Small Mammal Mail

Newsletter celebrating the most useful yet most neglected Mammals

for CCINSA & RISCINSA -- Chiroptera, Rodent, Insectivore, & Scandens
Conservation and Information Networks of South Asia

Volume 2 Number 1 **Jan-Jun 2010**

Contents

Will Fruit Bats be delisted as Vermin on the Indian Wildlife Protection Act in the International Year of Biodiversity? If not now, when?, Pp. 2-5

Small mammals survey in Bhutan, Tenzin, Pp. 6-8

A Note on Feeding Habits of Fruit Bats in Colaba, Urban Mumbai, India, J. Patrick David and Vidyadhar Atkore, P. 9

Training Report on Bat Capture, Handling and Species Identification, Manjit Bist, Pp. 10-11

Training Workshops in South Asia, Pp. 12-15

An Updated Checklist of valid bat species of Nepal, Sanjan Thapa, Pp. 16-17

Field Notes on albinism in Five-striped Palm Squirrel *Funambulus pennanti* Wroughton from Udaipur, Rajasthan, India, Satya Prakash Mehra, Narayan Singh Kharwar, Partap Singh, P. 18

Short Report on First One-day National Seminar on Small Mammals Issues, Sagar Dahal and Suchita Shrestha, P. 19-21

Radio awareness Programme, Sanjan Thapa, P. 21

Report on field study at Nagarjuna Cave by SMC RF research team, Rameshwor Ghimire, Robin Rana, Narayan Lamichhane, Kastuv Raj Neupane, Sanjan Thapa, Pp. 22-23

Status survey and conservation education: community participation to protect bats in Thar Desert, India, K. R. Senacha, Pp. 24-30

Bat Conservation begins in Pakistan, Muhammad Mahmood-ul-Hassan, Pp. 31-32

Research and Conservation Awareness of Bats in Palpa District of Nepal, Hari Adhikari and Laxmi Karki, Pp. 33-35

New Network Members

CCINSA

Mr. Manjit Bista
Student, Institute of Forestry, Pokhara, Nepal
mister_manz@yahoo.com, uniquelad@hotmail.com

Mr. Muhammad Asif Khan
Research Associate, Pakistan Museum of Natural History, Zoological Sciences Division, Islamabad, Pakistan
masifzai@gmail.com, masifzai@hotmail.com

RISCINSA

Mr. Muhammad Asif Khan
Research Associate, Pakistan Museum of Natural History, Zoological Sciences Division, Islamabad, Pakistan
masifzai@gmail.com, masifzai@hotmail.com

In CCINSA and RISCINA we have never passed a period of six months (and actually it is now eight months) between newsletters and had so few new members. Either we have everybody who is interested in bats and rats already a member (VERY unlikely) or we have lost our reach into the academic and nature study institutions that have provided our current collection of members. I hope we haven't lost "our touch" to satisfy some of the needs of batty and ratty scholars and enthusiasts. Please let us know if there is something we can do to improve that doesn't cost money.

We had not mentioned before but we lost over half our funding about 3 years ago when the economy plummeted around the world, and our donors have not recovered. Be that as it may we have still brought out SMM and also conducted a training in some South Asian county every year. This year we don't have funds to go outside of India or bring anyone here so, our own Dr. Sanjay Molur, who today (really and truly) had his Viva to obtain a Ph.D. with a thesis on bats and rats. He won't get the letter confirming before we go to press so ... if we are wrong about the **Dr.** in Sanjay Molur, we are sorrier than anybody! See you next issue with a summary of his thesis! Sally Walker, Editor, SMM

Editorial: Battle to end a National Disgrace

Will Fruit Bats be delisted as Vermin on the Indian Wildlife Protection Act in the International Year of Biodiversity? If not now, when?

2010 is the International Year of Biodiversity but misguided and inaccurate beliefs and lobbying, ostensibly on behalf of agriculture, have been winning a battle between science and super-stition, a war that has been polightly waged since the Wildlife (Protection) Act listed Bats as Vermin (Schedule V) on the Act (1972).

Agriculturists and farmers do not gain from this Act, they lose, along with the rest of us by the loss of wild plant biodiversity that actually is enhanced by fruit bats as they eat and disburse seeds of wild fruit throughout landscapes.

Classified as Vermin in the Act, bats can be captured, bought and sold, and killed legally without penalty. They are used for food by a significant number of people, the single meal a poor substitute for a lifetime of the useful activities of a bat.

For at least 3 decades, individuals and institutions around India and even abroad, who understand and appreciate fruit bats for their crucial role in nature, have been waging passionate campaigns with the concerned ministry (first, Ministry of Agriculture, DoEF, and later MoEF) to remove Fruit Bats from Schedule V, Vermin category of the Wildlife (Protection) Act.

The number of people who have approached government on the issue are too numerous to name. The primary instrument for keeping this campaign alive has been Dr. G. Marimuthu, Professor & Head, Department of Animal Behaviour & Physiology**,** Center for Excellence in Genomic Sciences**,** School of Biological Sciences**,** Madurai Kamaraj University, Madurai who has been a student and researcher of bats his whole academic career. Dr. Marimuthu was the first Chair of our bat network, CCINSA, Chiroptera Conservation and Information Network of South Asia and served as such for many years.

For years, those of us associated with CCINSA have pursued this noble cause, requesting government to release fruit bats from Schedule V, with small success. After one fruit bat had been declared threatened by IUCN and listed on the IUCN Red List, it was delisted from the Act but leaving over a dozen fruit bats taxa as "Vermin".

The primary reason fruit bats were listed as vermin in the first instant is that it was believed that they were highly destructive to agricultural crops, primarily fruit. Chiroptera specialists from different countries throughout the world have studied fruit bats and claim the amount of fruit taken is not significant but the return of a small investment is very high. Fruit bats defecate the seeds which are scattered over a wide area and then germinate. It has been proven also through research that the defecated seeds actually germinate faster than seeds which are planted!

A government officer from MoEF informed several years ago that government would pay more attention if hard evidence in the form of published research articles were produced, confirming the utility of fruit bats. CCINSA wrote letters to government and sent copies of such published articles from other parts of Asia but then were told that government would not accept these as sufficient evidence. They would want to know it was a fact ***in India*** before changing legislation.

Recently, July 5, 2010, a letter (see page 3) was written by Dr. Marimuthu and the Chair of the Bat Specialist Group, Dr. Paul Racey, Retd. Professor, University of Aberdeen, and sent to the Joint Secretary, Ministry of Environment and Forests, Government of India, again calling attention to the fact of such ecologically useful animals being classified as Vermin and a succinct summing up of research conducted in India and, in fact, funded by the Government of India. It establishing that ten of the 13 species of fruit bats listed in Schedule V, live in forests and feed on wild fruits without even visiting commercial fruit orchards. Moreover they disperse the seeds of wild fruit, aiding in the regeneration of forests. Of the three species that visit commercial orchards, it is shown that they prefer the non-commercial varieties of fruit and can be lured away from commercial fruits if farmers plant "trap crops" of wild fruit trees; they also pollinate and disburse seeds of other commercially important plants. These facts are backed up by published articles from India which are listed along with abstracts in the boxes below. Dr. Marimuthu has oriented some of the research in his institute towards this goal and these articles are the first of many yet to come.

It is laudable that Dr. Marimuthu and other scientists are conducting research to prove the economic utility of fruit bats, but in the meantime, despite the evidence of their positive contribution to biodiversity which has been well established, fruit bats are declining in numbers because there is no law to protect them, only legislation to secure their demise and contribute to their ultimate extinction, Happy IYB!

This is not what legislation is for ... it is a misuse of legislation based on ignorance or, perhaps worse - knowing that government now knows the facts, apathy. ***Sally Walker, Editor, SMM***

Letter to Ministry of Environment and Forests, Government from Dr. G. Marimuthu, and Dr. Paul Racey

Species Survival Commission
The Innovation Centre
University of Bath
Carpenter House, First Floor
Broad Quay, Bath, BA1 1UD
United Kingdom

Tel: ++44 (1225) 388 501
simon.stuart@iucn.org
www.iucn.org/species

Bat Specialist Group, SSC IUCN

July 05, 2010

Mr . Hem Pande, Joint Secretary,
Ministry of Environment and Forests,
Government of India, Paryavaran Bhavan,
CGO Complex, New Delhi -110003,
India

Subject: Request to remove the designation of "vermin" from fruit bats

Dear Mr Pande

With a single exception, all 13 species of fruit bats living in India, are classified in the Wildlife (Protection) Act as "vermin". However, research funded by the Government of India has revealed that ten of these species are forest dwellers, feeding on wild fruits, dispersing their seed widely and thus making a significant contribution to forest regeneration. They do not visit commercial fruit orchards.

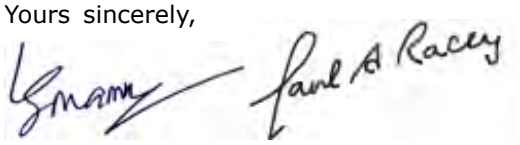
The research has also shown that only three species of fruit bats do so, but that they actually prefer non-commercial fruit! These species are *Pteropus giganteus*, *Rousettus leschenaultii* and *Cynopterus sphinx* and they can be attracted away from commercial fruits by planting trap crops (a paper published during the year 2006 in Acta Chiropterologica is enclosed). Moreover, they pollinate and disperse the seeds of commercially important plants such as pettai, mahua and kapok.

We have reviewed the evidence upon which our statements are based in a paper (enclosed) published last year in the international conservation journal *Oryx*.

India is the only country in the world which continues to refer to its fruit bats as vermin. The Year of Biodiversity is an appropriate time for the Government of India to consider removing the designation of "vermin" from fruit bats in general, allowing the possibility of a derogation for fruit farmers experiencing the occasional instance of serious damage to their commercial fruit.

We look forward to your reply and timely action

Yours sincerely,



Prof G. Marimuthu, Head & Chairperson, Department of Animal Behaviour & Physiology, School of Biological Sciences, Madurai Kamaraj University, Madurai 625 021, Tamil Nadu, India. (mailbox_gm@rediffmail.co, emailboxgm@gmail.com)

Prof P. A. Racey, Co-Chair, Bat Specialist Group, IUCN Species Survival Commission; Vice-Chairman, Fauna & Flora International; School of Biological Sciences, University of Aberdeen, Tillydrone Avenue, Aberdeen AB24 2TZ, U.K. (p.racey@abdn.ac.uk)

SSC
Species Survival Commission
INTERNATIONAL UNION FOR CONSERVATION OF NATURE

Do fruit bats deserve to be listed as vermin in the Indian Wildlife (Protection) & Amendments Act? A critical review

Natarajan Singaravelan[1], Ganapathy Marimuthu[2] and Paul A. Racey[3]

Abstract

Of the 13 species of fruit bats occurring in India, the Indian flying fox *Pteropus giganteus*, the dog-faced fruit bat *Rousettus leschenaultii* and the greater short-nosed fruit bat *Cynopterus sphinx* are distributed throughout the country. They usually live in trees (*P. giganteus*), temples and caves (*R. leschenaultii*) and foliage (*C. sphinx*) and feed on fruits such as fig Ficus spp., Singapore cherry *Muntingia calabura*, Indian almond *Terminalia catappa*, mango *Mangifera indica*, guava *Psidium guajava* as well as leaves, nectar and pollen. The other 10 species live at sea level and at altitudes of .2,000 m and their distribution and foraging activities may be restricted mainly to forests. Two of them, the Nicobar flying fox *Pteropus faunulus* and Salim Ali's fruit bat *Latidens salimalii* are endemic. Although details of their foraging activity are poorly known, there is no evidence that they visit commercial fruit orchards. They feed on wild fruits and disperse seeds widely, contributing to forest regeneration. Although *P. giganteus*, *R. leschenaultii* and *C. sphinx* feed on commercial fruits, their role in pollination and seed dispersal of economically important plants such as kapok, *Ceiba pentandra*, mahua, *Bassia latifolia* and petai *Parkia spp*. is important. Sacrificial crops such as *M. calabura* can be used at orchards to reduce the damage bats cause to commercial fruit. Because the ecological services provided by bats are not appreciated by the public and conservation planners, all fruit bat species with one exception are still categorized as vermin and included as such in Schedule V of the Indian Wildlife (Protection) Act, 1972 and amended Acts. It is now appropriate for the Government of India to revisit this issue and consider removing these pollinators and seed dispersers from the list of vermin in the Wildlife (Protection) Act.

