to take photographs. Then there are some, who go a step further by breaking chunks of the rocks and taking them home as souvenirs.

Credit: All Photos by C. Srinivasulu, B. Srinivasulu and T. Sasikala

Heat wave claims *Pteropus giganteus* (Brunnich, 1782) colony

C. Srinivasulu* and Manju Siliwal**

On 3 June 2003, while on our way to Nagarjunasagar Srisailam Tiger Reserve, we stopped to take a count of the Indian Flying Fox colony that the first author and Mrs. Bhargavi Srinivasulu had been monitoring on a long-term basis (Srinivasulu & Srinivasulu, 2002) near Dindi Reservoir (16°31' N, 78°40' E, 1313 ft) about 100 km from Hyderabad. The colony, on a large Peepul (*Ficus religiosa*) tree, had been under investigation since late 1996, and it consisted of 187-217 individuals. In March 2002, Srinivasulu & Srinivasulu (2002) reported desertion of this colony due to the presence of nine large beehives on the tree. The bats (187 individuals) had relocated themselves on three *Eucalyptus* species 200m. from the original site.

By mid December 2002 as the activities of the bees on the original roost site decreased the bats had recolonized the peepul tree. A few bats remained on the nearby *Eucalyptus* trees. On our visit to the colony, we found that the whole colony had deserted and were shocked to observe 36 carcasses of the Flying Fox on 5 trees [19 on the *Ficus religiosa* (1 tree), 16 on *Eucalyptus* species (3 trees) and 1 on *Prosopis* species (1 tree)]. On enquiry with the Assistant Fisheries Inspector (the colony happens to be in the Campus of the State Fisheries Department's Fish Breeding Centre) we understood that the heat wave had claimed the colony. Between 15 to 18 May 2003, we were informed by the fisheries department staff that a majority of the bats succumbed from 1200 to 1630 hrs. The department staff had removed around 55 to 75 carcasses fallen on the ground. We counted 36 carcasses on the trees. We think that the rest might have either survived and shifted to another suitable roost or in the worst case might have succumbed further away from the roost where they might have been taken away by feral dogs or raptors. Although the roost is located downstream the Dindi River near the Dindi reservoir, scarcity of water and severe heat (40°C to 43°C) had taken its toll. As on 3 June 2003 the reservoir was totally dry and the nearest water source was a small stream about 18 km further south (16°25' N, 78°43' E). On 11 June enroute to Nagarjunasagar, and on 16 June 2003 while returning to Hyderabad we did not encounter any live bats in the colony.

Reference

Srinivasulu, C. & B. Srinivasulu 2002. Indian Flying Fox *Pteropus giganteus* (Brunnich, 1782) deserting its traditional roosting site. *BatNet* CCINSA Newsletter 3(2): 2.

***Department of Zoology, Osmania University, Hyderabad – 500 007.**

****Zoo Outreach Organization/WILD Society, 29/1, Bharathi Colony, Peelamedu, Coimbatore – 641 004 Tamil Nadu, India**

Bat Festival ?

Debojit Phukan*

A unique kind of event called a "Bat festival " was celebrated by the local people living a few kilometers away from a large bat cave complex in Kondoli hill, 22 km from Nagaon town of Nagaon District in Assam. The caves are located in the foot hills. It is very difficult to get there because of the dense forest cover. People do not visit the area even during the day. For this event, a route was cleared through the forest by the locals. This celebration was in the form of bat sighting/watching, chorus of prayers, offering foodstuff, lighting a mustard oil flame and talking about bat habits. The event took place for 3 days from March 2, 2003. The news of "Bat Festival" was a head/front page news in several Assamese daily news papers (Guwahati) on 03/03/2003.

The local people are basically villagers who are illiterate and sustain on farming. They are fully devoted to religion, beliefs and traditions. There is a story about this particular group of bats in this area. The story goes that once upon a time this cave was supposed to have been in a kingdom and only women allowed inside. The entry of men was strictly banned. Once a priest entered the cave by disguising as a woman but even he was caught by the women and punished by being hanged upside down from the cave wall. Being a great priest, he took his revenge by sentencing the women in the kingdom to be hanging creatures there. The punished women are now the bats in the caves of Kondoli Hills!

The idea of celebrating this Bat Festival might have come from the state celebrations like the Brahmaputra Festival, Elephant Festival etc. It is likely that the bats are disturbed by such events. An estimated several thousand bats of an unknown number of species inhabit this cave. A study needs to be done on the bats of this cave, both for ascertaining the different species, population and distribution so that the impact of the "Bat Festival" can be ascertained over time.

***Secretary, Megamix Nature Club, Dhakuakhana-787 055, Lakhimpur, Assam.**

Recaptures of the Salim Ali's fruit bat *Latidens salimalii*

G. Marimuthu*

Credit: Arnab Roy, Z.O.O.

Karl F. Koopman, a well-known chiropteran taxonomist, identified 888 species of bats (Koopman, 1984). However Mickleburgh and his coworkers recently (2002) indicated that nearly 1001 species of bats are present in the world. Among them approximately 15% are frugivorous bats and the remaining are insectivorous. Fourteen species of fruit-eating bats and more than 100 species of insect-eating bats occur in the Indian subcontinent (Bates and Harrison, 1997). Among them three species of fruit bats may be familiar to the Indian mammalogists. They are the Short-Nosed Fruit Bat *Cynopterus sphinx* (body mass *ca*. 45g), the Fulvous Fruit Bat *Rousettus leschenaulti* (body mass *ca*. 90g) and the Indian Flying Fox *Pteropus giganteus* (body mass *ca*. 900g).

The Salim Ali's Fruit Bat *Latidens salimalii* is one of the rarest bats of the world. It is endemic to the State of Tamil Nadu, India. Hutton (1949) collected this species more than 50 years ago at the High Wavy Mountains, labeled it as *C. sphinx* and deposited it at the museum of the Bombay Natural History Society. Later Thonglongya (1972) found it to be a new species and identified it as *Latidens salimalii.*

Paul Bates and his coworkers rediscovered *L. salimalii* 21 years later at the High Wavy Mountains and reported the area as the only habitat harbouring this endemic bat (Bates *et al*. 1994). Recently N. Singaravelan (Research Scholar, MKU) captured 28 individuals of this enigmatic bat at the same High Wavy Mountains complex. This habitat is situated near Chinnamanur about 70 km away from Madurai towards the west. Singaravelan captured *L. salimalii* using mist nets when the bats visited their night roost (a rocky chamber). The following paper published in the 10th January 2003 issue of 'Current Science' reveals the details of the habitat and the captures of the bats:

N. Singaravelan and G. Marimuthu (2003). Mist net captures of the rarest fruit bat *Latidens salimalii*. *Current Science* 84: 24-26.

Based upon the Report of the 'Conservation Assessment and Management Plan' (C.A.M.P.) Workshop (organized by the CCINSA at the M.K. University, Madurai 21-25 January, 2002), *L. salimalii* is 'Endangered' due to restricted extent and area of occurrence and continuing decline in quality of its habitat. Even though it is confirmed that *L. salimalii* lives in High Wavy Mountains for several decades, its day roost is still unknown. Singaravelan undertakes nerve-wracking and painstaking efforts to locate the day roost of *L. salimalii*. He believes that location of its day roost would facilitate to carry out detailed studies such as its population size, foraging and breeding behaviour. The Bat Conservation International (U.S.A.) under its 'Student Fellowship Program' supports his work on *L. salimalii*. MoEF, DST and CSIR of the Government of India support the author's bat-research.

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***Head, Department of Animal Behaviour and Physiology School of Biological Sciences, Madurai Kamaraj University Madurai 625 021, Email: gmari@eth.net**

Education Programme on Bats

Rajiv Saxena*

An education programme on bats was conducted at Amrita Public School, Gwalior on 17.01.2003. More than 100 students of upto 8th class interacted and 50 Bat kits were distributed. A field trip to a nearby tree where Indian Flying Fox roosts, was also organised. An article containing information on bats in Hindi was also distributed among students and teachers.

Children during the programme wearing bat masks and holding bat placards is seen in the photo.

***M-853, Darpan Colony, Thatipur, Gwalior 474 911, Madhya Pradesh**

UPDATE ON INDIAN BAT PROTECTION

Despite the great number and diversity of bats in India, Indian foresters, policy makers and even wildlife scientists are not sufficiently aware of bats and their important role in our lives. At a biodiversity training course given to foresters from the southern Indian states a year ago, we spoke of the then upcoming C.A.M.P. workshop and a participant asked " why are you having a workshop only for bats: there are only two". Checking with other participants, it was confirmed that all of them were unaware of any but the giant fruit bat and (some of them) one insectivorous bat. Since then many foresters have confirmed that bats were just not on their agenda.

Even foresters dont' know --

Bats are not counted in the annual census which is carried out in every forest division in the country. Bats were not protected in the Wildlife Protection Act of India until this year when two species were listed on Schedule I (the second highest level of protection) after being assessed as Critically Endangered in the Bat C.A.M.P. workshop. The rest of the fruit bats are still on Schedule V of the Act and are defined along with crows, rats and mice as Vermin. Bats in India can be killed indiscriminantly and in any number with impunity. Clearly there is a great need for improvement in the awareness of foresters, wildlife biologists and policy makers as well as the public in India.

Bat C.A.M.P. Summary --

CCINSA has taken this issue up as a priority and has come out with a Summary of the C.A.M.P. workshop especially made for foresters and busy policy makers. These summaries give all pertinent information that would be of particular interest to foresters and sent to over 600 foresters and policy makers. CCINSA members also got 2 copies and an invitation to request for more copies if they wanted them for higher level education and to approach foresters and policy makers. We will keep up the pressure by sending the list of 600, newsletters and items about bats from time to time.

Bats get a big push --

Very recently, bats got a big plug at a MoEF sponsored all-India workshop to decide immediate priorities for wildlife. Bats were used as a case study in the theme presentation on Endangered Species. In the presentation, a strong case was made for removing bats as well as rats and mice from Schedule V and getting "threatened" species put on a protected schedule. Some senior officials commented that this issue had come up many times and it was time to address it. There is reason to believe this is being followed up very seriously at this time.

