



Newsletter of the Chiroptera Conservation and Information Network of South Asia
CCINSA and the IUCN SSC Chiroptera Specialist Group of South Asia (CSGSA)



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BAT NET & CCINSA

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Chiroptera Conservation and Information Network of South Asia (CCINSA)

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

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

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Notes on two evening bats of the genus *Myotis* Kaup (Chiroptera: Vespertilionidae)

Y. P. Sinha *

While studying bat specimens present in the National Collections of Zoological Survey of India, Kolkata and in the National Institute of Virology, Poona, I came across 13 males and 20 females of *Myotis muricola* (Gray) and 8 males and 4 females of *Myotis siligorensis* (Horsfield) from different places in India, Myanmar and Borneo, the details of which are given below. In this paper, notes on taxonomy, distribution and reproduction of these two species of *Myotis* have been provided. Measurements (in mm) of important body parts and skull have also been incorporated here in detail for future workers. The mean value of measurements has been given in parenthesis.

1. *Myotis muricola* (Gray, 1846)

1846. *Vespertilio muricola* Gray, Cat. Hodgson Coll. Brit. Mus. 4, (Nepal).

Common name: Nepalese Whiskered Bat

Material examined: 4 males, 7 females: Tiang, Mergui, South Myanmar (Burma); 31 Jan. 1882; J. Anderson. 7 males, 10 females: Yumuka, Mergui, South Myanmar (Burma); 24-25 Feb. 1882; J. Anderson. 1 male; Ross Island, Mergui, South Myanmar (Burma); 14 Nov. 1921; C. Primrose. 1 female: Borneo (Kalimantan); 1872. 1 female: Simla, Himachal Pradesh, India, 1871; Moulvi Atar Rahman. 1 male, 1 female: Hasimara, Bhutan Duars, West Bengal India, 17 & 19 Mar. 1916; N.A. Baptista.

Measurement: External body parts: 13 males: forearm length 34.0-36.5 (34.7); tibia length 14.5-16.0 (15.0); length of foot including claws 5.0-7.5 (6.5). 20 females: forearm length 34.5-36.0 (35.1); tibia length 14.0-16.0 (14.5); length of foot including claws 5.0-6.8 (6.3). Skull: 5 males: total length 13.0-13.7 (13.5); zygomatic width 8.0-9.0 (8.5); cranial width 6.0-6.7 (6.5); posterior palatal width (m3-m3) 5.1- 6.0 (5.5); upper tooth row (c-m3) 5.0 (inall); lower tooth row (c-m3) 5.0- 5.5 (5.2); mandibular length 9.5-10.5 (10.0).

Remarks: Taxonomy: I could not find any significant differences in measurements of *M. muricola* and *M. siligorensis*. Measurement given by Bates and Harrison (1997) of these two species also overlap each other. Therefore, these two species can only be differentiated on the basis of colour of fur and height of brain case and size of canine. Brain case is relatively lower and canine distinctly longer than the long cusp of third premolar (p4) in *M. muricola* as against domed skull and short canine in *M. siligorensis*. *M. muricola* has darker pelage with hair tip coppery brown as against hair tip shiny ochraceous in *M. siligorensis*.

Distribution: In Bates and Harrison (1997), the distribution of *M. muricola* is from Afghanistan to Taiwan and New Guinea. In the Indian subcontinent they have recorded this species from northern and northeastern India, Nepal, Afghanistan and northern Myanmar. Here specimens of this species have been examined from Himachal Pradesh, and West Bengal in India, South Myanmar and Borneo (Kalimantan).

Reproduction: A pregnant female specimen with a foetus in its late

stage in its womb and three young ones collected in the last week of January from South Myanmar indicate its breeding season. Bates and Harrison (1997) have not mentioned anything about its reproduction.

2. *Myotis siligorensis* (Horsfield, 1855)

1855. *Vespertilio siligorensis* Horsfield, Ann. Mag. nat. Hist. 16: 102. (Sligori, W. Bengal, India).