Keywords:

Conservation policy, fruit bats, India, pollination, seed dispersal, vermin, Wildlife Amended Acts

Source:

2009 Fauna & Flora International, *Oryx*, 43(4), 608–613

[1]Department of Biology, University of Haifa at Oranim, Tivon 36006, Israel

[2]Department of Animal Behaviour and Physiology, School of Biological Sciences, Madurai Kamaraj University, Madurai 625 021, India. E-mail: gmari@sancharnet.in

[3]School of Biological Sciences, University of Aberdeen, Tillydrone Avenue, Aberdeen, AB24 2TZ, UK.E-mail p.racey@abdn.ac.uk

Muntingia calabura — an attractive food plant of *Cynopterus sphinx* — deserves planting to lessen orchard damage

Natarajan Singaravelan[1] *and Ganapathy Marimuthu*[2]

Abstract

Even though megachiropteran bats in the Old World tropics feed chiefly upon fruits, flowers and nectar produced by wild plant species, they occasionally feed on commercial fruit crops as well. Therefore, the public frequently views these generally ecologically beneficial megachiropterans in a negative light due to the potential for damage to crops (Fujita and Tuttle, 1991; Mickleburgh *et al.,* 2002). Large-scale cultivation of commercial fruits frequently leads to conflicts between fruit growers and bats in countries like Australia (Loebel and Sanewski, 1987; Tidemann *et al*., 1997), Israel (Moran and Keidar, 1993), South Africa (Jacobsen and DuPlessis, 1976), and Malaysia and Indonesia (Fujita, 1988). The most serious conflict occurs where the supply of native fruits is reduced through habitat loss, forcing bats to feed on commercial fruits (Fleming and Robinson, 1987; Tidemann and Nelson, 1987). Fruit bats and farmers in India are also subjected to such conflicts. The short-nosed fruit bat, *Cynopterus sphinx* (Chiroptera: Pteropodidae), is one of the most common of the 14 mega chiropterans on the Indian subcontinent (Bates and Harrison, 1997). Its dietary breadth is known to include not only commercial fruits like mango, guava, sapota and grape berries (Bhat, 1994; Bates and Harrison, 1997; Rajan *et. al*., 1999), but also non-commercial fruits such as Ficus spp., Calophyllum inophyllum and Coccinia indica (Elangovan *et al*., 1999). In addition, C. sphinx feeds upon the leaves of C. indica, Cassis fistula and Mimusops elengi (Elangoven *et al*., 2001). Of the 14 species of pteropodid bats that are found in India, *Cynopterus sphinx* receives most of the blame for causing damage to commercial fruit crops. We observed the number of visits made by *C. sphinx* to four species of commercial fruits in orchards (*Mangifera indica*, *Achras sapota*, *Psidium guajava* and *Vitis vinifera*), and four species of wild/non-commercial fruits (*Muntingia calabura*, *Ficus bengalensis*, *F. religiosa* and *Bassia latifolia*) in suburban areas. The total number of bat visits to *M. calabura* was significantly greater than to all other fruit species. The range of percentages of total nightly bat visits was from as low as 5% (*V. vinifera*) to 47% (*F. religiosa*), in comparison to the total nightly visits made to *M. calabura*. In addition, the number of mist-netted individuals of *C. sphinx* per hour near *M. calabura* was also significantly higher than near other fruit spp. We suggest that if *M. calabura* is grown in and around orchards, damage caused by *C. sphinx* to commercial fruit crops may be decreased and therefore would serve as a non-destructive method for managing removal of commercial fruits by bats.

***Key words*:**

Cynopterus sphinx, orchards, bat damage, non-destructive control, *Muntingia calabura*

Source:

Acta Chiropterologica, 8(1): 239–245, 2006
PL ISSN 1508-1109

[1]Department of Biology, University of Haifa at Oranim, Tivon 36006, Israel
[2]Department of Animal Behaviour and Physiology, School of Biological Sciences, Madurai Kamaraj University, Madurai 625 021, India. E-mail: gmari@sancharnet.in

Small mammals survey in Bhutan

Tenzin*

I attended the hands on field techniques training, and identification of small mammals in Sep 2009. Immediately after the training I did an opportunistic survey of small mammals at Wanghuck Centennial Park. I took advantage of my survey with a biodiversity survey where I am working as Species Management and Research Section Head. In the field we had set up Sherman traps for small mammals in three locations. In the first night we had set up ten traps at Murtey. In the morning we caught three small mammals. The baits we used were peanut butter, biscuits and fruits.

The team briefing how to set up traps and to use the baits

The team briefing how to set up traps and to use the baits

***Species Management and Research Section,**
Wangchuck Centennial Park, Bumthang, Bhutan.
E-mail: tenzin.mandar@yahoo.com

Handling of White Bellied Rat

Tail length: 16cm
Body length: 11.5cm
Weight: 45 gm
Sex: Female
We also took the sample for DNA analysis from the ear
Location: Murtey

Examining the White Bellied Rat

Tail length: 17.5cm
Body length: 18cm
Weight: 61 gm
Sex: Female
We also took the sample for DNA analysis from the ear
Location: Murtey

The Little Himalayan Rat

Tail length: 15.5cm
Body length: 11.5cm
Weight: 11.5 gm
Hind limb: 3cm
We also took the sample for DNA analysis from the ear
Location: Murtey

The Himalayan Water Shrew

Tail length: 6.5cm
Body length: 8cm
Weight: 34gm
Hind limb: 4cm
Sex: Male
We also took the sample for DNA analysis from the ear
Location: Krasebee

A Note on Feeding Habits of Fruit Bats in Colaba, Urban Mumbai, India

J. Patrick David* and Vidyadhar Atkore**

Observing feeding behaviour of nocturnal creatures like bats is very difficult unless we are equipped with night-vision instruments. However, we were very fortunate to observe the feeding techniques of the Short-nosed fruit bat *Cynopterus sphinx* and the Indian Flying Fox *Pteropus giganteus* on the fruits of *Ficus racemosa* near the Police Headquarters in Colaba, Mumbai, without the aid of any specialised instruments. Since the tree was located in an urban area, there was bright light which made observations easier with the naked eye. The tree produced pink ripe fruits, numbering more than one thousand. Unlike other figs, the fruits are borne directly in the main trunk and other branches in bunches of 50-100. We could not collect any systematic data as it was a sensitive area and we were even questioned by sentries about our intentions. So we just observed them for 15 minutes for three days without pen or paper. It provided us valuable insights into the feeding behaviour of the two fruit bat species.

Feeding Behaviour

The Short-nosed fruit bat maneuvered for sometime around the fruiting tree and then flew directly into a bunch of fruits and took a fruit in its mouth and disappeared to feed on another tree. It stayed in the fruiting tree only for a few seconds. All attempts to pluck fruit were not successful, some of them ended in failure. It picked up fruits at the lower level, at about 2m from the ground and always took the fruit away from the fruiting tree to eat. Some of them were taken into the Police campus and some were eaten on trees along the pavement, such as *Polyalthia longifolia* and *Peltophorum roxburgii*. In contrast the Indian Flying Fox landed directly on the tree and crawled along the branches to reach the fruits. Once near the fruit it picked up a single fruit with its mouth, supported by one of its fore legs and started to feed. It did not fly away with the fruit. It took 2-3 bites to finish one fruit. The Indian Flying Fox was always found feeding a metre or two above the Short-nosed fruit bat and hence did not compete with the Short-nosed fruit bat for the fruit resource. But there was competition among Flying Foxes, there was constant squabbling and some of them were even displaced from their feeding sites.

Implications

This differential feeding behaviour of the two fruit bat species has one significant implication. The Short-nosed fruit bat, by carrying the seeds away from the fruiting tree, helps in dispersing the seeds of this species and thereby provides the seeds a better chance to germinate. The Indian Flying Fox by dropping the seeds below the fruiting tree gives seeds little chance to survive. Seed and seedling mortality are high below the parent tree and it is always beneficial for the seeds to be carried away from the parent plant (Janzen 1970). Though these might be invalid in an urban environment, in the wild these observations are very significant as have been shown by some scientists (Howe 1987).

Conclusion and Recommedations

Casual observation around Colaba, reveal that there are lots of fig trees and fruit bats were observed feeding on them. From the conservation point of view we suggest that year round observations should be undertaken to bring out the significance of figs for fruit bats in Colaba and these plants should be given priority for conservation.

References

Howe, H.F (1987). Consequences of seed dispersal by birds: A case study from Central America. *J. Bombay. Nat. Hist. Soc.* 83 (Supplement): 19-42.

Janzen, D.H (1970). Herbivores and the number of tree species in tropical forests. *Am. Nat.* 104: 501-528.

*pat_david@yahoo.com,
**vidyadhar.atkore@gmail.com

Training Report on Bat Capture, Handling and Species Identification

Manjit Bist*

"Bat Friends", Pokhara, Nepal is a non-governmental, non-profit, volunteer organization established in 2006 by students of the Institute of Forestry (IoF) with an aim of conserving bats and their habitat. This aim was to be realized through research and awareness programs, to disseminate information about bats to students as well as common people. This organization has conducted many programs like species identification, education, workshops, training, essay competition, articles, etc, in different sites in Pokhara Valley as well as other parts of Nepal.

Handling a bat

Classroom session

On 10th April 2010 "Bat Friends" organized a "Training on Bat capture, handling and species identification". The program was conducted in two sessions; in the first session at IoF students were trained and in the second session they were taken to the field for field-based experience. The program intended to prepare volunteers from IoF (Institute of Forestry) who can later work in Chiroptera research, awareness and conservation.

Specific objectives were sharing information about bats, their behaviour and their habitats; training students to capture bats, handle them safely and identify the species; sharing knowledge about the importance of bats in ecosystem and biodiversity; encouraging students for conservation of bats and the environment.

Training from resource persons: The first session of the training programme was conducted at IoF from 7:30 am to 9:30 am. A total of 60 participants and two resource persons, Assoc. Prof. Raj Kumar Koirala, and Mr. Prakash S.Thapa attended. Training materials included general information about bats, diagrams, information of morphological parts, field data sheets, etc, which were distributed to participants. Dr. Raj Kumar Koirala's topic included: Introduction to bats and its characters, Differences between megachiroptera and microchiroptera, Bats globally and locally, and the Importance and ecological role of bats. Mr. Prakash S. Thapa spoke on Capturing techniques using mist net and scoop net, Safe handling techniques for the captured bats, Measurement of various morphological parts for identification, Use of field data sheet and Use of various instruments necessary in field trip.

In the second session, participants were taken to Birenda Cave located in Bhalam

*Nepal Bat Conservancy, Pokhara, Nepal.
E-mail: mister_manz@yahoo.com

for a field based experience. The GPS location of the cave entrance is; Lat: E 84^{0}00'15.1", Long: N 28^{0}14'50.2" and Alt: 911m. We reached the cave around noon and Prakash S. Thapa taught about cave dwelling bats while Manjit Bista related precautions to be taken in caves to the participants.

Six groups, each containing ten students were formed and a group was taken inside the cave for observation of bats. Four bats were captured inside the cave. The morphological measurements of the specimens were taken and demonstrated to the participants. The proper method of filling the field data sheet was taught to the participants. They were taught to identify the species of bat and finally it was found that all the four specimens were *Rhinolophus affinis.*

Program output

The 60 students who participated in the training program were given detailed information on bats, their characteristics, importance and techniques for bat capturing, safe handling and species identification with a field based experience. It is expected that the participants will be able to identify species of bats with safe handling after the capture during bat related study and research.