Sally Walker, CCINSA

A huge colony of bats in Thailand

M.K. Chandrashekaran*

On a visit I made to Thailand in January 2002, I was driven to a place called Phu Phaman in Khon Kean province some 450 km north-east of Bangkok to watch the exodus activity of a colony of bats at sunset on 12th January 2002. The cave site was a huge granite (?) rock complex with a gaping cave mouth of *ca*. 150' x 100' (across) dimensions. Contrast this with the cave of the Samanar Hills in Madurai, in which G. Marimuthu and I worked, the entrance to which was so small that we had to file in one after the other, legs first! At the Thai cave site there were sixteen tourist buses and we were thrilled to see stylized bronze statues of bats with the scientific name of the species. At around 6.45 p.m. the tourists gasped at a huge colony of bats *pouring* out of the cave like a moving column of monsoon cloud. The bottom ledge of the cave mouth was *ca*. 100 m above ground level making it difficult to make precise observations. The sun was going down the horizon but a few kites were still aloft. The steady flow of the bats continued with the earlier outfliers keeping close and parallel to the rock front, and the entire colony of millions of bats seemed to have emerged in a mere 'gate' in time *of seventeen* minutes. There was no way or question of counting. I was fortunate that a juvenile bat, possibly on his first evening out, landed close to me on the ground. I gingerly picked it up by the tip of its wings and examined the bat. I cannot vouch for the species but given its close resemblance to *Tadarida aegyptiaca,* occurring in Madurai in colonies of 1000 to 1500 bats, I conclude it belonged to *Tadarida brasiliensis.* Later I placed the bat on a small boulder in the gathering darkness. That evening, I noticed the phenomenon of swarming of bats *ca.* 150 m high in the air.

In the Bracken caves in Central Texas a lot of people assemble in time to see millions of free-tailed bat *Tadarida brasiliensis* pour upwards out of the cave for minutes on end. Clouds of bats emerge and sway away and disperse to distant foraging sites. This is the largest known bat colony in the world and Dr. Merlin Tuttle (Founder of Bat Conservation International) estimates that some 20 million Mexican free-tailed bats live in the caves. The combined body mass of bats living in Bracken cave amounts to a stupendous 270 tons.

I seek information from knowledgeable readers of Bat-Net, if I have reproduced the names of the Thai places, the latitude and longitude of the cave site and the species name correctly.

***AstraZeneca Research Professor, Chairman, Jawaharlal Nehru Centre for Advanced Scientific Research, P. Box No. 6436, Jakkur P.O. Bangalore 560 064, Karnataka**

Endemic bats of South Asia – IUCN Red List and justification for status assessment

Sanjay Molur* and Sally Walker**

Introduction

There are many reasons for conducting species status assessments for wild animals and plants. The most obvious is to know the status for the sake of saving species: if the status is known, and if it is veering towards danger, conservation action measures — research, management, public education — can be taken to reduce the risk to the species. Another reason, albeit indirect, is to "catch up" with the new developments about species in a particular Order or taxonomic grouping. Studies are taking place throughout the world and often species are "discovered" in new places, which can change their global threat status. Also species thought to be endemic to a particular country or region may not be so when the new studies are accounted for. Mistakes can occur when making identifications also and when confirmed as mistakes, species thought to occur in a particular country actually don't ! Both of these situations occurred this year in the case of South Asian bats.

Status assessments also create opportunities for much needed communication between specialists at global, regional, national and local levels. In addition, whether reflected globally on the IUCN Red List of Threatened Species or locally in publications, educational material, or governmental reports, status assessments are good opportunities for promoting the species and their needs to diverse groups in lobbying and public education programmes. Policy-makers, wildlife professionals, academics, local people, students, children can learn about the dangers threats pose to species and ecosystems and hopefully become encouraged to act on their behalf.

The organised and focused participatory assessment exercises, such as what take place in Conservation Assessment and Management Plan (C.A.M.P.) workshops cover all these bases.

How does the output of a C.A.M.P. workshop make it onto the IUCN Red List of Threatened Species ? The best way is through the IUCN SSC Specialist Group Chair, if he will recognise the exercise. CCINSA, ZOO, & CBSG, South Asia make every effort to insure that the relevant Chairs (in this case the Co-chairs of the Chiroptera Specialist Group) are well-informed about the C.A.M.P.s we conduct and, ideally, that at least one of them attends. In the case of the recent 2002 Chiroptera C.A.M.P. Tony Hutson, Co-Chair, IUCN SSC Chiroptera Specialist Group attended the workshop.

The Chair may or may not be the "Red List Authority" for his Specialist Group. If not, the Chairs will forward the information — species and status according to the C.A.M.P — to the designated Red List Authority. In the case of Chiroptera, Tony Hutson and Paul Racey are the Red List Authorities for the group.

There is a specific procedure for listing, delisting or altering the IUCN status of species. IUCN lists only "global" assessments, the status of a species throughout its global range. That is one reason why we put so much emphasis on South Asian regional or South Asian country endemic species in our South Asian C.A.M.P. workshops. If a species is endemic to our region or a country in our region, then South Asian field biologists, taxonomists, academics, foresters and other conservation workers are responsible for it as no one else can be. Information about South Asian endemic species is most likely to be the most up-to-date, accurate and plentiful coming from the currently working field biologists and other scientists in the region. That is why regional or national C.A.M.P. workshops are increasingly well-regarded.

The Specialist Group Chairs and the Red List Authority filter the assessments in case of new information from other countries or mistakes in use of the IUCN Red List Criteria.

In the case of the 2002 Chiroptera C.A.M.P., there were major changes to the workshop assessments which could be pointed out and confirmed by the Specialist Group Chair. These are described later in this paper. These were cases in which new sightings both within the country and outside the entire region changed the status of two species previously thought to be endemic to one area. Without species assessment exercises, it might have taken several years for this to come to light.

After the Specialist Group Chair interacts with the individuals working on the status assessments in the region or country he makes his final report to the IUCN Red List officers in Cambridge where further checks may be done. If submitted species qualify in all respects they are listed on the IUCN Red List of Threatened Species. That is how it will come to be that several new South Asian species will be listed on the 2003 Red List.

If new information becomes available since the 2002 C.A.M.P. as a result of field studies, biologists should try and get it published as soon as possible, but also to inform CCINSA. CCINSA will coordinate a postal and email review of all endemic species so that any changes can be reflected in the 2004 IUCN Red List of Threatened Species, for which there is a special push for assessing all mammal species.

Assessments of species which are not endemic to the region are also communicated to the Specialist Group Chair who may find it useful to study the information and comments on the individual Taxon Data Sheets and use the information in his assessment of the global status of species throughout their range.

For these species, the IUCN Regional and National Guidelines are used by the C.A.M.P. workshop so that the

***Deputy Director, Z.O.O., **Convenor, CCINSA, PB 1683, Peelamedu, Coimbatore 4, TN, India**

South Asian region and every country can know the status of these species in their own country. In the final analysis, every country is responsible for all species whose range includes their country. Losing a species in the country is not desirable, even if it has a large range elsewhere, and no nation's wildlife authority wants this.

In nearly all South Asian countries there is an IUCN country office which are being encouraged to bring out national Red Lists by the IUCN Regional Biodiversity Programme, Asia (RBP, Asia). So far Sri Lanka, Bangladesh and Nepal have published national Red Lists for many vertebrates. Pakistan is about to begin a Red List Programme.

Although there is no country office in India, Z.S.I. in India has brought out Red Lists on mammals and plants based on the earlier criteria.

Species listed on the IUCN Red List carry a special weight with policy makers and wildlife professionals. Individual countries have their own methods of ranking species, according to their priorities and policies. In the case of India, the most important listing of species and status is the Wildlife (Protection) Act although the criteria used for ranking is very different from the IUCN criteria. The IUCN criteria is based on a species' biological values so that assessments for all taxa from all countries will have the same standard. Individual countries use different values including trade, habitat deterioration, endemicity, economics, etc.

The C.A.M.P. workshop process uses the IUCN Red List Criteria and biological values exclusively for assessments, although other variables are recorded in the taxon data sheet. The policy makers of a country can then utilise the status of the species as they will, secure in the knowledge that these assessments are fully objective as well as consistent with those in other parts of the world.

This article can be considered as an update on the endemic species in the 2002 South Asian Chiroptera C.A.M.P. since the 2002 Chiroptera C.A.M.P. Report has been issued.

C.A.M.P. Workshop for South Asian Chiroptera

C.A.M.P. Workshop for South Asian Chiroptera

The 2002 South Asian Chiroptera Conservation Assessment and Management Plan (CAMP) workshop assessed and reported that 31 species of the 123 species of bats occurring in South Asia are threatened. In addition, 22 species of non-endemic bats occurring in South Asia were also assessed as threatened. In the exercise South Asia was limited to the 7 countries of SAARC although bordering countries bats were also discussed.

An initial count of endemics within South Asia indicated a list of 17 species – 2 fruit bats and 15 insectivorous bats. However it is now confirmed that two of the 15 insectivorous bats thought to be endemic are also found in other parts of the world, especially in northern Africa. Hence *Taphozous perforatus* and *Rhinolophus ferremequinum* are

Figure 1. Flowchart to explain the process of assessments followed for Chiroptera in South Asia

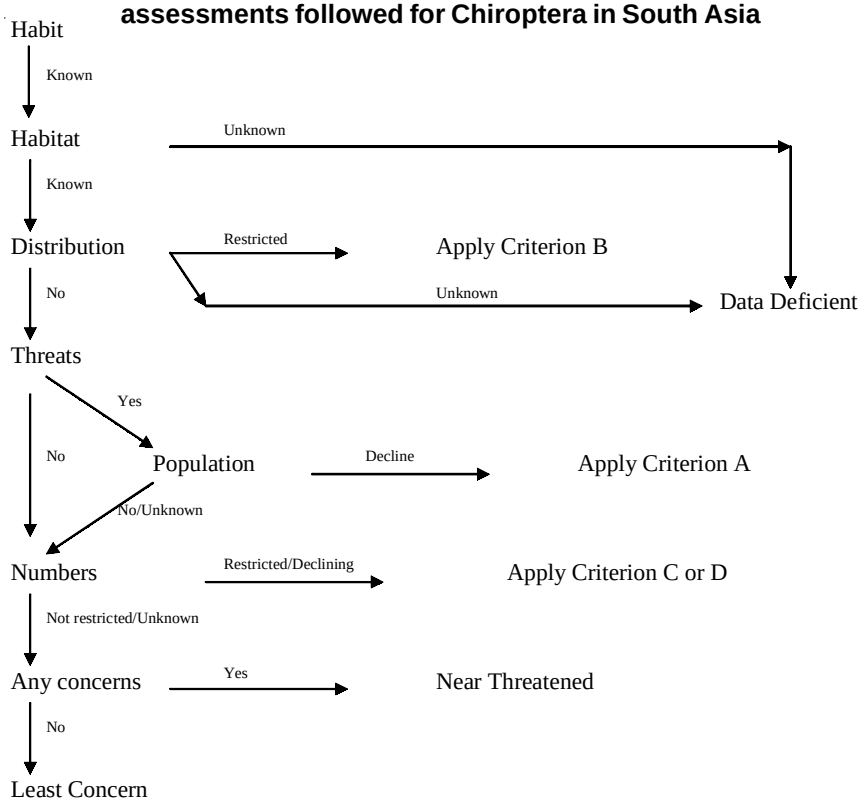
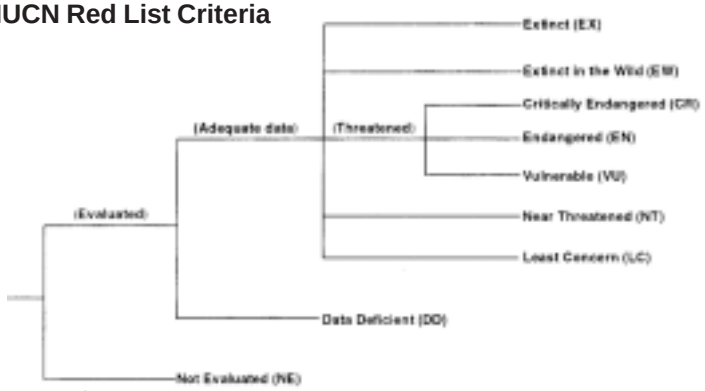