Common name: Himalayan Whiskered Bat or Siliguri Bat

Material examined: 6 males, 2 females: Nepal; Aug- Oct. 1876 and Jun- Sep. 1877; J. Scully. 2 males, 2 females: Dwali (Alt. 2770m), Almora dist., 4-5 Oct. 1967; Dogalbita (Alt. 2370m), Chamoli dist., 12 Jul. 1970; Uttaranchal, India, H.R. Bhat.

Measurements: External body parts: 8 males: forearm length 34.0-37.0 (34.8); tibia length 13.0-16.0 (15.0); length of foot including claws 6.5-8.0 (7.4). 4 females: forearm length 34.0-35.0 (34.6); tibia length 13.0- 15.5 (14.2) total length 12.6- 13.5 (13.0); zygomatic width 7.8-9.0 (8.3); cranial width 6.3-7.0 (6.6); postpalatal width (m3-m3) 5.0-6.0 (5.4); length of upper tooth row (c-m3) 4.3-5.0 (4.7); length of lower tooth row (c-m3) 5.0- 5.7 (5.4); mandibular length 9.2-9.7 (9.5). 1 female: total length 12.2; zygomatic width 7.4; cranial width 5.7; posterior palatal width (m3-m3) 5.0; length of upper tooth row (c-m3) 4.2; length of lower tooth row (c-m3) 5.5; mandibular length 9.2.

Remarks: Bates and Harrison (1997) could not study skins of this species from India and Nepal and have given forearm length as 30.0-31.5mm based on Malayan specimens studied by Medway (1969). Bates & Harrison (1997) included Dwali and Dogalbita, Uttar Pradesh (now in Uttaranchal) in the distribution range of this species based on Bhat (1974) who has not given measurements of this species. Therefore, measurements of above specimens from Nepal, Dwali and Dogalbita in Uttaranchal, India will be useful for further study on the taxonomic status of *M. siligorensis*, and *M. muricola*.

Acknowledgements

The author wishes to thank the Director, Zoological Survey of India, Kolkata for providing facilities and to Dr. H.R. Bhat, then (in 1988) Director, Virus Research Centre, Poona for help in taking measurements of some bats present in this institute. I am also thankful to Ms. Sally Walker for encouraging me to do work on bats.

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Update : Bat Tree and Cave Survey for Forest Divisions -- up to April 2004

Up to now, foresters in South Asia have not paid much attention to bats, and even to rodents and other small mammals. Bats are not even listed as wild animal in the annual census of wildlife in Protected Areas, sanctuaries, etc. Many foresters with whom we have spoken about the utility of bats were horrified that such a useful animal was being overlooked.

We took that for genuine interest and sent 500 foresters our various materials, BATNET, the Summary of the C.A.M.P. report, our educational packets, etc. and got a good response from them.

Thus encouraged, CCINSA decided to try enlisting foresters in the various forest divisions of Protected Areas to make a beginning towards census of bats. We sent around a survey form with very basic instructions so that DFO's could enlist rangers and even local people to report bat trees and caves and count bats. We used a picture of a very large bat tree full of bats to give instructions in

counting bats. Caves would be more difficult but we figured a try is better than nothing.

We will be sending all issues of BAT NET to these forest divisions to keep up interest. We thought it would be useful to report our results till date in order to encourage the foresters who have not sent back their forms and also to convey what information we got to our bat network members.

If you know foresters personally or live near a forest division and can help with this survey, please do so. If you want a copy of our letter to them and the form, just write to us with this request.

Thanks very much to Bat Conservation International (BCI) and Riverbanks Zoological Gardens for funding our Foresters for Bats project so far.