This program motivated the participants to work for the conservation of bats, their habitat and the ecosystem. They were encouraged to disseminate their experience to the friends in IoF and also to the members of thier family. One of the participants, Mr. Bimal Chand shared his experience like this, "I am very excited and happy to see bats living inside cave like this. I was afraid at first but they did not attack. I had never been so close to bats and I touched there for the first time. I like them now, they are wonderful creatures. We all should protect them".

The group learning to take measurement of a bat in the field

Classroom session on Bat taxonomy

Participants of the training

Training Workshops in South Asia

Report on one day workshop Bat biology and conservation" held at National Centre for Biological Sciences (NCBS), Bangalore. February 23, 2010

Patric David*

The workshop on Bat Biology and Conservation was conducted on Feb 23, 2010 at NCBS by the Co-ordinator, Mahesh Shankaran, NCBS and the collaborators, Leeds University, England. Participants totalled 17 students from India and one from Nepal.

The workshop began at 9am with a lecture by John Altringham, Leeds University, England on the life history strategies, feeding and roosting ecology of bats. He introduced us to the various bat feeding guilds viz., frugivores, nectarivores, insectivores and carnivores and the relative proportion of these bat assemblages around the world. Different roosting sites are used by bats. The Honduran white bat uses *Heliconia* leaves, Banana leaves are used by the Banana bats of Malawi, and the Short-nosed fruit bat uses the underside of palm leaves. There are bats which roost in caves, abandoned buildings, temples, underside of bridges, tunnels etc.

Anita Glover, Leeds University, England talked about the ecological role of bats as insect controllers, seed dispersers and pollinators. A south American nectar feeding bat *Anoura fistulata*, has the longest tongue among bats (85mm, 150% of it body length), specially designed to feed on flowers with long, narrow corolla tube. It was recently discovered in the cloud forests of Eucadorian Andes. The flowers of *Centropogon nigricans* are pollinated only by *A. fistulata*, because of its long corolla (8-9cm long). In China, the gene flow in a particular plant species increased where nectar feeding bats were present.

An interesting point to emerge was that bats could also be seed predators. The South American *Chiroderma doriae* and *C. villosum* destroy fig seeds instead of dispersing them.

Group setting up mist net
Photo credit: Monica Picot Manuel

Capture and handling a bat. Photo credit: Monica Picot Manuel

John Altringham talked about the threat to bats due to deforestation, fragmentation and hunting. Forest fragmentation due to roads affects the movement of low flying bats which hesitate to cross roads, even if they do, they are sometimes hit by vehicles. The little Marianas fruit bat *Pteropus tokudae*, an endemic species to Guam is now extinct, most probably due to hunting. The numbers of another species Marianas fruit bat, *Pteropus mariannus* has been drastically reduced due to hunting by the native Chamorro residents, as it is considered a delicacy. Though this problem has now been controlled by legislation, nobody could stop the introduced Brown tree snake from feeding on juveniles of *P. mariannus*. The population of *P. mariannus* continues to decline.

Email: pat_david@yahoo.com

Dr. Marimuthu of Madurai Kamaraj University gave a short talk on "Prey detection and capture by the Indian False Vampire Bat". The Indian False Vampire Bat is primarily an insect feeder but also takes small vertebrates like frogs. It flies close to the ground (<1m) searching for prey moving among the leaf litter. If the prey remains stationary it is not detected, but if it moves, the bat detects the sound and captures the prey. This hunting strategy was revealed through a serious of experiments conducted *ex-situ* in a dark chamber. In one set of experiment frogs were tied with thread and pulled on a wet glass slide, the bat could not detect the frog movement, as the pulling did not produce any sound. When frogs were pulled on dry ground (which produced sound), they swooped down on the prey, took it to their roost site and swallowed the prey head first.

The prey detection strategy in water was slightly different. The bat was able to detect the frog only when its head was above water. As the bat flew over the water, it produced ripples with its wings, which guided it to its prey. All these information was well complemented by moving images caught in a video camera.

Evening Session: Three mist nets were laid in a lawn opposite to NCBS at 6pm. The first one was the largest and tallest (8mx8m). The nets were tied to an aluminium pole and positioned perpendicular to the ground. Setting up the 3 nets took 45 minutes. During this exercise 1 *Pipistrelle sp* and 2 *Cynopterus sphinx* were captured. The session closed at 7.30pm.

Report on One Day Training Workshop at Tribhuvan University, Kathmandu, Nepal

Sanjan Thapa*

Small Mammals Conservation Club - CDES and Central Department of Environment Sciences (CDES), Tribhuvan University (T.U.), Kathmandu, Nepal organized a one day training on "Basic Bat Handling Techniques" on February 15, 2010. The program was supported by Small Mammals Conservation and Research Foundation (SMCRF).

Sixty masters-level students from the College of Applied Sciences, Tribhuvan University, Satdobato, Lalitpur; School of Environment Management and Sustainability (SchEMS), Pokhara University, Maharajgunj, Kathmandu; Khowpa College, Purbanchal University, Bhaktapur; Central Department of Environment Science and Central Department of Zoology, Tribhuvan University, Kirtipur, Kathmandu participitated in the training.

Chief Guest Mr. Shiva Raj Bhatta, Ecologist, Department of National Parks and Wildlife Conservation inaugurated the training. Lectures on slides, demonstration of measuring bats with museum specimens, mist netting and bat detector handling practices in field were covered during the training session.

A participant handling a heterodyne bat detector

Mist netting practice at T.U. Coronation garden forest

Participants of the training

***Small Mammals Conservation and Research Foundation, SMCRF, New Baneshwor, Kathmandu, Nepal. E-mail: sanjan_thapa@yahoo.com**

One day Workshop on Voucher Specimen Preparation of bats

Sanjan Thapa*

On 13th April 2010 Small Mammals Club - CDZ and Central Department of Zoology, Tribhuvan University jointly organized the one day workshop on Voucher Specimen Preparation of bats at CDZ Laboratory, T.U, Kirtipur, Kathmandu. The programme was supported by Small Mammals Conservation and Research Foundation, SMCRF, New Baneshwor, Kathmandu, Nepal. Fifteen interested masters' level students from CDZ and Central Department of Environment Sciences participated the workshop. Wet specimen preparation, labeling and skull preparation was carried out. The objective of the workshop was to preserve the specimens for further detailed taxonomic studies. Wet specimens of ten species namely: *Pipistrellus* sp., *Taphozous longimanus, Myotis csorbai, Miniopterus schreibersii, Hipposideros cineraceus, Rhinolophus pusillus, R. affinis, R. luctus, Myotis nipalensis, Scotophilous heathii* collected from different parts of Nepal by students of CDZ and members of SMCRF, were prepared. The skull of Dawn Bat *Eonycteris spelea* (exralimital material excluding wings and tibiae) gifted by Nepal Chepang Federation, Kathmandu was prepared. Labels were made and attached to the specimen. They were kept at CDZ Museum as well detailed records were filed at SMCRF.

Specimens were tied to glass slabs by threads and the label was prepared by writing short information: (accession number, species name, sex, date and place of collection), on tracing paper with pencil. The label was tied to the top of the glass slab by thread. The specimen along with label was dipped into 500 ml plastic jar filled with spirit (70% alcohol). Before tying the specimen to the glass slab they were measured carefully thrice and all the measurements were noted.

Measuring specimen

A specimen tied on a glass slab

Participants at workshop

***Small Mammals Conservation and Research Foundation, SMCRF, New Baneshwor, Kathmandu, Nepal. E-mail: sanjan_thapa@yahoo.com**

During the skull preparation, a cut was made from the posterior edge of the mouth through the cheek. Skin was peeled off and muscles were carefully removed. The skull covered with muscles was boiled in simmering water and again muscles were taken off and the skull was cleared. The accession number was written on the skull with permanent Indian ink marker. All the preserved specimens and skulls will be regularly monitored by SMCRF and CDZ.

Acknowledgements:
I would like to heartily acknowledge Malcolm Pearch, Harrison Institute, Centre for Systematics and Biodiversity Research, Sevenoaks, Kent, England and Dr. Gabor Csorba, Deputy Director and Curator of Mammals, Hungarian Naural History Museum, Budapest, Hungary for providing precious advice, guidance and support.

Note: Collecting voucher specimen for future research is essential and collections should be properly preserved and made available for anyone interested in bat research and for reference work. Moreover novices should not do voucher collection since it is not a good practice.

The preserved bat specimens stored at CDZ Museum

A part of CDZ Museum where preserved bat specimens are placed (pointed)

A tagged specimen of *R. affinis* inside the bottle filled with spirit

Prepared skull of *Eonycteris spelaea*

An Updated Checklist of valid bat species of Nepal

Sanjan Thapa*

Suborder Yinpterochiroptera
Superfamily Pteropodoidea
Family Pteropodidae

1. *Cynopterus sphinx* (Vahl, 1797), Greater Short-nosed Fruit Bat
2. *Eonycteris spelaea* (Dobson, 1871), Dawn Bat
3. *Pteropus giganteus* (Brünnich, 1782), Indian Flying Fox
4. *Rousettus leschenaultii* (Desmarest, 1820), Leschenault's Rousette
5. *Sphaerias blanfordii* (Thomas, 1891), Blanford's Fruit Bat

Superfamily Rhinolophoidea
Family Rhinolophidae

6. *Rhinolophus affinis* Horsfield, 1823, Intermediate Horseshoe Bat
7. *Rhinolophus ferrumequinum* (Schreber, 1774), Greater Horseshoe Bat
8. *Rhinolophus lepidus* Blyth, 1844, Blyth's Horseshoe Bat
9. *Rhinolophus luctus* Temminck, 1834, Great Woolly Horseshoe Bat
10. *Rhinolophus macrotis* Blyth, 1844, Big-eared Horseshoe Bat
11. *Rhinolophus pearsonii* Horsfield, 1851, Pearson's Horseshoe Bat
12. *Rhinolophus pusillus* Temminck, 1834, Least Horseshoe Bat
13. *Rhinolophus sinicus* K. Andersen, 1905, Chinese Horseshoe Bat
14. *Rhinolophus subbadius* Blyth, 1844, Little Nepalese Horseshoe Bat

Family Hipposideridae

15. *Hipposideros armiger* (Hodgson, 1835), Great Himalayan Leaf-nosed Bat
16. *Hipposideros cineraceus* Blyth, 1853, Least Leaf-nosed Bat
17. *Hipposideros fulvus* Gray, 1838, Fulvus Leaf-nosed Bat
18. *Hipposideros Pomona* K. Andersen, 1918, Andersen's Leaf-nosed Bat

Family Megadermatidae

19. *Megaderma lyra* É. Geoffroy, 1810, Greater False Vampire

Suborder Yangochiroptera
Superfamily Emballonuroidea
Family Emballonuridae

20. *Taphozous longimanus* Hardwicke, 1825, Longed-winged Tomb Bat

Super family Vespertilionoidea
Family Vespertilionidae

21. *Arielulus circumdatus* (Temminck, 1840), Bronze Sprite
22. *Barbastella leucomelas* (Cretzschmar, 1826), Eastern Barbastelle
23. *Eptesicus dimissus* Thomas, 1916, Surat Serotine
24. *Eptesicus serotinus* Schreber, 1774, Serotine
25. *Falsistrellus affinis* (Dobson, 1871), Chocolate Pipistrelle
26. *Hesperoptenus tickelli* (Blyth, 1851), Tickell's Bat
27. *Ia io* Thomas, 1902, Great Evening Bat
28. *Kerivoula hardwickii* (Horsfield, 1824), Hardwicke's Woolly Bat
29. *Kerivoula picta* (Pallas, 1767), Painted Woolly Bat
30. *Murina aurata* Milne-Edwards, 1872, Tibetan Tube-nosed Bat
31. *Murina cyclotis* Dobson, 1872, Round-eared Tube-nosed Bat
32. *Murina huttoni* (Peters, 1872), White-bellied Tube-nosed Bat
33. *Murina leucogaster* Milne-Edwards, 1872, Rufous Tube-nosed Bat

***Small Mammals Conservation and Research Foundation (SMCRF), New Baneshwor, Kathmandu, Nepal. E-mail: sanjan_thapa@yahoo.com**