Figure 2: IUCN Red List Criteria



not to be considered endemic to the South Asian region. Previously it was thought that *Otomops wroughtoni* was endemic to the Barepada caves in Karnataka and thus assessed as an Indian endemic in the 2000 Microchiropteran Action Plan produced by the Chiroptera Specialist Group. Recent information from various published sources and personal communications indicate that this species is no longer restricted to the Barepada caves, rather it is recorded from Cambodia (Walston & Bates 2002), Siju caves in Meghalaya (Thabah & Bates, in prep.), Dandeli and other areas in Maharashtra (Anand Pendharkar, pers. comm.) and in Corbett (Anand Pendharkar, pers. comm. on Meena Haribal's findings). This species therefore due to new information on its distribution is no longer considered an Indian endemic.

Accounts of all endemic bats of South Asia are given in the following pages. A rationale for their assessments is also included. The assessments are based on the global IUCN Red List Criteria and Categories and is derived using the logical derivation of information based on Figures 1 and 2 on the previous page.

In using the IUCN Red List Criteria and categories, a species is not categorized as Data Deficient unless there is sufficient proof to indicate lack of information. This is contrary to that of some biologists who proclaim a species Data Deficient without considering the minimum datasets available that can potentially lead to derivation of the status. In the C.A.M.P., the standard approach adopted for any species to be assessed was if there was information on habitat, habit and threats either to the population or to the habitat then an assessment would be attempted The flowchart indicates steps to this approach.

Of the 15 endemic bat species of South Asia, three are island species restricted to either Sri Lanka (*Hipposideros lankadiva*), the Nicobars (*Pteropus faunulus*) or the Andamans (*Rhinolophus cognatus*). The more restricted species of these island forms, *viz*., the Andaman and Nicobar species are threatened, while the Sri Lankan species is considered Least Concern due to its wide distribution and relatively few threats. *Pteropus faunulus*, a fruit bat of the Nicobar Islands is highly restricted and due to the threats of changing land use patterns it is considered threatened under Criterion B (Restricted Distribution and extreme fluctuation). *Rhinolophus cognatus* on the other hand is known from three islands in the Andamans, which are known to be relatively safe from human pressures. Yet, since the species has a narrow distribution, any change in land use or human intereference could cause the population to be negatively impacted. Hence it is assessed as Vulnerable based on precaution.

Two species, *viz*., *Murina grisea* and *Rhinolophus mitratus* are known from the Indian mainland only from their type locality and from the type description. No recent studies have been conducted to determine the status of their information. Yet, based on the knowledge of the habitat of the type locality, it is inferred that the temperate bat in Mussourie, *Murina grisea*, is Critically Endangered, if not already extinct, and the Jharkhand species (of *Rhinolophus mitratus*) is Vulnerable based again on the precautionary principle due to its known occurrence in a single locality.

The other endemic fruit bat – *Latidens salimalii* – which is recently included in the Schedule I of the Wildlife (Protection) Act, amended in 2002 is categorized as Endangered due to its restricted distribution in the High Wavy Mountains of the Western Ghats. This species was categorised as Critically Endangered (B1 +2c, D) (2000 IUCN Red List of Threatened Species since it was known from a single locality and its range was thought to be extremely narrow. Current information indicates that it is more widespread than earlier believed, although it is still not found over large areas to categorise it under a category lower than Endangered.

The three remaining threatened endemics, *viz*., *Hipposideros durgadasi*, *Hipposideros hypophyllus* and *Myotis sicarius* are all restricted in their distribution and are therefore threatened.

Apart from *Latidens salimalii*, none of the other threatened endemic bats in South Asia have been studied, or even surveyed in the last 10 years. To understand the actual status, rigorous studies including surveys, monitoring, ecological studies and impacts of threats on the population, demography and habitat should be understood. However, given the lack of this information and the large number of species yet to study, it was decided by the workshop to assess these species with whatever information currently exists so that at least crucial research and management areas for the conservation of the species could be flagged. Declining to assess a species for want of information consigns it to a sort of purgatory in which little action is taken on its behalf. Thus, ignoring species for want of rigorous scientific information may in itself be a threat to the species considering the result of sheer inaction. The Red List guidelines provide enough scope for assumptions within reason including inference and estimation for such groups of neglected species. However, with the information available presently, further investigations are required to standardize data collection and to undertake a more realistic assessment. This is a "first cut" and should be considered as a platform to work on future actions to save the species in the wild.

Endemic species and justification of their status assesment

Hipposideros durgadasi (Khajuria, 1970)
Khajuria's Leaf-nosed Bat - Hipposideridae
Endangered - D
The taxon is threatened due to its limited number of mature individuals inferred from past studies. It is also restricted in distribution to less than 5000km^2 extent of occurrence and 500km^2 area of occupancy since it is known from only two locations. Threats to its habitat, however, is not known. It is presumed that there is some human disturbance but further studies are required.

Hipposideros hypophyllus Kock & Bhat, 1994
Kolar Leaf-nosed Bat - Hipposideridae
Endangered - B1ab(ii,iii) + 2ab(ii,iii)

The taxon is threatened due to its restricted distribution – found in only two locations and has a distribution range of less than 5,000km^2 and 500km^2 area of occupancy. Due to various threats such as habitat loss, extraction, mining, deforestation and encroachment, there is a continuing decline in area and quality of habitat.

Latidens salimalii Thonglongya, 1972
Salim Ali's Fruit Bat - Pteropodidae
Endangered - B1ab(iii) + 2ab(iii)
Salim Ali's Fruit Bat is reported from 2-3 locations that are contiguous within its known restricted distribution of less than 5,000km^2 extent of occurrence and 2,000km^2 area of occupancy. The species is also under pressure from threats such as habitat loss, extraction, agriculture, horticulture, farming, non-forest produce collection as well as trade for medicinal purposes.

Murina grisea Peters, 1872
Peter's Tube-nosed Bat - Vespertilionidae
Critically Endangered - B1ab(iii)
This temperate bat is known only from a single location of its description, which used to have good forest cover and habitat in 1872. However, current information on the area indicates total destruction of the habitat, which could imply that although nothing new is known about the species, it could be facing a very high risk of extinction if not already extinct. It is therefore categorized as Critically Endangered.

Myotis sicarius Thomas, 1915
Mandelli's Mouse-eared Bat - Vespertilionidae
Vulnerable - B2ab(iii)
The taxon is threatened due to its restricted area of occupancy of less than 500km^2. Due to various threats such as habitat loss, extraction, mining, deforestation and encroachment, there is a continuing decline in area and quality of habitat. This species is known to occur in only 7 locations.

Pteropus faunulus Miller, 1902
Nicobar Flying Fox - Pteropodidae
Endangered - B1ab(iii) + 2ab(iii)
This island bat is known only from 3 locations on 3 islands in the Nicobars. Although no recent work on the species has been carried out, current information on the islands and the habitat indicates some loss of habitat and change in quality of habitat. Given that the species is restricted and the habitat is changed, *Pteropus faunulus* is threatened.

Rhinolophus cognatus Andersen, 1906
Andaman Horseshoe Bat - Rhinolophidae
Vulnerable - D2
It is reported from 2-3 fragmented locations within its known restricted distribution in the Andaman group of Islands of less than 5,000km^2 extent of occurrence and 500km^2 area of occupancy. Although there are no threats to the species on the islands currently, the islands themselves are vulnerable to human pressures in the future either from settlements or in their use, which makes this unique Andaman bat Vulnerable on precaution.

Rhinolophus mitratus Blyth, 1844
Mitred Horseshoe Bat - Rhinolophidae
Vulnerable - D2
This Jharkhand bat is known only from a single location with no further information after its description in 1844. No information on the bats habitat is known but current knowledge on the status of the habitat at Chaibassa (type locality), the bat is presumed safe. However, since no new records of the bat is found in any other locality and presuming a worse-case scenario for the habitat in the area, which could be affected by development.

Rhinolophus beddomei Andersen, 1905
Lesser Woolly Horseshoe Bat - Rhinolophidae
Near Threatened
This bat is seen in 16 locations in India and Sri Lanka. Although widely distributed, low-density population and forest dependency suggest that this species is vulnerable to habitat destruction.

Scotoecus pallidus (Dobson, 1876)
Desert Yellow bat - Vespertilionidae
Near Threatened
The Desert Yellow bat, though known to occur in more than 20 locations in India and Pakistan, is prone to threats and is considered to be Near Threatened.

Hipposideros lankadiva Kelaart, 1850
Kelaart's Leaf-nosed Bat - Hipposideridae
Least Concern
This taxon occupies over 2000 sq. km. in India, Bangladesh and Sri Lanka. Though the taxon is prone to habitat destruction, the population is widespread and relatively stable.

Hipposideros speoris (Schneider, 1800)
Schneider's Leaf-nosed Bat - Hipposideridae
Least Concern
The Schneider's Leaf-nosed Bat occupies over 2000km^2 in India and Sri Lanka. There is no change in habitat status and the population is stable at present.

Pipistrellus dormeri (Dobson, 1875)
Dormer's Bat - Vespertilionidae
Least Concern
The Dormer's bat is widely distributed in many countries of South Asia. The habitat status is stable and the population is increasing.