CCINSA Staff

Bat Tree Survey, Forest Divisions, results up to April 2004

Name & address/ Ph	Location	# Bat trees	Tree Species	No. of bats	Kind of bat
R.J. Asari, CF MNP Jamnagar, Saurashtra, CF MNP, Nagnath Road, Ganjiwada, Jamnagar, Gujarat Ph: 98250-49064 (M), 2557020 (O)	Girnar Forest, Junagadh Dist. (i) Bordevi	3	<i>Ficus bengalensis</i>	262	Fruit bat
			<i>Ficus bengalensis</i>	232	Fruit bat
			<i>Ficus bengalensis</i>	72	Fruit bat
	(ii) Nalpani	1	<i>Ficus bengalensis</i>	153	Fruit bat
	(iii) Jambudi	1	<i>Ficus bengalensis</i>	372	Fruit bat
	(iv) Manuela	2	<i>Ficus bengalensis</i>	122	Fruit bat
			<i>Mangifera indica</i>	82	Fruit bat
	(v) Mathura Jamnaagar Dist.	1	<i>Ficus bengalensis</i>	52	Fruit bat
	(vi) Victoria Bridge	2	<i>Tamarindus indicus</i>	372	Fruit bat
	(vi) Victoria Bridge		<i>Tamarindus indicus</i>	154	Fruit bat
(vii) Kileshwar Barda Hills	1	<i>Ficus bengalensis</i>	132	Fruit bat	
(viii) Barda Hills (Sanctuary)	1	<i>Ficus bengalensis</i>	76	Fruit bat	
S. Krishnaian, D.F.O., S.V. Sanctuary, A.P., Wildlife Management Division Tirupathi, Chittoor Dist. 517 507 Ph: 0877-80980 (T)	Chittecheria	6	<i>Tamarindus indicus</i>	>2000	Fruit Bat
	Kuchivaripalli	1	<i>Terminalia arjuna</i>	>500	Fruit Bat
	Madhauarapu Ponu	4	<i>Tamarindus indicus</i>	>3000	Fruit bat
V. Naganathan, I.F.S., Wildlife Warden Gulf of Mannar Marine NP Ramanathapuram Ph: 230079 (O) 230088 (R)	Aathur	3	<i>Terminalia arjuna</i>	3000	Fruit bat
	Srivaikundam	2	<i>Terminalia arjuna</i>	3000	Fruit bat
Anil Joshi, D.F.O., Wildlife Division, Hamirpur 177 001, H.P. Ph: 01972-222319 (F)	Private area-Sahimdada- Bagh-Gangual Road, Near Permanent Nursery Kot towards West.	26	Mango	~1000	Fruit bat
V.K. Chaudhary, R.O.F., Sheikhpura, Jamui Forest Div, Jamui, Bihar	Samas, Barbigaha	5	Tar	50	Common Indian Bat
	Ambari-Shekhopur Sarai	1	Peepal	150	Common Indian Bat
	Chema, Shekhopur	1	Peepal	100	Common Indian Bat
	Katan-Ghat Rosma	2	Peepal	250	Common Indian Bat
	Babasbigaha-Barbigaha	1	Bargad	250	Common Indian Bat
	Mehus-Sheikhpure	1	Peepal	200	Common Indian Bat
	Mafo, Sheikhpure	1	Peepal	150	Common Indian Bat
	Akani, Ariari	1	Bargad	250	Common Indian Bat
	Kasar,Ariari	1	Bargad	100	Common Indian Bat
	Husaikabad, Ariari	1	Peepal	150	Common Indian Bat