34. *Myotis blythii* (Tomes, 1857), Lesser Mouse-eared Myotis
35. *Myotis csorbai* Topál, 1997, Csorba's Mouse-eared Myotis
36. *Myotis formosus* (Hodgson, 1835), Hodgson's Bat
37. *Myotis muricola* (Gray, 1864), Nepalese Whiskered Myotis
38. *Myotis nipalensis* (Dobson, 1871), Nepal Myotis
39. *Myotis sicarius* Thomas, 1915, Mandelli's Mouse-eared Myotis
40. *Myotis silingorensis* (Horsfield, 1855), Himalayan Whiskered Myotis
41. *Nyctalus montanus* (Barrett-Hamilton, 1906), Mountain Noctule
42. *Nyctalus noctula* (Schreber, 1774), Noctule
43. *Philetor brachypterus* (Temminck, 1840), Short-winged Pipistrelle
44. *Pipistrellus coromandra* (Gray, 1838), Coromandel Pipistrelle
45. *Pipistrellus javanicus* (Gray, 1838), Javan Pipistrelle
46. *Pipistrellus tenuis* (Temminck, 1840), Least Pipistrelle
47. *Plecotus homochrous* Hodgson, 1847, Brown Big-eared Bat
48. *Plecotus wardi* Thomas, 1911, Gray Big-eared Bat
49. *Scotomanes ornatus* (Blyth, 1851), Harlequin Bat
50. *Scotophilus heathii* (Horsfield, 1831), Greater Asiatic Yellow House Bat
51. *Scotophilus kuhlii* Leach, 1821, Lesser Asiatic Yellow House Bat

Family Miniopteridae

52. *Miniopterus pusillus* Dobson, 1876, Small Long-fingered Bat
53. *Miniopterus schreibersii* (Kuhl, 1817), Schreiber's Long-fingered Bat

***Myotis sicarius*. Photo by Sanjan Thapa.**

Field Notes on albinism in Five-striped Palm Squirrel *Funambulus pennanti* Wroughton from Udaipur, Rajasthan, India

Satya Prakash Mehra[1], Narayan Singh Kharwar[2], Partap Singh[3]

Albinism is not rare among mammals in nature. Many albino mammals both in nature and captivity have been reported - Chinkara (*Gazella g. bennatti*) (Mohnot, 2006, pers. comm.), Common Mongoose (Tehsin and Chawra, 1994), Nilgai (Ranjitsingh, 1987), Sloth Bear (Bharos, 1988), Rat-tailed Bat (Bhati, 1988), Palm Civet and Palm Squirrel (Sharma, 2004) and many others. Albinism is a genetic disorder and is caused by a single mutation which prevents the formation of the pigment melanin. Melanism is another genetic disorder that has rarely been observed among mammals. Bahadur (1942) observed melanism through cross-breeding the normal individual with the abnormal animal. Later on Taibel (1945) gave the experimental explanation of albinism in mammals. We came across similar observations in the wild in Five-striped Squirrel *Funambulus pennanti*. In 2005, an albino individual of Five-striped Squirrel (F1) was sighted (Mehra *et al.* 2007). On taking field records of the albino individual, we came to its parental history. One of the parents (male) was also albino, and lived for two years in the same residential areas. Thus, the cross between normal female with albino male resulted into two normal and one albino male (F1) (Case 1). The albino male (F1) crossed with the normal female and produced normal litter in the subsequent generation (Case 2). Both the cases are presented in Figure 1.

If we assume that the normal female was homozygous (NN) with respect to its morphological character of coat, and that 'normal coat' is dominant to an 'albino coat', we could only expect that the offspring would all be like the normal type phenotypically, but genetically females are heterozygous (Nn) for coat colour. In the present case, the first generation has 2 normal (Nn) and one albino (nn) siblings. This shows that female was heterozygous (Nn) in case 1. Due to this, one of the siblings was albino (F1). In case 2, the female was homozygous thus producing normal coat heterozygous (Nn) siblings. It is interpreted that if the normal coat offsprings of heterozygous nature of case 2 cross with the albino individual, it would likely to reproduce yet other albino individuals (Fig. 2).

Parents (Phenotypic pattern)	**Offsprings**
1. Normal (female) x Albino (male)	2 normal and 1 albino (F1)
2. Normal (female) x Albino (male)	3 normal (F1)
Parents (Genotypic pattern)	**Offsprings**
3. Normal (female) (Nn) x Albino (male) (nn)	2 normal (Nn) and 1 albino (F1) (nn)
4. Normal (female) (NN) x Albino (male) (F1) (nn)	3 normal (Nn)

Interpretation for future generation

5. Normal (female) (Nn) x Albino (male) (nn)	50% normal (Nn) and 50% albino (nn)

Acknowledgement

We are thankful to the house owner Mr. Kumawat for rendering permission as well as helping in taking day to day observations on the albino Five-striped Squirrel.

References:

Bahadur, R. S. (1942). Black Panthers. *J. Bombay Nat. Hist. Soc.* 43(3): 519.

Bharos, A. M. K. (1988). Albino Sloth Bear. *J. Bombay Nat. Hist. Soc.* 85(1): 187.

Bhati, U. S. (1988). Occurrence of an albino Rat-tailed Bat, *Rhinopoma microphyllum leinneari* Wroughton in the Indian Desert. *J. Bombay Nat. Hist. Soc*. 85(3): 608.

Mehra, S. P., J. S. Kharwar & N. S. Kharwar (2007). Second record of albino Fivestriped Palm Squirrel *Funambulus pennant* Wroughton from Udaipur, Rajasthan. *J. Bombay Nat. Hist. Soc.* 104(3): 2-3.

Mohnot, S. M. (2006). The albino Chinkara in Dhava-Doli wildlife closed area near Jodhpur (Per. Comm.).

Ranjitsingh, M. K. (1987). Unusual colouration of Nilgai, *Boselaphus tragocamellus. J. Bombay Nat. Hist. Soc.* 84(1): 203.

Sharma, S. K. (2004). Occurrence of albino common Palm Civet and northern Palm Squirrel in southern Rajasthan. *Zoos' Print* 19(5): 1483.

Taibel, A. M. (1945). On experiment in albinism with Chital (*Axis axis*). *J. Bombay Nat. Hist. Soc.* 45(3): 417-419.

Tehsin, R. and S. S. Chawra (1994). Albino common mongoose (*Herpestes edwardsii* Geoffory) sighted near Udaipur. *J. Bombay Nat. Hist. Soc.* 91(2): 304-305.

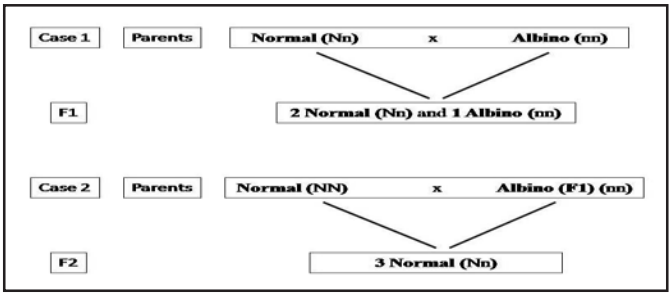


Fig 1: Observations on breeding of albino Fivestriped Squirrel

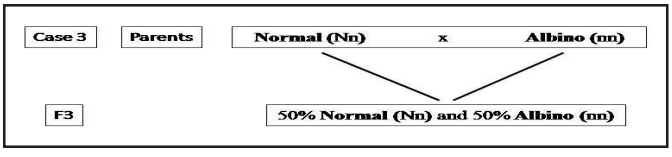


Fig 2: Predicted albino offsprings in wild References

[1]Corresponding author: spmehra@yahoo.com,
[2]narayansingh78@yahoo.co.in,
[3]partapsk@yahoo.com

Short Report on First One-day National Seminar on Small Mammals Issues

Sagar Dahal* and Suchita Shrestha

For Celebrating International Year of Biodiversity 2010, the Small Mammals Conservation and Research Foundation (SMCRF), in collaboration with the Department of National Parks and Wildlife Conservation (DNPWC) organized the first one-day National Seminar on Small Mammals Issues, on May 15, 2010 at the Local Development Training Academy (LDTA), Jawalakhel, Lalitpur. The event was supported by Himalayan Nature, Nepal Academy of Science and Technology (NAST), National Trust for Nature Conservation (NTNC) and Red Panda Network. Radio Kantipur 96.1 MHz was associated as the media partner.

Inaugural and introduction to the status of small mammal in Nepal

Technical Session of the Seminar in progress

The objectives of the seminar were to:
· gather researchers, conservationists and organizations working in the field of biodiversity in Nepal;
· disseminate achievements, opportunities and challenges in conservation and research activities on small mammals of Nepal;
· update resource data on small mammals of Nepal;
· highlight the International Year of Biodiversity through media participation.

Altogether 85 participants affiliated to different colleges, volunteers at SMCRF, and guests participated the program. The programme opened with welcome, inauguration and introduction of status of Small Mammals in Nepal.

The technical session included five different papers (presented) and four posters (displayed) on small mammal issues summarized below.

Distribution and habitat of *Lutra perspicillata* in Narayani River, Chitwan National Park, Parash Mani Acharya.

Site of the study was river banks at Gidha, Amaltari, Khana Khola, Tribeni Barrage. *L. perspicillata* is a robust and key indicator species of aquatic ecosystem. The technique utilized for the research was observation of tracks and signs and their measurement on the river banks. Signs of *L. Perspicillata* were seen in eleven different sites. The research suggested the decline of fish to be the major threat to the otter population, and caused by industrial pollution, grazing, and sand and boulder extraction as well as direct hunting and trapping. The paper concluded with recommendations for monitoring of fish population, conservation of otter habitat and detail study of the species.

Recent records of bats in Nepal with notes on their taxonomic and ecological characters, Sanjan Thapa

Author reviewed Chiroptera study in Nepal since Hodgson in 1835. The review was done in

Small Mammals Conservation and Research Foundation (SMCRF), New Baneshwor, Kathmandu, Nepal; Email: *sagardahalinktm@gmail.com; info@smcrf.org; URL: http://www.smcrf.org

twenty districts including four new districts. Seventeen species were identified. The methodologies used in the study were mist netting, roost survey, bat detector, population estimation (in caves) and morphometric measurement. The research concluded that Rhinolophid bats were the most recorded and *M. csorbai* the most threatened among all bat species. Recommendations were preliminary survey, detailed survey and regular monitoring for preparation of chiropteran database of Nepal.

Species information through poster presentation

Ethnozoology and Pangolin conservation awareness in human dominated landscape of Nepal, Prativa Kaspal

Pangolins are placental mammals. The author gave an overview of two types of Pangolins and they are Chinese pangolin, *Manis pentadactyla*, Indian pangolins, *Manis crassicaudata* and their habitat in Nepal, including general behavior of this animal. The paper also related the local use of different body parts of pangolin by different ethnic groups. The study site of the project has many traditional medical shops in the valley, four Wards of Balthali VDC, areas around and inside Chitwan NP, Suryapura and Bishnupura VDC of Lumbini district. Methodology included the field visits, visit and interaction to traditional healers, shop owners, related vendors in the cities and questionnaire survey. Also included in the methodology was public awareness activities such as distribution of brochures and posters. Author noted the lack of data on Pangolins due to limited research and conservation. Pangolins are facing threat of extinction due to trade value for meat and use in traditional healing. Recommendations were establishment of reserves within the Pangolin's habitats to prevent disturbances, control of poaching, forest fire, soil mining, funds for research and captive breeding.