Eptesicus tatei Ellerman & Morrison-Scott, 1951
Sombre Bat - Vespertilionidae
Data Deficient
The Sombre bat has been collected only from one locality (Darjeeling, India) which is the only source of information. Further taxonomic studies are needed to determine if this is a true species.

Myotis csorbai Topal, 1997
Csorba's Mouse-eared Bat - Vespertilionidae
Data Deficient
This taxon has been collected only from one locality in Nepal. There is no information about its habitat, threats or population.

CCINSA: Research projects undertaken

1. Diversity of Bats in Peechi-Vazhani Wildlife Sanctuary, Western Ghats, Kerala
-- Dr. P.O. Nameer, Kerala Agricultural University

Introduction:
Seed dispersal and pollination by animals play a crucial role in the maintenance of forest ecosystem worldwide. Frugivorous bats are important pollen and seed dispersers in the Paleo-tropics and at least 300 plant species are known to rely on Old World fruit-bats for their propagation. Old World fruit-bats have the potential to disperse small seeds to hundreds of kilometers (Fleming, *et al*., 1987; Fleming, 1986; Shilton *et al.* 1999). Bats carry six times more pollen than birds (Law *et al*. 1999). Frugivorous bats are important agents in the regeneration of tropical forests (Gonzalez, 1998). Changes in the frugivorous bat community may have indirect consequences on both the demographic and the genetic structure of plant population inside forest fragments (Cosson *et. al.* 1999). Many of the plants that benefit from pollination or seed dispersal by bats are economically important to man (Fujitha and Tuttle, 1991). At least 443 products useful to man are derived from 163 plant species that rely to some degree on bats for pollination or seed dispersal (Fujitha and Tuttle, 1991). These products include timber, fruits, fibre and tannins that contribute significantly to world markets, as well as lesser known products such as medicines and food items important in local economies.

Bats play an important role in influencing insect population in agricultural habitats, urban areas and forests. Bats consume the equivalent of their own body weight of insects each night. Different species of bats show an apparent preference for particular group of insects (Akbar *et al*. 1999). The study conducted on dietary habits of Egyptian Fruit Bat (*Rousettus aegyptiacus*) suggests that the definition of the fruit-bat as a major agricultural pest should be re-examined because fruits constitute only 15 percent of the bat's diet (Korine *et al.* 1999). Fruit-bats are found to have antibodies against Nipah virus which causes respiratory and nervous symptoms and death in pigs, and can transmit between pigs in contact with each other (Nordin, 1999).

Bats though constitute the largest mammalian order in India, very little studies have been done on them. This is true for the bats of Kerala also. The proposed study envisages understanding the different species of bats present in Peechi-Vazhani Wildlife Sanctuary. The study is expected to reveal information on this lesser known group of mammals, which in turn would be of use in their conservation. The information brought in would be of immense use for the managers of the protected areas, so that at the time of planning and implementation of the management strategies of the protected areas they can take into consideration these groups of animals too. Such basic information on the status and distribution of bats can also ensure the conservation of this group of mammals.

Objectives:
To study the diversity, status and distribution of bats in Peechi-Vazhani Wildlife sanctuary, Western Ghats.

Study area:
The Peechi-Vazhani Wildlife Sanctuary is located between 76° 15'and 76° 27' E longitude and 10° 30' and 10° 42' N latitude in Thrissur Forest Division. The area enjoys a tropical monsoon climate. The minimum temperature do not fall below 17° C, while the maximum reach up to 42° C. Humidity is high during the monsoon (80-100%) while in summer (March-April) a minimum humidity of <20% is experienced. Annual rainfall is above 2000mm distributed over six months, 70% of the rainfall is received during the south-west monsoon period. The soil cover belongs to the red ferralitic type. All sub-types from typical red ferralitic in forest areas to plinthic ferralitic in settlement ores can be observed. The soils are highly acidic, low in cation exchange capacity, well drained and sandy loam to loam in texture (Sankar, 1990).

The forest cover of the area comprise of three main types:
a. Semi-evergreen forests (84 km^2)
b. Moist deciduous forests (102 km^2)
c. Man-made forests (12 km^2) (Swarupanandan and Sashidaran, 1992).

Methodology
Most methods for inventorying bats and their abundance estimation require the animals to be captured. One of the most common traps that are used for the capture of bats is the mist net. Hence the mist nets will be used for capturing the bats. These nets are used most commonly for the small volant mammals, because they are easily deployed and suitable in a variety of situations (Brosset, 1962a; Greenhall and Paradiso 1968; Nagorsen and Peterson 1980; Helman and Churchill 1986; Finnemore and Richardson 1987; Kunz and Kurta 1988; Bates, *et al*., 1994a). Mist nets are effective for capturing bats at ground level, at different heights in the sub canopy and high in the forest canopy. The trapping will be done at different elevation gradients available (20-600m) within the sanctuary to understand the distribution patterns of the bats along an elevation gradient.

Mist-nets will be opened at the same time relative to sunset on each night. Mist-nets will be opened by sunset as there is often a peak in activity immediately after sun-set. They will be checked immediately after opening so that any birds that may have been caught can be removed immediately. Mist-nets will also be left open for the same number of hours on each night. The nets will be checked at regular intervals.

A bare minimum number of voucher specimens will be collected with prior permission from the Forest Department for identification and preservation as a reference collection. However, other specimens obtained will be released unharmed after making necessary observations.

Duration: Two years

Time frame of the study
First six months (January 2003 to June 2003)
Collection of literature and general reconnaissance of the study area and identifying the locations for the collection of the bats.

Second six months (July 2003 to December 2003)
Monitoring begins for the first season. In each season ten to twelve visits will be made, and during each visit four to five days will be spend in the forests for studying the bats.

Third six months (Jan 2004 to June 2004)
Field works continues during the second season.

Fourth six months (July 2004 to December 2004)
Statistical analysis of the data, discussion of the results and preparation of the report.

2. Survey of Bats in the Nallamala Hills, Eastern Ghats, Andhra Pradesh, India

Dr. Chelmala Srinivasulu, Osmania University, Hyderabad

Project Aims & Objectives:

1. Study the diversity of chiropteran fauna in the Protected Areas of Nallamala Hills in Eastern Ghats.
2. To gain an insight of the general biology, habitat requirement and roost characteristics of the bats.
3. Mapping bat locations.
4. Identify key species and their habitats for formulating conservation inputs.
5. Document peoples attitude to mitigate man-bat conflicts/ interactions.

Project duration:

January 2003 to March 2003 (Duration: 3 months with 1 month for field study, 1 month for specimen studies and analysis, and 1 month for report writing).

Brief description of the study area:

The Nallamala (15°20' – 16°31' N and 78°30' – 80°10' E) is a group of low hill ranges in the central part of Eastern Ghats and stretches across five districts of the state of Andhra Pradesh. The Nallamala – an unbroken chain of rugged hills with precipitous cliffs encompassing an area of about 7,640 km^2 – runs a distance of 430 km from the Palnad basin in the north to the Tirupati basin in the south and has an average width of 30 km (Anon, 1965). The vegetation is typically of southern tropical dry deciduous and southern tropical moist deciduous forest types intermingled with scrub (Champion & Seth, 1968). The climate is generally hot and dry with temperatures rising up to 43°C to 45°C during May and dips down to 8°C in December. Average rainfall in this region is between 900 to 1,000mm. Surveys would be carried out in different localities throughout the Nallamalas.

Rationale:

The rich faunal diversity of the Nallamala has been poorly studied, and studies conducted during the last one decade has resulted in documentation of 74 species of mammals belonging to 28 families of 9 orders (Srinivasulu & Nagulu, 2002). As no one has ever attempted to study small volant and non-volant mammals, they are poorly represented in known diversity of this region. Recent surveys conducted by a CCINSA member has led to the rediscovery of the rare Lesser Woolly Horseshoe Bat - rediscovered from this area after 80 years!

The Nallamala is one of the hot spots in the Eastern Ghats with innumerable species yet to be discovered (A recent study yielded in identification of more than 25 new invertebrate species). Nagarjunasagar Srisailam Tiger Reserve (3,568 sq. km.) and Gundla Brameshwaram Metta Wildlife Sanctuary (1,190 sq. km.) are two the two protected areas that are managed by the Government to conserve the rich biodiversity.

This project proposes to document and collect voucher specimens of the bat species occurring in the Nallamalas as well as gain insight in their ecology and explore the biotic pressures on them. Thorough knowledge of the existent biodiversity is critical for identifying the focal points of conservation actions. In order to evolve suitable management responses it is important to document and inventory lesser known taxa in any given area.

Methodology:

Field study - A month long field expedition (mid January 2003 to mid February 2003) would be carried out. The expedition would aim at collecting bats from the 10 localities. At each locality surveys would be carried out for 2-3 days.

Specimen collection and preservation - Standardized techniques would be followed to collect bats (using hand nets and mist nets) in the field. Only a male and female specimen of species would be collected from each locality. Photographic records too would be maintained. Records of external measurements and other important observation will be also be kept.

Preservation of the collected material would follow standardized techniques. The collected bats would be deposited in the Natural History Museum of the Osmania University, Hyderabad, India.

Identification of pressures - During the surveys interviews with the local tribes inhabiting the vicinity of the bat colonies would conducted with a view to get a view of their beliefs towards bats and also pressures, and threats to them.

Project implementation:

The project implementation will have the following components:

1. Involvement of the Andhra Pradesh Forest Department: This is critical for smooth execution of the project. The Andhra Pradesh Forest Department has given collection permit for bats from the Nallamala Hills to Dr. C. Srinivasulu - one of the CCINSA members who would be co-ordinating and implementing this project. The findings of the project will be shared with the Andhra Pradesh Forest Department.

2. Field work: A month long (30-days) field expedition is planned. During this expedition the team will travel about 4,000 km.

   The field work would be undertaken by Dr. C. Srinivasulu of Department of Zoology, University College of Science (A), Osmania University, Hyderabad with assistance from 2-3 local and non-local volunteers. The expedition team would be functional only during the field study.

3. Analysis and Recommendations: An analysis of the findings would be done at Department of Zoology, Osmania University, Hyderabad. It will be with a view to understand the present diversity of bats, their ecology, influencing factors, and to make recommendations for their conservation.

4. Dissemination: The findings of the project and the recommendations will be shared with the Andhra Pradesh Forest Department, Funding Agency, the local community (through print and news media), and other relevant stakeholders and bat researchers. The project findings would be published in a scientific journal with a wide readership.