Name & address/ Ph	Location	# Bat trees	Tree Species	No. of bats	Kind of bat
Arvind Kumar, R.O.F., Chakai Range Jamui Forest Div., Bihar	Chewara-Chewara	1	Bargad	100	Common Indian Bat
	Sthakha, Shekhopur Sarai	15	Tar	250	Common Indian Bat
	Chakai, Bazar	2	Eucalyptus	376	Common Indian Bat
	Jamuni	1	Peepal	160	Common Indian Bat
	Muswadih	1	Peepal	150	Common Indian Bat
Bat Cave Survey, Forest Divisions, results up to April 2004					
Name & address/ Ph	Location	List of bat caves	Type of cave	No. of bats	Kind of bat
S. Krishnaian, D.F.O., S.V. Sanctuary, A.P., Wildlife Management Division, Tirupathi, Chittoor Dist. 517 507 Ph: 0877-80980 (T)	Gundala Kona	Gundala Caves	Overgrowth	>200	Insect bat
	Jangamala Hills	Jangali caves	Overgrowth	>500	Insect bat
	Abbalameru	Abbalameru caves	Over growth	> 500	Insect bat
	Thumburtheertham	Thumburtheertham caves	Overgrowth	> 500	Insect bat

Cantor's Roundleaf Bat *Hipposideros galeritus* Cantor, 1846: An addition to chiropteran diversity of Andhra Pradesh, India

C. Srinivasulu *

Cantor (1846) described a roundleaf (earlier leaf-nosed) bat based on specimens from Penang (Malaysia), distinct from other such known bats in Asia in bearing unpigmented noseleaf and two supplementary leaflets. From India, Dobson (1874) described a similar looking taxon as *Phyllorhina brachyota* basing on a specimen collected from Central India. Presently the latter name is considered as a synonym of *Hipposideros galeritus* Cantor, 1846. Although widespread in southeast Asia, this species is known from India from very few registered localities (Table 1) indicating restricted distribution. Owing to its restricted distribution and small colony size it has been assigned a Near Threatened status in South Asia (Molur *et al.*, 2002).

While conducting surveys to document bats of Nallamala Hills (14°26'-16°31'N & 78°30'-80°10'E) in the Eastern Ghats of Andhra Pradesh, I collected Cantor's Roundleaf Bat *Hipposideros galeritus* Cantor, 1846, a species that has

been hitherto not recorded from Andhra Pradesh. Nallamala Hills – an unbroken chain of rugged hills encompassing an area of about 7,640 km² include two protected areas [namely, the Nagarjunasagar Srisailem Tiger Reserve (3,568 km²) and the Gundla Brahmeswaram Metta Wildlife Sanctuary (1,194 km²)] – is home to a rich and varied faunal diversity (Rao *et al.*, 1999; Srinivasulu & Rao, 2000; Srinivasulu, 2002; Srinivasulu & Nagulu, 2002; Srinivasulu, 2003; Rao *et al.*, in press).

On 9 June 2003, while studying bats in the Akkamahadevilam Cave (16°07'N & 78°52'E) located on a ledge facing River Krishna in the Nagarjunasagar Srisailem Tiger Reserve, we mist-netted five individuals (3 females with suckling young and 2 males) of Cantor's Roundleaf Bat. Only the males were collected as voucher specimens (NHM.OU MAMM/CHI – 1/2003 & NHM.OU MAMM/CHI – 2/2003) that have been deposited in the Natural History

Table 1. Details of registered localities of Cantor's roundleaf Bat *Hipposideros galeritus* Cantor, 1846 in India

S. no.	Location	State	Longitude	Latitude	Source
1.	Singar	Bihar	24°48' N	85°00' E	Wroughton, 1915
2.	Danta	Gujarat	24°13' N	72°50' E	Ryley, 1914
3.	Palanpur	Gujarat	24°12' N	72°29' E	Wroughton, 1918
4.	Badami	Karnataka	15°58' N	75°45' E	Brosset, 1962
5.	Honawar	Karnataka	14°19' N	74°27' E	Wroughton, 1913
6.	Gwari	Madhya Pradesh	23°09' N	79°52' E	Khajuria, 1970
7.	Ajanta Caves	Maharashtra	20°30' N	75°48' E	Topal, 1975
8.	Bedsar Caves	Maharashtra	18°50' N	73°30' E	Brosset, 1962
9.	Bombay	Maharashtra	18°56' N	72°51' E	Brosset, 1962
10.	Chikalda	Maharashtra	21°29' N	77°12' E	Brosset, 1962
11.	Ellora Caves	Maharashtra	20°04' N	75°15' E	Brosset, 1962
12.	Akkamahadevi	Andhra Pradesh	16°07' N	78°52' E	Present study - Bilam Cave