Population status, habitat utilization, distribution and conservation threats of Hispid Hare in Bardia National Park of Western Nepal, Promod Tandan

Author presented detailed literature review of hispid hare *(Caprolagus hispidus)* which is found in Suklaphanta Wildlife Reserve only. The objective was to determine the status, threats and conservation issues of hispid hare in Bardia National Park, Nepal with secondary notations of Pygmy hog which is believed to be extinct. The study site of the research were Bardia National Park in Western Terai of Nepal; 4 districts: Surkhet, Kailali, Bardia & Banke. The method of the study was reconnaissance survey followed by field survey, laboratory and data analysis and report. Detailed methodology included line transect, vegetation analysis, soil sample collection, presence/absence survey of Pygmy hog and questionnaire survey. Findings included presence of hispid hare in 7 different grasslands and diet composition of 23 food plant species. The distribution of hispid hare was found to increase after burning, contradicting previous studies. The conclusions of the studies were presence of hispid hare in Bardia National Park and absence of Pygmy hog. The study reported 70% pellets found in isolated small groups with limited distribution (7 out of the 36 patches.) Pellet density: 4.07/ha in winter and 8.71/ha in summer. Preferred habitat: Proximity to water source, grassland area dominated by *Sachharum spontaneum* and *Imperata cylindrica*. Key threats: low adaptability to the changing environment and lack of species-targeted management. Recommendations include more studies on hispid hare, effective guidelines for preventing fires in Park, community awareness and sufficient equipment for the staff.

Legal Issues on Small Mammals Conservation and Research in Nepal, Buddi Sagar Paudel

Author listed animal species status from IUCN Red List and CITES, based on the paper on species overview, legal provisions, current status, strategies, initiative, etc. He described strategies and working policies of interim plan 2007-2010. According to NPWC Act 1973, 27 mammals, 19 birds and 3 reptiles are protected. Interference with any animal within Protected Areas is prohibited unless granted the written permission of an authorized officer. The protected small mammals of Nepal were briefly introduced. A list of Protected Areas management

plans were presented. More than 224 crore U.S. dollar spent on rhino, tiger, vulture, elephant, snow leopard for conservation and research purpose. Research has increased in Protected Areas since peace agreement between Nepal and Maoist governments. Deficiencies of research on small mammals were noted as short duration study, species oriented researches in endangered animals, lack of peer review, and paucity of publications are the obstacles in conservation activities. Author's recommendations included enactment of NPWC Act and Regulations, establishment of Protected Areas, species-specific conservation action plans, management plans, and buffer zone initiatives for the protection of small mammals. He also suggested collaboration and partnership, enhancement of institutional capacity, data sharing and networking for improved conservation of small mammals.

A paper presentation in progress

The event received good media coverage from both radio, T.V. and print news. Some institutions represented included Small Mammals Conservation and Research Foundation, Nepal Academy of Science and Technolohy (NAST, Department of Zoology (CDZ), Tribhuvan University, National Trust for Nature Conservation (NTNC) and Red Panda Network Nepal.

Radio awareness Programme

Sanjan Thapa*

Small Mammals Conservation and Research Foundation, SMCRF, started its long-awaited objective: a community awareness radio programme from 22nd January, 2010. SMCRF heartily acknowledges Rufford Small Grants Foundation, UK for sponsoring it. The programme "Mammalian World" comes every Friday 7:30 to 8:00 AM from Radio Kantipur 96.1 and 101.8 Mhz, leading FM in Nepal. This program includes informative episodes on small mammals with a particular focus on bats. Interactive programmes, interviews, news and reporting are other features of the program.

Rajesh Pandey, RJ Radio Kantipur and Suchita Shrestha, Secretary SMCRF during the program in KFM studio

***Small Mammals Conservation and Research Foundation (SMCRF), New Baneshwor, Kathmandu, Nepal. E-mail: sanjan_thapa@yahoo.com**

Report on field study at Nagarjuna Cave by SMC RF research team

Rameshwor Ghimire, Robin Rana, Narayan Lamichhane, Kastuv Raj Neupane, Sanjan Thapa*

Nagarjuna Cave is one of the important sites of the project entitled, "Detailed monitoring survey of bats and their conservation through radio awareness programme and outreach programme to school children in Kathmandu Valley". This is a small cave located at N 27° 44' 43.7", E 85° 17' 39.4" and altitude 1373m within Shivapuri-Nagarjun National Park, along the Kathmandu-Trishuli Highway. The site is culturally important to Tamang community. The surrounding area of the cave is a northward facing slope dominated by *Schima wallichii* (Chilaune), Alder *Alnus nipalensis* (Utis), *Plum Prunus* sp. (Payaun) and Chir Pine *Pinus roxburghii* (Raani Salla). Down there is settlement of Newar community and agricultural lands. The site was visited from January 5-7, 2010.

Weighing captured bat

Rhinolophus macrotis

Day I.

The five-member project team reached the site in the late afternoon. In the evening we were busy for mist netting at the cave entrance. Bats in flight emerged early evening (5:37 pm), with crowding at 5:43 pm. The first bat was netted at 5:58 pm, second bat netted at 7:59, third netted at 9:40 pm.

The frequency determined were 25 kHz, 60 kHz and 90 kHz respectively. In the gap a few bats hovered nearby the net, however, they were not caught. Meanwhile, captured bats were measured and photographed and immediately released without giving more stress to them. Field identification was made on the basis of reference (Bates and Harrison 1997) tally.

The three individuals were confirmed to be three separate species namely Big-eared Horseshoe Bat *Rhinolophus macrotis*, Greater Horseshoe Bat *R. ferrumequinum* and Intermediate Horseshoe Bat *R. affinis*, respectively. We packed the net at 10:00 pm. We couldn't record Least Horseshoe Bat *R. pusillus* and also didn't hear the sound of Cicada as usual.

Day II.

Late in the morning we could see crowds at Paanidhara, in the settlement area down the cave. Some of them were collecting drinking water; some were bathing and washing clothes. We made a scheduled survey there. We continued the scheduled survey in households

Small Mammals Conservation and Research Foundation, New Baneshwor, Kathmandu, Nepal
***sanjan_thapa@yahoo.com**

of the Newar community. We questioned people from school children to elder persons of the community. They knew quiet a bit about bats and their importance.

As we continued to investigate, we came to know that this was the positive result from our Small Mammals Conservation and Research Foundation having displayed the board at the cave. At 2:00 pm we stopped the scheduled survey for lunch and afterwards, we contacted school for the lectures to school children. Unfortunately, we couldn't carry on the programme because school vacation was in progress. Before the evening we set a mist net across a small stream. We could see bats flying after 5:42 pm.

The heterodyne bat detector detected echolocation calls ranged from 25 kHz to 90 kHz. We were unable to capture bats this night and we packed our net at 8:45 pm.

Day III.
We started roost searching from the late morning in the Nagarjuna forest. We hiked for three hours but couldn't find good roosts in trees (hollows) or bats. Before lunch we again visited the cave. Three team members went caving in search of bats deep inside the cave (up to 400m length). Two of us focused a light and searched bat colonies (*R. pusillus*) at the upper height of the cave just few meters inside of the entrance. We couldn't find them. Also we couldn't see bat droppings. We left the site with a plan to re-visit during the second phase of the project.

Rhinolophus ferrumequinum

Rhinolophus affinis

Acknowledgements
We acknowledge Rufford Small Grants Foundation, UK for financial support to the project and to Prof. Dr. Paul A. Racey for donating a mist net and continuous support and advice. We are grateful to Dr. Sarala Khaling, Regional Co-ordinator, Eastern Himalayas, CEPF; Dr. B. A. Daniel, Scientist, ZOO, India and Associate Prof. Dr. Nanda Bdr. Singh, Central Department of Zoology, Tribhuvan University, Kirtipur for strong recommendations for the project. We express special thanks to Mrs. Geeta Shrestha, Chair, NATURE, Kathmandu for donating the bat detector, and Rajesh Goit for donating a GPS.

Status survey and conservation education: community participation to protect bats in Thar Desert, India

K. R. Senacha*

Ed. Note: *This article is the Final Report, Rufford Small Grant Project Ref. No. 06.08.07, 1 – 67, heavily edited for this newsletter. Both author and grant maker agree to publication of this report in Small Mammal Mail. Constraint of space has forced us to leave out the illustrations and diagrams. The authority is prepared to send anyone who so desires an electronic copy of the report in PDF.*

Summary

Bats as pollinators, seed dispersers and insect predators are keystone species in ecosystems. Potential habitat and roosting sites of bats in Jodhpur region, a chiropteran diversity hotspot in Thar Desert is facing serious threat due to increasing anthropological pressures. My recent study shows four species of bats and various roosts have vanished over the last two decades and many more are facing serious threat. People are unaware of the ecological role of bats and consider them as a bad omen. Conservation of bat diversity in this area is one of the core ecological priorities. There is an urgent need to raise bat conservation awareness among local communities, through sensitizing them about their ecological significance.

The Rufford Small Grant Foundation provided financial support to undertake here a project entitled "Status survey and conservation education campaign: a community participation approach to protect bats in the Thar Desert, India".

The objectives of this project were,

i. to undertake intensive survey of exploring the bat roosts in the limits of Jodhpur district of the Thar Desert and

ii. to identify the species of bats inhabited therein;

iii. to undertake a bat conservation education campaign consisting of

a. teaching ecological significance of bats

b. uprooting existing myths about bats among local people and

c. educating policy makers about the ecological significance of bats.

A mix colony of *Rhinopoma microphyllum kinneari* and *Rhinopoma hardwickii* roosting inside Mandore Tunnel roost located at Mandore garden, Jodhpur

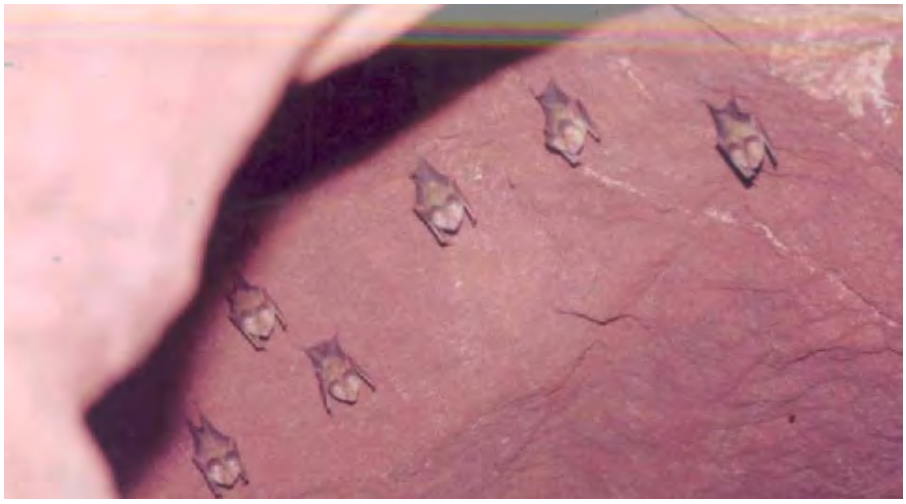
The project was executed from January 2008 to September 2009. A total of 96 bat roosts belonging to 9 species, 2 megachiropteran and 7 microchiropteran, were explored in the limits of Jodhpur district.

Beside Jodhpur city total of 87 settlements (town/villages/ dhanis) were visited for bat conservation education campaign. Lectures themed of ecological significance, nature and diversity of bats in the Thar Desert were delivered in 5 colleges, 55 schools (53 co-ed. and 2 girl's school), 15 village Panchayat Bhavans and 45 small gathering at different destinations. Fifteen schools were short listed near prominent bat roosts in the study area and motivated to formulate a bat club.

To create conservation awareness and to educate locals about ecological significance of bats total of 6500 pieces of informative educational material on scientific facts about bats of this region (500 big size, 500 medium size posters/4000 postcards/1500 pamphlets) were distributed among target groups during this campaign. The response of campaign participants and audiences were overwhelming. Of the targeted spectators more than 98% were unaware of ecological significance of bats whereas 70-80% were strongly believed in prominent myths like bats attack furiously on human nose and consider them as sign of sin. They admitted the fact that because of poor knowledge about its ecological significance presence of bats near human settlements has never been appreciated; rather they have always been misunderstood by the locals in this region. Therefore in many instances, bats become victims and their roosts have been debilitated by ignorant people.

***41, Surya Colony, Near Polytechnic College, Residency Road, Jodhpur, Rajasthan - 342 001. Email: senacha@yahoo.com or senacha@gmail.com**

Through interview, discussion and lectures participants of this campaign updated their knowledge about bats. Upon learning about the ecological significance and natural facts they realized that bats are quite useful creatures and play important role to insure good health of an ecosystem. They seemed quite excited upon discarding their fear of bats attacking human nose and its image as sign of sin and get convinced that because of their ecological role bats should be considered as friends. They appreciated bat awareness activites in the project and were impressed Rufford Small Grant Foundation to fund this project.