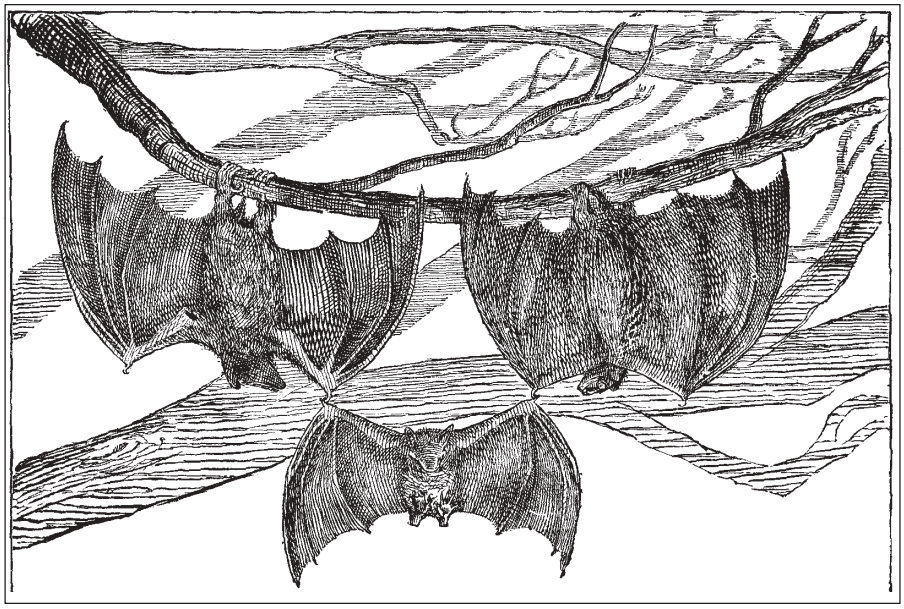
Output:

- √ Documentation of bat diversity of the Nallamala Hills, Eastern Ghats.
- √ Pressures and threats and attitude of the local people towards bats identified.
- √ Biological data on data deficient and rare species of bats.
- √ Recommendations to conserve bats and their role in the habitat made.
- √ Papers published in journals.

For Historians of Natural History ... an old story from The Tribes on My Frontier, an Indian Naturalist's Foreign Polia : The Bats

September

"Eye of newt and toe of frog,
Wool of bat and tongue of dog,
Adder's fork and blind worm's sting,
Lizard's leg and owlet's wing."



Witches seem to hang their cauldron from the lamp-hook in the centre of the ceiling, and every now and then it boils over. The "tongue of dog" is wanting this morning, and the wing is a sparrow's, not an owlet's, but the rest of the ingredients seem to be as *per recipe*. In these materialistic days it is taken for granted that the witch in question is a rat; but that at least is a delusion. No rat in the flesh could get to a hook situated in the very middle of a smooth ceiling unless it had wings, and we have been spared winged rats. I protest in all conscience they are bad enough with four legs and a tail. No; few eyes have rested on the embodiment of hideousness from whose foul repast these crumbs have dropped. The demon bat does not go forth to do its deeds of darkness until the shades of night are falling, and as soon as *'The cock, that is the trumpet to the morn, Doth with his lofty and shrill-sounding throat Awake the god of day,"*

It retires, like a guilty ghost, to its dark haunt among the rafters of some deserted godown. But in the small hours of the morning I have risen, when I heard its jaws at work, *"Feeding like horses when you hear them feed,"* and, quietly shutting the windows, have made it a prisoner, and in the morning there it was, hanging from the hook, its hyaena eyes glaring at me and a restless tremor playing over the thin membrane of its enormous ears. Very microphones those ears are, fit to catch the gentlest rustle of the feathers of a dreaming sparrow. Another pair of little trumpets of semi-transparent skin, like subordinate ears, rise from the nose, to gather the faintest odour of the sleeping prey as it floats past upon the air. To this extraordinary detective apparatus, the demon bat adds a pair of ample wings of the softest vellum, on which it glides noiseless and ghost-like among the trees, or up and down the verandah, under the eaves of the roof. It scents a sparrow asleep, with its head cosily buried in its wing. The sparrow has a dream, a dreadful dream; it starts and raises its head and gives a piercing shriek, and the curtain falls. The sparrow is now hanging limp and lifeless from the jaws of the shadowy spectre, which flits in at the window and up to its favourite hook. In the morning two wings are lying beside the flower-vase upon the table, and perhaps a beak, for though the demon bat eats the head, skull and all, before any other part, it often leaves the beak. If the *hamal* is up before his *sahib* in the morning, he sweeps the remains is up before away, and no one is a bit the wiser. That a sparrow's wings should occur in the table does not strike him as a phenomenon requiring explanation, especially if he found frogs' feet or a mouse's tail, or the remains of a little bat, on the same spot the morning before.

The demon bat has a miniature, very much inferior to itself in size and ugliness, which I hold responsible for the grasshopper's legs and wings of death's-head moths which I find about one particular corner of the dressing-room. I caught the transgressor once almost *flagrante delicto*, and sentenced it to be put under chloroform and examined. On recovering from the effects of the chloroform it was set free, for I abhor taking life needlessly. Jerdon puts this and the demon under different *genera*, and calls the one *Hipposideros* and the other *Megaderma.* It does not appear to me that they should be classed among bats at all. They seem rather to be a sort of incarnations of Satan, and might serve as models to Gustave Dore illustrating "Paradise Lost".

When we speak of the bat we generally have in mind a little animal which spends the day in crevices about the eaves, or in chinks of the window sunshades, squeaking and quarrelling on a small scale with its neighbour, and at dusk sallies forth after mosquitos. With its wrinkled face and small peering eyes it is a type of the race, a very estimable, inoffensive, and humdrum race. Beyond this in their praise it would be affectation to go: their virtues are not of the striking sort. One feels grateful to them, of course, for their unostentatious labours

in keeping down mosquitos, small beetles, and flies, but Dr. George Smith could not make a biography out of them. No animal abhors the honest light of day more cordially than the common bat. Even *Lucifuga blatta*, the cockroach, will creep out from its hiding place under the table when it smells that the lid has been left off the butter-dish; and as for the owl, that bird of night, I never saw one yet, any hour of the twenty four, which had not a very large round eye fixed on me. But a bat in day-light feels worse than Hercules when he put on the coat with which his spouse presented him and suffered prickly heat. The prophet who says that the people will cast their idoles to the moles and to the bats must have been a naturalist. Nature furnishes no more striking figure. Terminus and priapus will lie neglected and half buried in the earth, obstructing the burrowing mole, while the Lares and Penates will be put away with other rubbish in some old lumber room or garret, heavy with the smell of long-unmolested bats.

Catching bats with a butterfly-net and examining them is a good pastime for cold weather evenings. There are more kinds of them than I can tell the use of, small ones and smaller ones, largish ones with yellow breasts, pug-nosed ones and others with more prominent snouts, some thick and podgy, and one slim fellow with wings so long they have to be folded a dozen times, more or less, before the animal can accommodate them about its person. This last is the one which you sometimes see shooting through the sky at express speed, chattering to itself in a shrill key. It is not to be caught with butterfly-nets or any such gins.

But after all, what have we to do with these? Of all the wild-fowl included under the name of bats, the only one that really comes into the foreground of Indian life is the fruit bat or flying –fox. This animal has what I consider a handsome face, with large soft eyes, and would not be a bat at all but for two characteristic points, a strong batty smell and an insatiable craving for strife. Flying-foxes carry this last trait further than any others of the tribe. Considering that they spend the night filling their stomachs with indigestible green fruits, it is nothing strange that they should be dyspeptic and disagreeable by morning; the odd thing is that, in order to be within quarrelling distance of each other, they all must need sleep on one tree, generally a huge tamarind with accommodation for two or three hundred. Before a dozen have gathered there is a misunderstanding between two which want the uppermost branch.

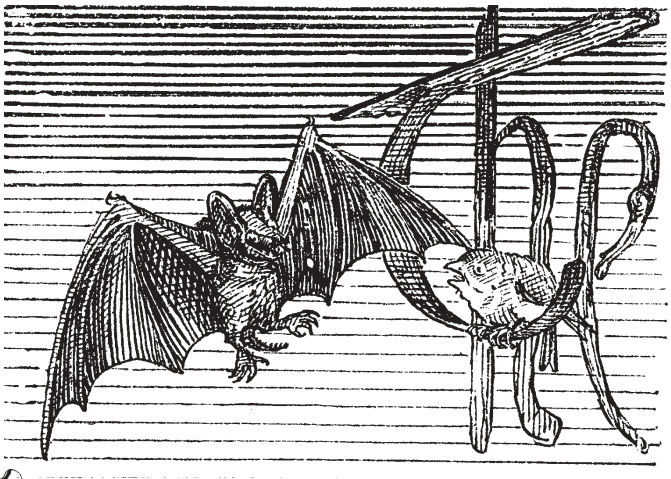
“That’s my place.” “I had it yesterday.” “You hadn’t”. “ I had. “ “You hadn’t.” “I had.” “Hands off.” “Whom are you shoving?” Mutual recriminations follow, and from words they proceed to blows. One is dislodged and flies round to the other side of the tree, where it is greeted by a chorus of the objectors, and three lose their hold. Then the brawl becomes general and ends in a regular *fracas.* As the sun grows hot they cool down a little, but the fire is only smouldering, and may break out again at any time. These wranglings often lead indeed to t he most scandalous scenes, as every one knows who has lived near a bat’s roosting tree. Such trees are not so common about Bombay as they are up country, because every Goanese cook plots against the life of the flying –fox.

The bat is one of the unclean birds mentioned in the 11th chapter of Leviticus, which the Jews were forbidden to eat, but Pedro rejoices in his Christian liberty, and reckons it second only to roast pig. He hankers after even the small fruit bat, that lesser edition of the flying-fox, which has such a *penchant* for the flowers of the plantain-tree. This animal is not a quarter of the size of the flying-fox, being only a foot and a half from tip to tip of the wings, consequently it is easily accommodated in a birdcage, and makes a pleasant pet. I once caught one with a net, as it was negotiating a guava to which it had no right, and in a short time it grew quite tame. When I presented a peeled plantain at the door of its cage it would travel along the wires, hanging by its feet and thumb-nails, and take the fruit out of my hand. Then it wrapped its wings round the plantain, and, beginning at one end, went steadily through it. The plantain was as big as itself, but capacity for food is one of the strong points of the whole bat family, and there was seldom anything left in the morning. During the day it enfolded itself in its wings and slept, hanging by one foot from the top of its cage.