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Table 2. External morphometry of the voucher specimens of Cantor's Roundleaf Bat *Hipposideros galeritus* Cantor, 1846 from Andhra Pradesh all measurements in mm)

S. no.	Parameter	Specimen*	Range**	Including forms from Sri Lanka
1.	Forearm (FA)	50.1	49.1	45.0 – 51.3
2.	Head-Body (HB)	52.5	54.8	45.0 – 59.5
3.	Tail (TL)	27.1	32.5	29.5 – 37.0
4.	Hindfoot (HF)	6.8	6.8	4.9 – 8.0
5.	Ear (E)	15.5	14.5	14.5 – 17.0
6.	Wingspan (WSP)	288	294	NA

* 1 - NHM.OU MAMM/CHI – 1/2003 2 - NHM.OU MAMM/CHI – 2/2003; ** After Bates & Harrison (1997)



Museum of the Department of Zoology, Osmania University, Hyderabad. No female voucher specimens were collected as all the three were with young. Cantor's Roundleaf Bat distinctly differs from other Roundleaf bats known from India in having two equal supplementary leaflets (Tate, 1941; Jenkins & Hill, 1981). The external measurements of the voucher specimens along with the range of measurements derived from other museum specimens (after Bates & Harrison, 1997) are given in Table 2.

The nearest known locality of its occurrence in southern India is Badami (15°58'N & 75°45'E) in Karnataka (Brosset, 1962; Bates & Harrison, 1997; Molur *et al.*, 2002). Cantor's Roundleaf Bat has never been collected from the Eastern Ghats. Thus, its presence in the Nallamala Hills puts on record for the first time its occurrence in the Eastern Ghats and Andhra Pradesh.

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A non-commercial fruit attracts bats and saves commercial fruits – a boon to orchardists

G. Marimuthu*

Orchardists frequently complain that bats regularly visit their grapes, guava, sapota and mango orchards during the night and feed on their crops. Such daily bat-visits create considerable loss to them (Verghese, 1998; Srinivasulu & Srinivasulu, 2001). An organized shoot, playback alarm calls, development of olfactory based repellent (Hall & Richards, 1987) and erecting nylon netting around vineyard (Verghese, 1998) are the suggested methods to control bats. Non-destructive control methods are adopted in countries like Israel, Australia, South Africa and Maldives where fruit damage by bats is serious (Mickleburgh *et al.*, 1993).

Recently, I completed a research project supported by the Ministry of Environment and Forests, Government of India. The project was to study the foraging behaviour of fruit bats in orchards found in and around Madurai. N. Singaravelan who worked in the project and awarded recently with Ph.D. at the Madurai Kamaraj University, carried out a detailed study on bats that visit orchards regularly. He spent several nights in orchards of grapes, guava, sapota and mango and quantified the bat-visits. He also included a non-commercial fruit, Singapore cherry *Muntingia calabura* in his work.

Results of the study showed that the three ubiquitous bats *Cynopterus sphinx*, *Rousetus leschenaulti* and *Pteropus giganteus* routinely visit orchards. A few farmers cover their entire orchard (particularly grapes) with nylon nets to avoid bats and birds. A few poor farmers beat drums and light torches to drive away the megachiropterans. Interestingly, the number of bat-visits, especially that of *C. sphinx*, to *M. calabura* was at least five times greater than the visits to the commercial fruits. Whenever a bat visits *M. calabura* tree, it approaches a branch with hovering flights, removes a ripe fruit with its mouth, carries the fruit to nearby tall trees (neem, banyan, tamarind, coconut and tulip) and begins to consume the fruit. After a few minutes of rest, the bat resumes its commuting flights between the fruit trees and feeding roosts.