A colony of Blyth's Horseshoe bat, *Rhinolophus lepidus* roosting inside a Daijar Mata Mandir cave, Jodhpur.

Project Objectives

The objectives of this project were as under:

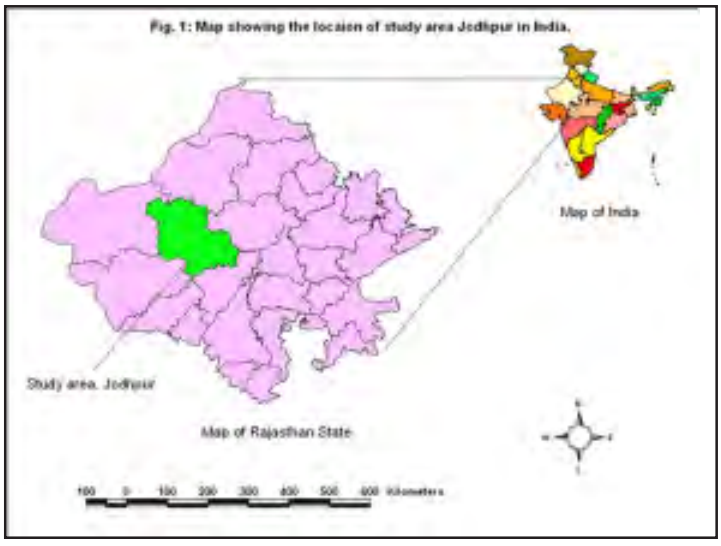
1. To explore the bat roosts in Jodhpur district of the Thar Desert by undertaking an intensive systematic survey.
2. To find out the species composition of bats at surveyed roosting sites.
3. Assessment of threats to bat roosts in the study area.
4. To eliminate existing myths about bats among locals in the study area through undertaking a bat conservation awareness campaign.
5. To provide a detailed report on status of bats in Jodhpur to state forest department such that bats get reasonable attention in upcoming wildlife management plan of government in this region.

A maternity colony of Egyptian Tomb bat, *Taphozous perforatus* at Mandore tunnel roost located at Mandore garden, Jodhpur

Materials and methods

To accomplish the objectives of this project following material and methods were used:

1. Survey of bat roosts
2. Identification of bat species
3. Bat conservation awareness campaign



Observations and results

(A)Survey and assessment of bat roosts:

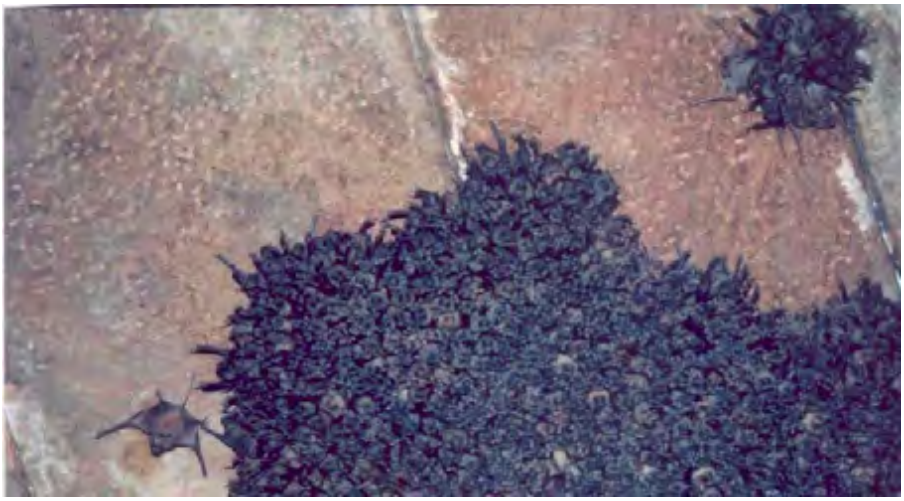
A sum of nine species of bats, 7 microchiropterans and 2 megachiropterans were reported from Jodhpur district of the Thar Desert during this investigation from their 89 active roosts. Of

the 19 bat roosts reported earlier from this area, from 1960 to 2007, seven were found deserted completely while other five have seen depletion in number of species inhabited there. Beside this we explored 77 new bat roosts (3 megachiropterans and 74 microchiropterans) from this study area.

Species composition at microchiropteran roosts varied significantly from prevailing congregation of Greater Mouse-tailed bat, *Rhinopoma microphyllum kinneari* and Lesser Mouse-tailed bat, *Rhinopoma hardwickii* to solitary roosts of each species. We have observed the co-existence of *Rhinopoma microphyllum kinneari*, *Rhinopoma hardwickii*, *Taphozous perforatus* and *Rhinolophus lepidus* at some of the roosts. However, at one roost in Tinwari four microchiropteran species, *Rhinopoma microphyllum kinneari*, *Rhinopoma hardwickii*, *Taphozous perforatus*, *Taphozous nudiventris* and a megachiropteran species, *Cynopterus sphinx* were found to roost together.

Occupancy estimates revealed that *Rhinopoma microphyllum kinneari* is the most common among microchiropterans followed by *Rhinopoma hardwickii*, *Taphozous nudiventris*, *Taphozous perforatus*, *Rhinolophus lepidus*, *Pipistrellus tenuis* and *Scotophilus heathii* prevailing respectively; but, *Pteropus giganteus* found abundant than *Cynopterus sphinx* among megachiropterans.

Based on regular monitoring of some selected sites, temporal fluctuations in population size were observed in six of the seven microchiropterans. Population of *Rhinopoma microphyllum kinneari* declined significantly in late summer whereas *Rhinopoma hardwickii* population showed a spike during the same time. *Rhinolophus lepidus* and *Taphozous perforatus* populations declined gradually from winter to summer and remaining stable thereafter, but no significant fluctuations were observed in *Taphozous nudiventris* and *Scotophilus heathii* populations. It shows that some of the microchiropteran species performs local migration to either overcome the effect of seasonal changes in microclimatic parameters of their roosts or to accommodate with food abundance, while others do not. Due to difficult roost access we could not study trend on population fluctuation in *Pipistrellus tenuis*.



Hibernating colony of *Rhinopoma microphyllum kinneari* roosting at Mandore tunnel roost, Jodhpur

Students of Government Primary School, village Sirda in Falodi Tahseel while posing with posters of bats after hearing informative lecture on bats by Principal Investigator of the project

As far as breeding of bats in the study area is concern, mating in *Pteropus giganteus* was observed in months of October and November, whereas parturition was observed in March and April. They found to deliver one pup and just after parturition the newborn hold position in mother's ventral body part by gripping her in head to head direction. Mating in *Rhinopoma microphyllum kinneari* and *Rhinopoma hardwickii* occurs in March and April, whereas parturition takes place in July and August. These too deliver single pup and remain attached to the ventral body parts of mother in head to tail direction. Parturition in *Taphozous*

perforatus was observed in May and June, but we could not conclude their mating time. Most delivered females of this species were seen with single pups but few others were sighted to carry two pups, possibly the twins. The direction of attachment of pups to their mother was head to head. Mating in *Taphozous nudiventris* was usually observed in March and April, but some pairs seen to be mounting in July and August. Parturition in this species was observed in July and August and pups found attached to mother in head to head direction. Parturition in *Scotophilus heathii* was observed in June and July, but their mating time could not be studied. Most delivered females seen with single pups, but remaining carried twins attached to mother's ventral body parts in head to head direction. However, parturition in *Rhinolophus lepidus* was observed in May and June, period of mating could not be defined. Delivered females were found to carry single pup attached to their ventral body part in head to tail direction. We could not observe breeding activities in species of *Cynopterus sphinx* and *Pipistrellus tenuis*.

Megachiropteran species, *Pteropus giganteus* found roosted on the seven species of trees viz., *Ficus bengalensis* (Banyan), *Ficus religiosa* (Peepal), *Azadirachta indica* (Neem), *Syzygium cumini* (Jamun), *Albizia lebeck* (Sares), *Saraca asoca* (Ashoka) and *Pithecellobium dulce* (Vilaiti Imaly), but *Cynopterus sphinx* were found roosted in deserted historical buildings like Havelies. The microchiropteran species viz, *Rhinopoma microphyllum kinneari*, *Rhinopoma hardwickii*, *Taphozous perforatus*, *Taphozous nudiventris* and *Rhinolophus lepidus* are found roosted in the segregated locations of deserted public wells (Pisaca's), stepwells (Bhavadi's) unattended ruined building structures, under roofs of mud houses, manmade tunnels, temples and natural caves, whereas *Pipistrellus tenuis* was found roosted in deep dark crevices in concrete and mud walls of building's or rocks. In contrast to all these, the *Scotophilus heathii* found to roosts in the hollow spaces under dry foliage of palm trees.

Farmers collecting guano of microchiropteran bats to use in crop field as a bio-fertilizer

Comparative analysis of data from current investigation to that with data from studies conducted in past from 1960 to 2007 revealed that seven bat roosts reported earlier have been deserted or destroyed completely in due course of time. Of the nine prominent microchiropteran roosts reported in recent past (Senacha, 2003) two, Shrinathji kee Haveli at Mahamandir and Krishna Nagar at New Pali Road in Jodhpur have became abandoned following the renovation activities and public intervention in due course of time. While significant depletion is observed in species composition and populations at other seven microchiropteran roosts. Two roosts of megachiropteran species, *Pteropus giganteus*, the Rail Sadan and the Balsamand Garden reported earlier by Senacha (2003) have also seen remarkable depletion in their populations. Microchiropteran species, *Rhinolophus lepidus* reported earlier co-existing with other three of the microchiropterans at Mandore tunnel roost in Jodhpur by Senacha (2003) found missing in this investigation. The species is comparatively timid to anthropological disturbances and might have moved out following generation of frequent vibrations through regular dynamite earth blasts in near by stone mines. Earlier, this roost was comparatively far from the stone mining sites but now this distance has been reduced with expansion in mining area.

Wild growth of the tree of *Prosopis juliflora* at openings of microchiropteran roosts is unique but severe threat at least to species of *Rhinopoma microphyllum kinneari*, if not to others. Purohit *et al*. (2002) were first to report the death of individuals of *Rhinopoma microphyllum kinneari* by entangling in thorns of *Prosopis juliflora*, grown in close proximity of their roost openings. The findings are further supported by observations of Senacha (2003). We have also come across similar observation of death of *Rhinopoma microphyllum kinneari* individuals, by entangling in thorns of *Prosopis juliflora*, at some sites explored during this study.

However, considering the fact that *Rhinopoma microphyllum kinneari* possess power of echolocation, it must not fail to detect presence of *Prosopis* twigs and thorns. Interestingly though other microchiropteran species co-exists in same roosts none of their individuals were found trapped in *Prosopis* thorns. These observations have raised a questions mark on potential of echolocation ability of *Rhinopoma microphyllum kinneari*. It seems either echolocation power become weak in some unhealthy or old individuals or be start malfunctioning temporarily in certain physiological or atmospheric conditions, leading this short of unique causalities. To unearth the exact fact behind this phenomenon detailed investigation is required on echolocation capabilities of individuals of this species.

Dr. Senacha while teaching young students about bats at Sagi ki Bhakari

Electrocution reported earlier in *Pteropus giganteus* by Purohit and Senacha (2003) and Senacha (2003) is quite common in this area and similar incidents were reported during this study. Total 28 individuals of this species were found dead due to electrocution at various feeding locations in this study area. Analysis of data revealed that most of these incidents took place, near the trees of *Ficus religiosa* (Peepal tree) planted road sides, on the open electricity wires installed for road lights or electricity supply to the houses. Individuals of *Pteropus giganteus* use eye vision and sense of smell to find their way while foraging as they lacks power of echolocation. While approaching to feed on *Ficus religiosa* fruits and foliage individuals of this species sometime fails to detect electricity wires located in proximity of feeding trees and hit them incidentally falling prey of electrocution. Though it is quite expensive and difficult task to either replace open electricity wires to coated cables or displace electricity line from proximity of their feeding trees or switch on to underground electricity system, these are the only possible options to overcome with this short of problem.