Bats have one lovely virtue, and that is family affection. I shall never forget a captive family of demon bats which I once saw, the grim old papa, the mother perhaps a trifle more hideous, and the half-grown youngster, not quite able yet to provide for himself. There was something very touching in the tender attachment to one another of three such ill-omened objects. Fruit-bats, too, when they go foraging, never leave the baby at home. It clings to the mother’s breast, and she carries it wherever she goes. A humane friend of mine has communicated to me, for insertion here, a very affecting story of a bat which he found, prostrate and bleeding, with a mob of dastardly crows seeking its life. Running to the rescue, he lifted it up, and discovered, under its wings, a helpless little infant, which it was vainly trying to save from its ruthless persecutors. The pathos of the story comes to a head at the point where my humane friend, putting his hand into his trousers pocket, draws out two annas and gives them to a native lad, charging him to protect the poor creature and take it to a place of safety. No one who has any respect for his own feelings will press the matter further, and inquire what the native did when he had received the two annas and my humane friend was gone.

This story extracted as a Chapter from The Tribes on My Frontier. An Indian Naturalist’s Foreign Polia: W. Thacker & Co. 2, Creed Lane, E.C. Calcutta and Simla: Thacker, Spink & Co. 1909.

Book donated by Gordon McGregor Reid, Director, Chester Zoological and Botanical Gardens, sponsor of CCINSA and many other bat projects.



Wildlife Week Celebrations at JNV University, Jodhpur

Vijayakrishna Vantipalli*

Men love to wonder, in fact that is the seed of science. Many wondrous things exist in nature, among those are the chiropterans, the only true volant mammals with their enormous peculiar characteristics have been receiving the interests of all kinds of people. The number of bat species is reducing drastically due to various factors. Many threats that affect the survival of the species have been noted especially man-made threats like habitat destruction, urbanization, demolishing old buildings, killing for food medicine, etc. Conducting awareness programmes is very much needed. Protection of bat species has become a challenge in front of conservators and bat researchers. Destruction of wildlife disturbs the ecological balance or equilibrium resulting in severe consequences. By keeping these facts in mind and by the continuous encouragement from Zoo Outreach Organisation I have conducted awareness program entitled “Just bats! About bats!!” during Wildlife Week, 2002.

”Just bats! About bats!!” with convent students:
About 140 convent students participated in this programme. The students were divided them into 4 batches for convenience. Before starting the programme, I interacted with the students to know their opinion about bats like, "What is your pet animal? Why you like that animal? Do you like bats or not? (if no) Why don’t you like bats? If a bat enters your house, how you feel"?. The students expressed both positive and negative views like "Bats seem to be ugly, that’s why I don’t like them", "Bats make injuries with their claws, I fear of bats", "Bats enter our house and spoil the store room with their excreta. That’s why I don’t like bats". Then I explained the significance of bats and how they are helpful to the mankind by giving suitable and easy

Students examining the contents of the packets and wearing masks

examples. Many of the students were impressed by the insectivorous nature of bats. I explained how they help in controlling insect pests and told them wildlife stories. A few photographs of bats were shown to them. The students also participated with enthusiasm in a quiz competition. Small gifts (pens) were distributed to the winners along with the packets provided by Zoo Outreach Organisation. After the programme, some students asked me if I would conduct more such programs in future. This indicates that they were interested and learnt something about bats. I am sure they will remember this occasion. The bat packets worked well for educating these students. I am very thankful to Zoo Outreach Organization.

Videography of bats

Wildlife Week celebrations with zoology students of A.C. College
As a part of Wildlife Week celebrations a special lecture was delivered on “Wildlife Conservation with special reference to Chiropterans and their importance” at Post Graduate Department of Zoology, A.C. College, Guntur, Andhra Pradesh. 48 students and all the staff members participated in this programme. Bats, their impact on human society, Chiropteran species, status and their distribution, conservation societies and organizations and their activities, IUCN Red List criteria, Bat research: Past, Present and Future were discussed in this occasion. Later, a group discussion was conducted among participants on the present topic. Photographs of Mega and Micro chiropteran species and their different roosting sites were shown to participants. Sri. B.R. Rajabhushanam, Head of the Department of Zoology, commented in his speech that this type of programmes increases research aptitude among students.

I am very much thankful to Sri. B.R. Rajabhushanam for his presence, encouragement and valuable guidance. I am also thankful to all the staff members for being with us in this precious occasion.

*** Junior Research Fellow, Department of Zoology, JNV University, Jodhpur 342 001, Rajasthan.**

Bat Conservation Education Programme at Shimla

S.K. Sahoo*

"Conservation Himalayas" organised two Bat Awareness Camps at Shimla, one at the Balika Ashram at Durgapur, for girls and the other one at the Sarvodaya Bal Ashram at Shimla, for boys. Students from class 2 to 8 participated with enthusiasm in both camps. Class room 'Lesson Study' on basic information on bats, Bat Image Poster Exhibition and Educational Games on Bats were the activities conducted during the camps in both the institutions.

Through our bat image poster exhibition the students were made familiar with pictures of some of the frugivorous as well as insectivorous bats, different kinds of bat homes and bat foods. The lesson study involved teaching about bats through action and visual display of the bat-related information like, bat home types, bat face images, bats in feeding, sleeping, and flying actions. Besides this information, special emphasis was given on the importance of bats and the need to conserve them. Along with the oral presentation on bats, special power point slide shows with a LCD projector were organised for the boys group only. Because of the fact the students in both the institutions preferred presentations in Hindi, we took the help of a Hindi translator during the lesson study sessions.

The lesson study was followed by activities. The girl students enjoyed playing two games (Find Your Mate and Bat Rescue) as per the guidelines provided in the booklet of the Zoo Outreach Organisation. The boys also played two games, Find Your Mate and Play Bat. The Bat Educational Kit of the Zoo Outreach Organisation was given to each student. It was altogether a new experience for the participating students and they showed their interest to learn more about bats, and at the same time they pledged that they would do the best they could not only to educate others about bats but also to be involved actively to save the habitats of the bat species in and around their living place.

Students wearing masks and holding placards

Group photo

Students playing a game called Bat Rescue

Conservation Himalayas is taking this 'Batty Message' to all sections of the community in its forthcoming Bat Conservation Education Programmes in Himachal Pradesh, Chandigarh and Uttaranchal region.

*** Chairman, Conservation Himalayas, POB # 3, Summerhill, Shimla-5. E-mail: chimalayas@yahoo.com**

Earth Day celebration with Bats at MCBT

Gowri Shankar*

To create awareness about the role of bats in our ecosystem, Madras Crocodile Bank Trust (MCBT) conducted a programme for students from Panchayat Union Elementary School, Perianemmelli. The programme was conducted in the form of observation, discussions, talks, and survey of the bat population in the village. This programme was also conducted in order to observe the Earth Day on 22nd April 2003.

A preliminary survey was undertaken by the Education officer for possible bat roosting locations in the nearby villages. The local villagers have, in the past, seen thousands of bats roosting but that is of rare occurrence now. However, it was observed that few fruit bats were still seen roosting on a Banyan tree in Perianemmeli village about two km. from MCBT.

The programme started with a talk on bats, their biology, role in the ecosystem, myths and misconceptions, need for conservation etc. using the materials provided by Zoo Outreach Organisation, Coimbatore. Following an interactive discussion, the students were asked to observe the physical appearance, behaviour and food habits of bats. The sound made by the roosting bats was also noted by the students. While discussing the food habits, students were asked to locate bat droppings. But this turned out to be a difficult operation due to the presence of garbage and polythene bags under the tree. Instead, the students were asked to observe the droppings of insectivorous bats, which roost in their house roofs. This was given as a home assignment. After familiarizing themselves with the bat's behavior, the students also took a count of the roosting bats on the Banyan tree, in groups. About 400 bats were observed to be roosting on the Banyan tree.

Students looking at bats on a banyan tree

Group photo with students wearing bat masks

Education Officer, Gowri Shankar explaining how to use the masks to students

All the students actively participated in the programme and were happy to wear the masks provided in the Bat packets provided by Zoo Outreach Organisation. The programme concluded with an oath taking session to protect bats in future. About 68 students from standard V participated in the programme. The Education officer, Mr. Gowri Shankar conducted the programme with the help of Mr. Dhanasekaran, Librarian. MCBT is grateful to Zoo Outreach Organisation for providing materials for this programme.

***Education Officer, Madras Crocodile Bank Trust, Post Bag 4, Mamallapuram 603 104**

Bat Awareness and Conservation Camp at Guwahati

Feature article in *The Assam Tribune*, Tuesday, June 10, 2003

A "Bat Awareness and Conservation Camp" was organised in connection with World Environmental Day- 03, on 5th June. The programme was conducted beneath the Indian Flying Fox colony, which was located in the Kachari area Guwahati City of Assam for the first time in the city for the conservation of bat species which was sponsored by the North-east Voluntary Association for Rural Development (NEVARD) and Chiroptera Conservation and Information Network of South Asia (CCINSA).

The first session began with a seminar around 11:00 am. P.P. Changkakoti, DFO, East Kamrup division was the president of the seminar and R.D.S. Tanwar, Conservator of Forests, was the Chief Guest of the programme and he spoke about the role of bats in the welfare of mankind. A leaflet published from the Society was released for the occasion.

Mr. Ali, Secretary General, B.A.T., mentioned in his talk about the rapid decline of bat habitats and about the misconcepts that bat flesh can cure asthma.

As a last part of the seminar session, Imdad Ali, lecturer, department of Zoology, Rangia College, shared his views about the rich biodiversity of Northeast India and appealed to the gathering to come forward to research on vertebrates and invertebrate fauna to evaluate their status in the wild.

The second session was the interaction with the general public of the busy Mahathma Gandhi Road (MG-Road), beneath the roosting site by the society members and specially invited school children from Cotton Collegiate HS school. A survey conducted on that day, shows that 95% of our educated and un-educated people believe that bat flesh can cure asthma. The importance and usefulness of bats were explained to them.

Mr. Ali giving a lecture on bats to participants

Chief Guest of the function discoursing on conservation

Students wearing masks and holding placards on bats

***Secretary General, Biodiversity Assessment Troop (B.A.T.), 1 Bat House, B.N. College Road (W), P.O. Bidyaparas, Dhubri 783324, Assam**

Comments from our readers

Letter from Dr. C.M. Seth, I.F.S.
Managing Director, J&K State Forest Corporation

This is regarding the summary of a report on the status and conservation of bats. I have gone through the report. This is an excellent exercise for providing information and knowledge about bats and their importance in the ecosystem. I am sure that this report will help in removing several myths connected to bats.

Dr. G. Marimuthu, Scientific Chair, CCINSA gave a talk to the Young Student's Scientists Programme (YSSP) members at the American College, Madurai on the importance of bats and their role in the ecosystem. He also distributed the education packets on bats "Just Bats about Bats" and a poster on bats produced by Zoo Outreach Organisation. Many of the participants wrote back about what they felt about the packets and thanking the organisers for the same. Following are some of the comments:

N.E.Ganga, St, Josephs Matriculation HSS, Madurai
I am a young scientist from YSSP programme. We used to have guest lectures and one among the speakers was Dr. G. Marimuthu. He gave some interesting news about bats and also he gave a book published by your company. From this book we learnt about these special mammals, I thank you for publishing the book and sending to us.

K. Sowmini, Seethalakshmi Girls HSS, Madurai
Dr. G. Marimuthu gave us a special lecture and the edition of your book on bats. I had read your book and now, I know a lot of informations about bats. Especially in your book, I like the “Test Your Knowledge”, Do you Know?”, “Importance of Bats”, “How do bats help people” and “Myths About Bats”. I enjoyed by wearing the masks, reading “Know your Wildlife welfare ABCs” and so on. Please send me more books on the same.

R. Ambiga, AKNU S. Sundar Matriculation School, Madurai
The book which you provided us is very useful. Only after reading the book, I started noticing bats carefully. The book explains the usefulness of bats. The pamphlet is useful for me to know their habitats, habits, colour, food, etc. and more at astonishing facts. Thank you for providing such as useful book.

J. Dhanya, Kendriya Vidyalaya, Madurai
The booklet about bats was very interesting and nice. Page 7 of the booklet was nice because we can save not only the bats but also other animals in forests. Thank you very much for sending us the wonderful facts about bats.

P. Shibani, A 25/1, Pandian Aprmts, Anna Nagar, Madurai
I thank you very much for showing us the different species of bats. This session has helped us very much. I have listed out a few.

a) It has enriched our knowledge about the habits of bats.
b) It has kindled our interest about bats
c) We learnt that fruit-eating bats are also present
d) We learnt many interesting facts about the characteristics of bats.

G. Vasanth Jeevana, 27, S.S. Colony, Madurai
The special lecture about the bats was most interesting. From childhood. I always had a special interest in bats. I always like anything connected with bats, movies, books and so I enjoyed the lecture given by Dr. G Marimuthu. I would be happy if you could send more information about bats.

J. Karthik, 2F/9 Gandi Nagar, Behird union office, Madurai
I am very happy to learn about bats through respected Dr. Marimuthu who gave a guest lecture about bats through YSSP programme. After this we have changed our thinking about bats, and now it the duty of me and my friends to save bats. The materials given by you is good and informative. Thank you for your work on saving Bats.

C. Arumugam, 3rd street, Madurai
I enjoyed the talk and gained a lot of knowledge on bats from the information packet “Just bats! About bats!”
All the 9 items in this bag is really exciting and informative to all the students at this “Young Students Scientist’s Programme” held at the American College. Please give bags about other animals also.

P.M.Senthil Naathan, 4/119, Sourashtra purum, Madurai
I am very much enjoyed the lecture of Mr. Marimuthu. He told us about bats and their habits, we were much interested in his speech. We wanted to know more details about bats, but there was not enough time. We want to know about some rare species of Bats and other rare birds. We also collected the Bats cover. It was very interesting.

N. Pradeep Kumar, Sri Sundereswara Vidyalaya, Madurai.
We are happy to go through the bats programme. We learnt that are different types of bats in the world and that they are well adapted to survive. We need more information on bats. The gift packet on bats was very useful to us.

S. Shanmugham, Atthampatti, Vadakkadu, Mallasamudram P.O. Kaundamkondai, Namakkal 637503 (in Tamil)
I had participated in the lecture given by Dr. G. Marimuthu at the P.S.G. Arts and Science college, Coimbatore. During your session, you had given us a bat mask and a booklet which I found very useful. By reading the book, I got to learn a lot about bats. I use the mask to play with and even made some children laugh by wearing the mask. I want to thank you very much for providing us the same.

Earth Day – 2003 : Awareness Camp for Children on Conservation of Bats

Jessie Jeyakaran

A one-day awareness camp for 50 children from Madurai and Dindigul on protecting animals such as bats was conducted on 22nd May 2003 at Dindigul, jointly by the CSI Diaconal Ministry with the Chiroptera Conservation Information Network of South Asia (CCINSA), the Zoo Outreach Organisation of Coimbatore and the CEDA Trust Dindigul at Dudley School Campus, Dindigul. These children are from villages where the CEDA Trust and the ECO project of the Madurai Diocese operate.

The children arrived at the Dudley School campus in the morning and went to Ayyalur a village 30 kilometres north of Dindigul to see a large group of fruit-eating bats, which are living in the biggest Banyan tree nearby. The children watched the thousands of bats with awe and were provided information on the ecological importance of such animals from resource persons such as Mrs. Jessie Jeyakaran of the CSI Ecological Committee and Mrs. Rathna who accompanied the children as guides.

The children returned with exciting experience and with the determination of conserving nature and animals. They were further provided with valuable information by Mr. Bharadidasan, founder of the Dindigul Nature Conservation Society, Prof. Dr. Prabhakaran Victor from the Heber College, Trichy and Mrs. Jessie Jeyakaran, Board Member of CSI-DM herself the Education Committee and Member of the International Union of Conservation of Nature IUCN, were the guides to these children in encouraging the children in reaching for knowledge.

The children also participated in competitions an prizes were distributed to them. The occasion was felicitated by the Rev. Dr. Samuel Soundara Pandian the Chairperson of the North Local Council of the Diocese of Madurai and the Rev. Chandra Mohan from the Diaconal Ministry.

Activity session holding mini-placards.

Cultural programme. Dancing with bats.

It was decided that such informative awareness programmes on protecting the nature and useful animals like bats should be given priority in trainings to be conducted to the congregations and school leaders for their networking with those who are already in the ministry of environmental protection.

***O.C.P.M. Girls Higher Secondary School, Madurai**

World Environment Day for National Green Corps, Madurai, highlights bats

Jessie Jeyakaran

World Environment Day celebrated for "Protection of Bats and Primates" on 5th June 2003 with eco-club students of 100 schools of National Green Corps

The World Environment Day on 5th June 2003 was celebrated and the concept "Protection of Bats " particularly was highlighted to the eco-club students (Std VII & IX) of 100 schools under National Green Corps, Madurai District. The eco-club came to OCPM Gr. Hr. Sec. School, Madurai at 9.00 am on 5 June for the programme. The day's programme was explained by the first author who is the coordinator of the programme. The first 50 students were sent to a separate room, where Dr. Marimuthu, Head of the Department of Animal Behavior, Madurai Kamaraj University briefed them about the bats with slides. Simultaneously, Rtd. Prof. Stanely Moses briefed on primates.

After an hour, the students gathered at a common place and shared what they had learned with one another. Bat education packets and also primate materials from Zoo Outreach Organisation were distributed. First author, Prof. Stanley Moses and Dr. Prabakaran took the sessions with the kit provided. Drawing competition on primates and competence test from Bat packets were conducted and the best three from each group won the prize. Both the groups performed the cultural programmes with the masks.

Participants left the campus joyously with a decision to protect bats and primates with the following outcome.

- Students confessed to killing the young bats and encouraging elders to shoot grown-up bats for their food.
- Students took an oath to share their experience with classmates, friends and at home.
- The myths about bats were broken.

Participants observing thousands of fruit bats in the Banyan tree at Ayylaur.

Group photo in front of the Banyan bat tree at Ayylaur.

Training in Ecological Field Techniques, Taxonomy, Captivity and Public Education for South Asian Chiroptera

Chiroptera Conservation and Information Network of South Asia CCINSA & IUCN SSC CSG
College of Forestry, Kerala Agricultural University, Thrissur – 28 Jul – 1 Aug, 2003

Another training workshop, after a long two years! The first was held at Madurai Kamaraj University, School of Biological Sciences, ably led by Dr. Paul Bates from U.K. and assisted by Dr. M. S. Pradhan and Dr. Y. P. Sinha from India. The workshop focused on general field techniques and taxonomy with a session on the IUCN Red List and the C.A.M.P. Workshop Process. A healthy group of batters attended and appreciated the workshop a great deal.

Since the workshop we have conducted a South Asian Regional Conservation Assessment and Management Plan Workshop (C.A.M.P.) for all species of South Asian Chiroptera and lobbied very seriously to get fruit bats off the Vermin (Schedule V) List of the Wildlife Protection Act. In pursuing the latter objective, we learned from the Ministry officials that they required scientific evidence that fruit bats were useful in India! Therefore, it seemed a good time to start promoting ecological field studies, which could turn up evidence of the tremendous positive impact both fruit and insectivorous bats have on the ecosystem. Such studies exist elsewhere but there are none so far in India. Some are ongoing currently but many, many more studies are required, both ecological as well as population, distribution, etc. We have also added captive management and public education to this workshop.

Another difference in this training and the first is that we will have a number of participants from outside India. We welcome bat biologists from Sri Lanka and Bangaladesh. It is a great satisfaction to help the surrounding countries build up their community of bat scientists.

We welcome our resource persons from abroad, Dr. Paul Racey, Chair of the SSC IUCN Chiroptera Specialist Group which CCINSA proudly represents in South Asia; James Andrewes who takes care of the bats at Chester Zoo, our network and workshop sponsor; and from India -- M. S. Pradhan, Y. P. Sinha, P. O. Nameer, and Sally Walker. For those of you who have not met Paul and James, a short write-up is below.

We had an overwhelming response to this workshop. If you did not get a seat in this training course, you will be prioritised for the next course which will take place next year.

Welcome External Resource Persons

DR. PAUL RACEY is Regius Professor of Natural History in the Department of Zoology, Aberdeen University, Scotland, E-mail: p.racey@abdn.ac.uk.
He is proud of the fact that he is the ONLY Regius Professor of Natural History in the world. No other university has this post !

Dr. Racey is Co-Chair of the SSC IUCN Chiroptera Specialist Group and an active bat researcher. He is active on many committees, including the Council of the London Zoological Society and the Inspection team for Laboratory Animals, etc.

Paul's summary of his current activities follows : "Bats are the most important contributors to Britain's mammalian biodiversity and although their roosts are protected, this is of limited value in maintaining bat populations if foraging habitats are being lost. Present knowledge of such habitats and the extent to which bat species adapt their foraging patterns to changes in land use is inadequate, and my group is addressing this throughout the UK and in mainland Europe. I am also increasing my involvement in ecological studies of tropical bats, and the relationship between ecological research and government wildlifepolicy

... continued on next page

MR. JAMES ANDREWES is a zookeeper at Chester Zoo, UK. I was born 20th March 1968 in London, but lived in Cheshire since late 1970's. I have had a lifelong fascination with natural history, mainly manifesting itself in birdspotting tendencies, birds being more readily accessible than most other animals in UK. I'm getting more into mammal-watching with trips up to Scotland looking for Otters, Martens, etc.