Microchiropteran roosts located in premise of ancient Forts and Havelies are prone to face threat of renovation. As these buildings are quite old their authorities are in process of renovation at most of the sites. We therefore approached the concern authorities and tried to convince them to not to disturb roosts of bats. However some were quite positive other seemed bit reluctant *in lieu* of the other benefits out of renovations. Majority of microchiropteran populations in rural areas roosts in unattended public or personal wells used traditionally to source ground water for drinking, irrigation and household purpose. Ground water level receded drastically over the time in this area and most of the wells become dry and useless, but, they serve as preferred and safe roosts for microchiropterans. Drinking water is supplied now by municipality pipelines in most of the villages while others opted to source ground water by tube wells or hand pumps. Therefore, dried wells, serving as roosts for microchiropterans, are no longer appreciated by villagers in many places. To avoid any possibilities causality of animals and children falling in these deserted wells people have sealed them completely in some places and others have intension to do or fill them completely with debris and soil.

An emerging threat for chiropterans in this study area is establishment of wind energy farms at various locations that comprises of installation of large number of windmills. Around 250 windmills have already been installed in different locations and many more are underway of installation. Windmills have proven dangerous claiming life of bats in many other parts worldwide. The reason behind short of incidents is that running windmills located in series create dangerous zones of low atmospheric pressure. When bats enter this zone while performing foraging activities their blood pressure began falling rapidly and leads to failure of blood circulatory system, resulting into their death (Arnett, 2005). To minimize the short of expected incidents one has to initiate proper investigation on this issue

and suggest proper damage control measures to the concern authorities.

(B) Bat conservation education campaign:
As mentioned earlier people in this area have been misunderstanding bats over last many generations and consider them as evil and sign of sin. They also believe in myth of bat attacking human nose. While campaigning we have delivered lectures and demonstrations about nature and significance of bats to children, students, youths and elders living in many of the urban and rural settlements of the study area. This exercise of bat campaign has helped many locals to sweep out existing myths on bats from their minds and turned them a lifelong admirer of bats. It is thus believed that these people will play key role in imparting right message to remaining public about nature and prevailing benefits of species of bats thriving in this area. Initiated bat clubs will be the source to teach the future generations about bats. By this way existing myths about bats from public mind would sweep out completely over the period of time and with their changed attitude people will start appreciating existence of bats in this area. Thus initiative of bat conservation through this project will flourish well and would be considered ahead a milestone achievement in field of wildlife conservation in this area.

Recommendations
Based upon the observations of this study following are the recommendations to conserve the roosts and species diversity of bats in Jodhpur of the Thar Desert.

1. Myths about nature of bats are deep rooted among locals. However, bat conservation campaign played significant role to uproot bat myths and update knowledge about significance of bats among locals, efforts are further required to ensure that this message persuade thoroughly to maximum number of people and their future generations. To ensure this, constant efforts are required to educate people through means of articles in local newspapers, repeating series of lectures in schools, colleges and gatherings at settlements (towns/ villages/dhanies) in due course of time.

2. Majority of bats in Jodhpur rural roosts in traditional public wells (Pisaca) used to source ground water. Most of these wells are running out of drinkable water and are not in use now. These, therefore, face a threat of either seals them completely or levels them with soil to avoid possibilities of animals and children falling in accidentally. It is therefore of vital importance that concern authorities of these wells be approached and convinced to not to level them, but be allowed to seal partially in such a way that a comfortable opening be left for bats to make in and out moment while foraging.

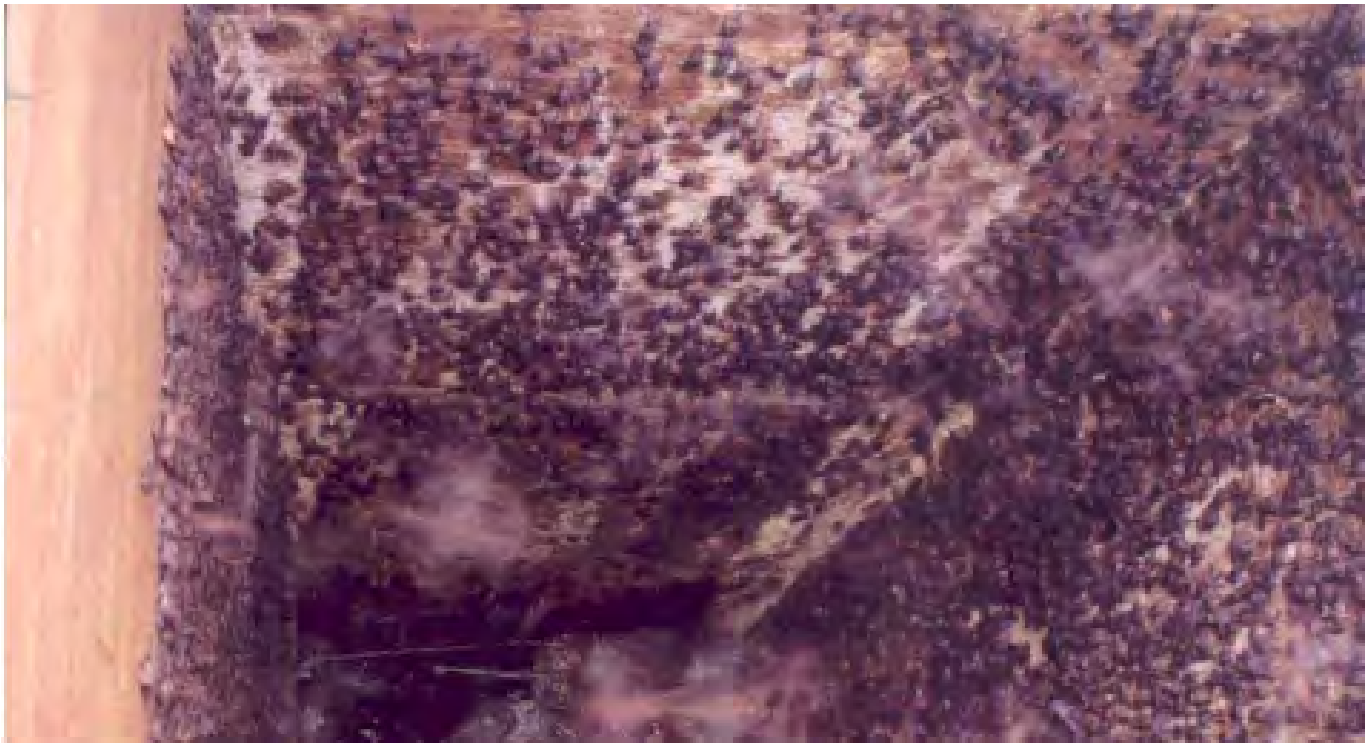
Individuals of *Pteropus giganteus* congregated over the trunk of tree of *Pithecellobium dulce* (Vilaiti Imaly) to overcome the effect of heat waves during hot afternoon of a summer day

3. Chiropteran roosts located in ancient monuments like Forts and Havelies are prone to face threat of renovation. Therefore, constant efforts are required to convince the concern authorities to avoid probable damage to these bat roosts. If comfortable, they can be further better educated about importance and diversity of species of bats inhabited in roosts, located in their premise, and be encouraged to make it a wildlife spot to show to visitors. But, they should only be permitted if they follow the wildlife regulatory norms.

4. Local wildlife department must be chased to rationalize their efforts to include bats in their conservation priorities. Currently bats are in low profile and not in their conservation priority list.

5. Study area should regularly be reinvestigated in due course of time to assess status of diversity of bats and to evaluate the impact of conservation measures initiated in this study.

6. Similar approach of studying bats and efforts to create bat conservation awareness is well required in other parts of the Thar Desert, such that a wider



A mix colony of *Rhinopoma microphyllum kinneari* and *Rhinopoma hardwickii* roosting on the fort walls of Chakelav well at Mehrangarh fort premise, Jodhpur

objective of conservation of bats in this unique ecosystem be achieved.

Future Plan

Following is my future plan to conserve diversity of bat in the Thar Desert.

1. I would try to promote and ensure fruitful functioning of the bat clubs instituted in the study area, such that they achieve their objectives of imparting bat conservation awareness education and to inculcate sense of appreciation about bats among younger and future generations.
2. To achieve wider objectives of conservation of bats in the Thar Desert, I would write some more project proposals and try that similar types of studies are undertaken and bat conservation awareness programme be launched in remaining parts of the Thar Desert.
3. I would also try to produce a documentary film on bats of the Thar desert, which would be instrumental in imparting bat conservation education and strengthen the future initiatives of bat conservation awareness programme in this region.
4. Initiatives of community conservation have been quite successful and a proven tool to protect various wildlife species in this region. I therefore would target prominent community leaders to educate them about significance and facts on bats, and would try to convince them that bats are the symbol of prosper and healthy ecosystem. Then would request them to advertise and impart this message among their community followers such that they start protecting bats.
5. I would write popular articles and try to ensure that information on bats be frequently published in local newspapers, such that readers be updated about status of bats in their region.
6. I would appreciate to assist local forest department in providing scientific information on bats and in future bat conservation initiatives taken on their behalf, if required.

Acknowledgement

On behalf of the project team first and foremost I express our sincere gratitude to The Rufford Small Grant Foundation, UK for providing full financial support to undertake this project work. I extend my especial thanks to Ms. Jane Raymod (Director, Rufford Small Grant) for her cooperation throughout the project implementation period. I personally extend my word of gratitude to Prof. G. Marimuthu (Head, Department of Animal Behaviour and Physilogy, Madurai Kamraj University, Madurai, India), Dr. Paul Bates (Director, Harrison Zoological Museum, Kent, England) and Dr. Shahroukh Mistry (Associate Professor, Biology Department, Westminster College, New Wilmington, PA, USA) for their letter of recommendation and valuable guidance to execute this project.

Bat Conservation begins in Pakistan

Muhammad Mahmood-ul-Hassan*

The idea of bat conservation is almost unheard of in Pakistan. Bats are totally ignored by the government and civic organizations and even by most conservationists.

Few Pakistani know much about bats, and most of what they know is wrong and usually damaging. Bats are mostly misunderstood and largely unwelcomed in most of this wildlife-rich country.

It was in 2004, when I heard that the India-based Chiroptera Conservation and Information Network of South Asia (CCINSA) and its founder, BCI South Asia Liaison Sally Walker, had accepted an invitation to coordinate and led a Conservation Assessment and Management Plan (CAMP) workshop for Pakistan Mammal at Lahore in collaboration with IUCN Pakistan. I had recently joined the University of Veterinary and Animal Sciences, Lahore at that time and was not known to anyone in the conservation circles of Pakistan. So I could not attend that workshop.

Later when I went through the proceedings of that CAMP workshop, I came to know that there was not a single bat biologist in Pakistan. Keeping in mind this situation, I started taking interest in bats and thought to play a leading role in bat conservation in my country. At first, I requested Madam Walker to organize another bat training workshop at Lahore where I could host her from the platform of my University providing here some partial funding to hold this workshop. Keeping in mind, my level of interest she invited me to attend a training workshop at Nepal where I was able to learn field techniques for studying both Volant and non-Volant small mammals. This workshop was a turning point in my career where

Dr. Mahmood and Mr. Arshad teaching the students how to fold and unfold the mist nets

Female post-graduate students erecting mist nets

I learnt non-lethal techniques for studying both bats and rodents from Prof. Dr. Paul A. Racey and Mike Jordan, respectively.

Prof. Dr. Racey took special interest to refine my project proposal for studying bats in Pakistan. It was only due to his encouragement and support, that in 2008 I could win the first bat project in Pakistan. The Higher Education Commission of Pakistan further supported me by providing funds to obtain a three months' training in Bat Ecology and Bioacoustics Laboratory, School of Biological Sciences, Bristol, UK.