After A-levels I went to Farnborough College of Technology to study Conservation Management. I've been working at the Zoo since 1986, first as a summer job in the stores department, then with Giraffes and other hoofstock in 1997, and moving on to Fruit Bats the following year up to now. In addition to caring for animals, I show visiting dignitaries around the place, particularly the Twilight Zone which houses "my" Bats. Running in tandem with this is my continued interest in all things feathered, furred, scaled etc, in UK. I attended a bat-detector workshop recently. I was lucky enough to see Tent-making, Northern Ghost and Greater False Vampire Bats during a visit to Costa Rica.

... contiued from previous page

Specific major projects of Paul Racey are:

(a) Testing the wildlife corridors hypothesis

Wildlife corridors have been widely promulgated by land managers in advance of formal proof of their value. Although the results of the first National Bat Habitat survey indicate the importance of linear landscape features and connectance between the habitats in which they feed, reports of the use of vegetation corridors by wildlife including bats, lack statistical rigour. This project involves automatic recording to test the hypothesis that bats move between occupied and vacant habitats along vegetation corridors.

(b) Gleaning as a foraging strategy in *Myotis nattereri*

To test the hypothesis that Natterer's bats do not switch off echolocation when gleaning and this affects where and on which arthropods they forage.

(c) The effect of eutrophication on Daubenton's bat, *Myotis daubentonii*

Using the natural laboratory of our study area which contains both oligotrophic and eutrophic rivers, we are testing the hypothesis that eutrophication is responsible for the increase in numbers of Daubenton's bats throughout Europe.

(d) Genetic variation in European bats particularly *Pipistrellus* and *Myotis*

In collaboration with Elizabeth Barratt (Institute of Zoology) and Gareth Jones (University of Bristol) this project has confirmed that the two phonic types of the pipistrelle are sibling species, and has thus added a new bat species to the European list. It continues to investigate genetic substructuring and patterns of gene flow in the two pipistrelle species, and is now accumulating data on the genetic structure of British populations of Natterer's bats.

(e) The ecology and roosting behaviour of the Noctule bat *Nyctalus noctula*

To investigate why this species prefers to roost in tree holes rather than in the roof spaces of houses.

(f) The role of fruit bats as pollinators and seed dispersers of tropical forests

To test the hypothesis that fruit bats are keystone species in tropical forests, work is in progress in Southern Madagascar and Thailand. The work in Madagascar also involves a nationwide survey of the roosts of the three endemic Megachiroptera, supported by the Darwin Initiative.

(g) The effect of different logging regimens on bat community structure and ecology

This project is supported by The Leverhulme Trust and will begin in June 2000 in Trinidad.

Training in Field Techniques for Ecological Studies, Captive Management and Public Education for Chiroptera Conservation

28 July - 1 August, 2003

CCINSA

Objectives of the field techniques workshop

- To convey practical field techniques for use for ecological studies
- To reinforce and improve handling, field and lab techniques for scientific studies
- To teach captive management and welfare of bats as well as educational techniques for reaching the public
- To discuss future directions and activities of the network in collaboration with the Chiroptera Specialist Group.

***Sponsored* by the Chester Zoological Gardens**

ZOOLOGICAL GARDENS CHESTER

***Hosted* by the College of Forestry, Kerala Agricultural University, Thrissur, Kerala**

***Organised* by the *Chiroptera Conservation and Information Network of South Asia (CCINSA)* representing IUCN SSC Chiroptera Specialist Group in South Asia**

Conservation Breeding Specialist Group (CBSG), South Asia

Reintroduction Specialist Group, S & E Asia

Zoo Outreach Organisation (ZOO)
Wildlife Information Liaison Development Society (WILD)

Training in Ecological Field Techniques, Taxonomy, Captivity and Education for S Asian Chiroptera

Chiroptera Conservation and Information Network of South Asia CCINSA & IUCN SSC CSG
College of Forestry, Kerala Agricultural University, Thrissur – 28 Jul – 1 Aug, 2003

AGENDA (Flexible)

27 Jul, Sun -- Day 0 **Arrival and settling in** — All Participants, Dinner in Thrissur

28 Jul, Mon -- Day 1

Inaugural
Lecture session*: Paul Racey, Chair, IUCN SSC Chiroptera Specialist Group
CATCHING Bats Why? Survey? Habitat Preferences?
Seasonality of Reproduction?

(i) ground mist nets
(ii) harp traps
(iii) sub-canopy nets
iv) flick nets and other hand-held net
(v) safe removal of bats from nets
  a) gloves,
  b) crochet hooks
  c) getting bitten
  d) first aid kits*

* Note : Lecture sessions will probably be held from mid-morning till late afternoon and even into the evening, daily. Lecture sessions will be punctuated by tea, lunch, hands-on demonstrations, field visits and question sessions. Field visits will be decided on site on the basis of species sought, climate, and other practical factors. Lab sessions may be during the night hours.

29 Jul, Tue -- Day 2

Lecture session: Paul Racey, Chair, CSG
EXAMINING CAUGHT BATS

(i) welfare issues
(ii) identification, use of keys, taking skin samples for DNA analysis
(iii) reproductive status
(iv) age
(v) recording data
(vi) collecting pollen and faeces

30 Jul, Wed -- Day 3

Lecture session:Paul Racey, Chair, CSG
DIETARY STUDIES – INCLUDING ROLE OF BATS AS POLLINATORS & SEED DISPERSERS

(i) collecting feeding remains from frugivores
  a) seed “traps” around fruiting trees
  b) “traps” at roosts
  c) “traps” beneath feeding perches
(ii) faecal analysis
  a) insectivores
  b) frugivores. Pollen viability tests
(iii) seed germination studies
(iv) chemical analysis of fruit

FORAGING BEHAVIOUR

(i) Cyalume lights
(ii) reflective tape on rings
(iii) radio-tracking

31 Jul, Thur -- Day 4

Lecture session: Paul Racey, Chair, CSG
IDENTIFYING BATS FROM ECHOLOCATION CALLS
James Andrewes, Chester Zoological Gardens
CAPTIVE MAINTENANCE AND BREEDING OF CHIROPTERA
Sally Walker, Convenor, CCINSA
EDUCATION FOR PUBLIC SUPPORT OF CHIROPTERA - Interactive Discussion

1 Aug, Fri -- Day 5

Paul Racey, P.O. Nameer and others
PICK UP UNATTENDED TOPICS, DEMONSTRATIONS & PRESENTATIONS
QUESTIONS AND ANSWERS; ROUNDING OFF and LEAVING
Closing and leaving

Letter to the Editor

First of all I like to convey my best wishes to you and all the members of CCINSA & CSG and ZOO for a happy and prosperous New Year.

I have received your letter dated 27-12-02 alongwith a copy of the Report of CAMPS workshop for 123 species of South Asian Chiroptera. I am sure that the report will guide the policy makers suitably in various decision making.

I do not find any meaning of using generalized term like "Fruit Bats" 'Rats" or 'Mice' under any schedule of IWPA. All these terms include a large range of species and as C.A.M.P. workshop pointed out some of their decision inclusion in the higher category of schedule. In fact, *Latidens salimalii* is a Fruit Bat and is included in Schedule I. Inclusion of 'Fruit Bats' in Schedule V and *L. Salimalii* in I is really a fallacy.

It is now well-understood that Chiropteran and Rodent species play most important roles in many ecosystems. Some of the bat species are even considered as key stone species in Caverni Colous and rain forest ecosystems.

However, during my recent field work in Rajasthan, I have seen thousand of bat specimen are killed or dispersed from their roosts for the sake of cleaning or beautification. Prior to such operation, no one bothers about their identification or role in the surroundings ecosystems. Such operation even gets support from the Government. I am really glad to note that C.A.M.P. workshops are seriously trying to identify species which are apparently less charismatic but significant and under serious threat.

I think inclusion of a species in the higher schedule of IWPA or Appendix of CITES will not be sufficient for its survival. Many of the threatened species of Chiroptera, Rodentia and Insectivora lie outside the protected or conserved areas. Our country is still lacking infrastructure as well as people's awareness for implementation of conservation practices outside the conservation areas.

Conservation includes sustainable use. But in our system of conservation, principle of sustainable use is totally ignored. In most of the conservation practices, common people are being deprived from their traditional rights resulting conflicts and apathy. There should be rational thinking about the transfer of benefits resulting from conservation programme to the common people.

Many species of bats and rats are used to fulfill the protein requirement of tribal communities. They are also required for various experimental purposes. Inclusion of "Fruit Bats" or "Rats" in V of IWPA resulted severe legal complication for much users. On the other hand, thousands of them are being killed by the support of the Government in the name of Pest Management! It is expected that in future C.A.M.P. will take necessary care about much dual policies and guide the policy makers to act really for the cause of conservation.

Dr. Sujit Chakraborty*
10. 01. 2003

Drawings: Arnab Roy, Z.O.O.

*** Service (Retd.), Zoological Survey of India, IA-28, Sector-III, Bidhan Nagar, Kolkata 700 097, West Bengal**

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Editor: Sally Walker
Assistant Editor: Padma Priya
Technical Advisors: G. Marimuthu, Sanjay Molur, B. A. Daniel

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.
G. Marimuthu: Scientific Chair
Sally Walker: Convenor and Administrative Chair
Red List Advisor: Sanjay Molur
Research Associate: Padma Priya

IUCN SSC Chiroptera Specialist Group of South Asia CSG-SA

CSG-SA represents the IUCN SSC Chiroptera Specialist Group in the region of South Asia. CSG-SA uses 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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CCINSA, CSG-SA, and BATNET are funded by the Chester Zoo Conservation Fund. Chester Zoo, which has an excellent facility for exhibition and breeding of bats and an active conservation interest in chiroptera is located in Upton on Chester in England and administered by the North of England Zoological Society.

CCINSA is an activity of Zoo Outreach Organisation (ZOO) and Wildlife Information Liaison Development (WILD) in association with CBSG, India and CBSG, South Asia.

For communication write to
CCINSA, c/o Zoo Outreach Organisation
Box 1683, 29 First Cross, Bharati Colony, Peelamedu
Coimbatore 641 004 TN India

Phone 91 422 2563 159
Fax 91 422 2563 269
Email zooreach@vsnl.com
Website http:\\www.zooreach.org