I feel honored to state that I have worked for some time with Professor Dr. Gareth Jones in his Laboratory at the University of Bristol. He taught me basic techniques for recording bat sounds and their analysis. He

***Associate Professor, Department of Wildlife and Ecology, UVAS, Lahore, Pakistan. E-mail: drmmhassan@uvas.edu.pk**

also taught me molecular techniques for analyzing bat's DNA. It was only due to untiring efforts that we could compile the first book on bats of Pakistan that was later published by the Verlag Dr. Muller, Germany.

While I was in his laboratory, I applied to the Rufford Small Grants, UK to provide me funds for studying bats as well as educating other people about the importance of bats. I was lucky enough that I got this funding and after returning back to Pakistan I had everything with me to work as leading bat biologist of the country. Again, I requested Madam Walker to provide me literature for educating school children which she very kind to sent me within a few days. I translated this English literature into Urdu and got it published locally.

At the moment I along with Ms. Bushra Khan, Zoo Education Officer at Lahore Zoo, have distributed this literature to more than 400 school children. We have concentrated our efforts on children, hoping that an early appreciation and understanding of bats might produce lifelong changes in attitudes toward these invaluable mammals. Our overriding message: conservation is the responsibility of all of us who share this Earth.

Our teams take school students to bat-roosting areas, where we familiarize them with bats' physical features and their roosting and foraging needs. We help the youngsters identify threats to bats and suggest ways in which they and their families and communities can improve things. We encouraged them to share their new knowledge with classmates and families.

In addition to imparting conservation education to school children, I am helping other university teachers to initiate bat research at their own institutions. Dr. Muhammad Sajid Nadeem, Assistant Professor at

One of the female trainee finally stopped hesitating and took the initiative

Dr. Mahmood showing students how to capture bats in their hand

Department of Zoology, University of Arid Agriculture, Rawalpindi is another bat enthusiast who has initiated bat research at his own University. We have a small group of students working with us on various aspects of bat biology.

Three of my M. Phil. students have already earned their post-graduate degrees on bat biology while two others are underway. Five of my Ph. D. students are also working on different aspects of bat biology.

Recently, I arranged a two days workshop for imparting bat education at Govt. Post-graduate College Gojra. The students not only learnt the field techniques for capturing and handling bats, they also attended lectures about the importance of bats, taxonomy and identification, and recording and analysis of bat sounds. Mr. Suhail, Mr. Khalid and Mr. Aun along with their Head of Department took keen interest to learn these techniques. They were convinced that from now onward, their students will also study bats for fulfilling their research requirements. They were also very keen to purchase all the field and laboratory equipment needed for studying bats.

Research and Conservation Awareness of Bats in Palpa District of Nepal

Hari Adhikari[*] and Laxmi Karki[**]

Conservation of biodiversity is not possible if the present generation is not aware of its meaning and significance. Children and young adults are the decision-makers for future. With the objective of preparing them, a large awareness campaign was conducted in Nepal using mass and printed media with the funds provided by Chester Zoo. A series of activities were conducted in Palpa District of Western Nepal to conserve roosting sites of some species of bats. Scientific knowledge about this species was conveyed to the lay people in simple terms.

Nepal is high biodiversity country but has few researchers of a technical level to work on different aspects of biodiversity. To minimize this problem, 15 individuals were trained at the Institute of Forestry for safe handling of bats and identification techniques. Six of them were taken to Palpa District for intensive work on this important animal group. Since these are delicate animals, technicians with mist-net experience or bat-handling experience were given preference for hiring as assistants. These 6 individuals were further trained to best placement of nets, safe handling techniques, correct measurements, species identification, field guide use, and in addition trips to University museums to discuss defining species characteristics. Palpa district lies in hilly region with elevation range 200-2000m above sea level. The Southern part of this district acts as a corridor for large mammals like elephant, tiger, bear, etc. Small mammals like Bat had been ignored even by the government authorities and wildlife department. So an attempt was made to know the species richness, roosting sites distribution and identify threats in and around their territory.

Radio programmes were developed to reach millions of people in and around the district to know the roosting sites of bat species. Altogether 5 episodes of 30 minutes each were prepared. Very basic to advanced information about different aspects of bats was broadcasted in sequence. The first episode conveyed very basic information on the external characters and ecological role of bats in the environment including agriculture. Feedback from listeners was collected, such as information about caves, tree roosting bats and places where there is occurrence of bats. This information was sorted out and field visits were made. At the same time, articles were published in local newspapers to reach educated people. Remote localities were visited to identify bat species. Interviews were conducted with the local people to learn their knowledge of different roosting sites of bats. In Argali V.D.C, most of the people related that

Field survey

formerly a huge roost of *Pteropus giganteus* existed in their locality but eight years ago their number decreased due to death by electric shock from electricity poles when they rest upside down and touched two wires. Later the whole colony disappeared from that location. Recorded interview clips of local people were also included in the program to make the program lively so that people were more interested to hear the program. The program was developed at the field level, including information on features of the caves and the threats to the bat species in the past. Direct observations were discussed. A small gift were given to the local people who gave the information of the roosting sites. After species identification from the caves this information was broadcasted in the next episode. A further 4 episodes covered facts about caves, species identified, species

[*]**Country Representative -IUCN SSC Chiroptera Specialist Group CGS; Coordinator - Natural Resources Research and Conservation Center (NaReCon) narecon@yahoo.com**

[**]**Joint Secretary - Natural Resources Research and Conservation Center (NaReCon)**

characters, their feeding behavior, the positive effect in the society and ecology, significance of bat conservation and bat diversity in Nepal. After creating awareness to the forest official, who is the main government authority to look after mammals in that area, interview with the District Forest Officer was taken and his commitment to work for conservation of bats was broadcasted in the fifth episode. Requests for attention to bat conservation was made to the inhabitant of Palpa district through Srinagar via F.M. radio.

Earlier, bats were killed for meat in some localities by using shooting or throwing stones at bats inside the caves. People had many misconception regarding bats. They used to think that they are symbol of evil, or that all bats had rabies virus, and they attack the eyes of human beings, eat all the fruits from orchard, and are dirty. People now realize that the bats that had been roosting in their locality are doing positive things for them.

Surveys of as many roosting sites of these bats as possible was carried out to understand the species richness in the study area. Every roosting site was visited three times to account for the maximum diversity, reduce error in bat field identification and to know the average population at each locality. Bats were captured with the help of mist nets and butterfly nets to know the diversity of species present in that locality. Care was taken not to injure the bats or disturb the whole colony during this survey. Critical measurements and physical features of each captured bat was recorded.

Threats were identified by direct observation; secondary data were collected beyond observation. Semi structured questionnaire was prepared and carried out among local people to assess the decline in the food that bat consumes and to identify any human induced and natural threats.

Training in handling of bats and identification

Research team interviewing local public

Data on roosting sites were collected using informal surveys, structured questionnaires, direct field visits, locality mapping, and interviews with herders, school students, municipality staff, development workers and village people. Articles and news were published in many newspaper of local and national level.

Compilation of materials on bats that was broadcasted was distributed to other Radio Stations for them to include in some conservation awareness program. Eight species (*Hipposideros armiger*, *Miniopterus schreibersii, Rhinolophus affinis, Rhinolophus pearsonii, Rhinolophus ferrumequinum, Pipistrellus tenuis, Pteropus giganteus* and *Cynopterus sphinx)* in and around Palpa District were

identified roosting on 13 localities in remote areas (Tansen Municipality, Argali V.D.C., Madan Pokhara Valley, Bougha Ghumba V.D.C., Sahalkot V.D.C., Siluwa V.D.C., Ramdi Area, and Butwal, Dhovan V.D.C.,). This is a first record of bat species from this region.

School programs were conducted in 12 schools to create awareness among children to bring positive attitude about bats and to reduce misconception. Community meetings were held in different places for people of different ages. Management recommendations were made that would work at the local level for conservation of roosting sites of bats by using Participatory Rural Appraisal (PRA) tool. Members of the community was given chance to share information regarding threats to bats.

A press conference was conducted at the end of the Project to share the information to the news reporters and this news was covered in most of the national and local level newspaper. Educational Kit "Bat Conservation in Nepal: An Educational Kit" and Brochure "Bat Conservation in Palpa" were also distributed to the media people, students, teachers, local conservationist, and field level workers.

This survey created baseline data on status and distribution of bats in study area of Palpa district. This project adds new data on wild mammals of Nepal, as there has not been any research on bats in the study area. This program created understanding among local people. Recommendations for conservation of *Pteropus giganteus* will be made to the Government of Nepal. Large numbers of people are now aware about importance of bats and will act as a conservationist.

Species identification in the field using key

Interview with local community

Acknowledgement

I am indebted to Chester Zoo (North of England Zoological Society) for financially supporting this project. I would like to express my sincere thanks to Dr. Paul Racey, Dr. Neil Furey, Malcolm Pearch, Dr. Gabor Csorba, Dr. Sripathi Kandula, Dr P. O. Nameer, Sally Walker and Sanjay Molur, Dr. C. Srinivasulu for their help and advice during this project.

School level awareness programmes

SMALL MAMMAL NETWORKS

Chiroptera Conservation and Information Network of South Asia (CCINSA)

CCINSA is a network of South Asian Chiroptera specialists, educators 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.

Chair: Sripathi Kandula
Convenor and Administrator: Sally Walker
Red List and Technical Expert: Sanjay Molur

Rodentia, Insectivora, and Scandentia Conservation & Information Network of South Asia (RISCINSA)

RISCINSA network of South Asia was suggested by interested biodiversity conservation specialists and the purpose of this network, then is to link together rodent field researchers and their field knowledge throughout South Asia (Afghanistan, Bangladesh, Bhutan, India, Nepal, Maldives, Pakistan, Sri Lanka and Afghanistan) so the pooling of information can lead to conservation action.

Scientific Chair: Sujit Chakraborty
Convenor and Administrator: Sally Walker

SMALL MAMMAL NETWORK International Partners

Chester Zoo Conservation Fund supports ZOO/ CCINSA office, BAT NET newsletter and training in field techniques for bats. Chester Funds have also made it possible to conduct training for rodent biologists as well. Chester Zoo, which has an outstanding and very popular facility for exhibition and breeding of bats, and an active conservation interest in chiroptera is located in Upton-on-Chester in United Kingdom and administered by North of England Zoological Society. **www.chesterzoo.org**

Bat Conservation International BCI is one of the most active, innovative and respected bat conservation organisations in the world. BCI has supported CCINSA for many years and takes active interest in the growth of the Network and its individual batters. See BCI's wonderful website: **www.batcon.org**

IUCN SSC Bat Specialist Group
CCINSA represents the IUCN SSC Bat Specialist Group in South Asia. BSG utilises the CCINSA Network to locate specialists in different subject areas, to organise training as well as conservation assessment workshops and other activities to assist the CSG in their mission.
Contact : Chair Paul Racey: p.racey@abdn.ac.uk

CHESTER

BSG, SSC, IUCN

BAT CONSERVATION www.batcon.org

Small Mammal Mail

SMM is bi-annual Newsletter celebrating the most useful yet most neglected Mammals for both CCINSA & RISCINSA -- Chiroptera, Rodent, Insectivore, & Scandens Conservation and Information Networks of South Asia

Editor: Sally Walker; Technical Advisors: Sanjay Molur, B.A. Daniel, R. Marimuthu; and Publication Assistants: Latha Ravikumar, Ravichandran, Pravin Kumar

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

Note: ZOOS' PRINT Magazine, Journal of Threatened Taxa, Newsletters and a variety of reports can be found on our websites: www.zooreach.org and www.zoosprint.org.

Small Mammal Mail, C/o Zoo Outreach Organisation
9A, Lal Bahadur Colony, Peelamedu, Coimbatore 641004 TN INDIA
Phone: 91 422 2561087; Fax 2563269; Email: <zooreach@zooreach.org>
Websites: www.zooreach.org, www.zoosprint.org; www.pterocount.org; www.southasiantaxa.org.

ZOO OUTREACH ORGANISATION

WILD WILDLIFE INFORMATION LIAISON DEVELOPMENT

CCINSA

RISCINSA