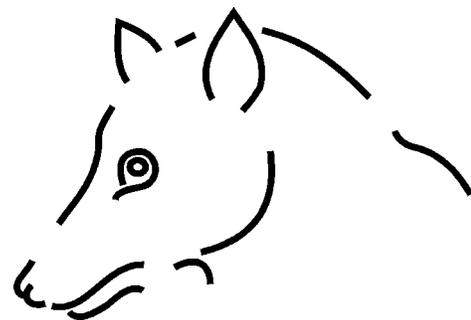
As the name implies, *M. calabura* was introduced from Singapore. The trees are usually found along the sides of public roads. The height of a tree is nearly 8m and the size of a fruit is similar to that of a common jujube, *Ziziphus jujuba*. A sapling of *M. calabura* grows into a tree within a year and yields sweet, yellowish orange fruits almost during all the seasons. Based on our study, we advise the orchard owners to grow *M. calabura* trees both at the peripheral and inner parts of their orchards. The availability of sweet, juicy and non-commercial cherry fruits in the midst of the commercial fruits will certainly attract the marauding bats. This non-destructive method not only saves the crops and propitiates orchardists but also makes

the much-preferred fruits available to bats. In addition, the bats disperse the seeds of *M. calabura* and in that way help themselves to propagate their favourite plants. Saplings of *M. calabura* may be available in most of the nurseries. As a member of the CCINSA I have this plant in the kitchen garden of my house.

I thank all the orchard owners for permitting us to conduct the study. The Ministry of Environment and Forests, Government of India supported the work.

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Status and distribution of Indian Flying Fox (*Pteropus giganteus* Brunnich) in Thar Desert of Rajasthan

Sumit Dookia * and Jeeva Ram Tak **

The Indian Thar Desert is a typical habitat having peculiar characteristics such as a wide variation in daily and seasonal temperature, sandy to rocky topography and xeric to dry deciduous vegetation. All these diverse conditions harbor assorted faunal elements of different groups of animals. Some of them have adapted to the desert conditions. On the other hand there are some other groups which are known to be resident of dense forests but have also been reported from desert areas e.g. *Pteropus giganteus*. The only representative of fruit bats found in Thar Desert of Rajasthan is *Pteropus giganteus* (Sinha, 1996).

Of the 1116 species of bats found throughout the world, 167 species are fruit bats and 12 are found in India (Molur *et al.*, 2002). Sinha (1996) reported only one species of fruit bat while Bates *et al.* (1994a) reported 2 species in Thar Desert, Rajasthan.

They are frugivorous and feed on flowers, nectar, fruits, tender and even mature twigs in the lean period. They visit flowers to feed upon nectar and serve as pollinators. They consume fruits of different plants as their food and scatter the seeds all over the area after digesting the pulp and serve as seed dispersers. In general they are beneficial to humans and have a significant role in the ecosystem.

Their distribution is restricted only to the semi arid part of the Thar Desert of Rajasthan. After a critical survey of literature (Prakash, 1963; Sinha, 1979, 1980; Bates *et al.* 1994a, 1994b, 1994c), only two localities Balsamnad (Jodhpur City) and Sheoganj City (Sirohi) have been reported for the presence of the species so far. Recently in our survey we located these fruit bats from five more localities in different districts of Thar Desert .

All relevant information was collected by interviewing local people. Five districts were selected for this study, viz., Jodhpur, Nagaur, Sirohi, Jalore and Pali of semi arid part of Thar Desert of Rajasthan from August 2001 to August 2003. All roosting trees were scanned whenever possible, in daytime. On every tree, bats were counted by repetitive counts (Rodgers, 1991; Sutherland, 1996). In general, fruiting trees were observed at random at night by detecting them through loud noisy calls and flying direction.

Seven different localities were observed as roosting sites of the Indian Flying foxes in the study area at Thar Desert. They are: Balasamnd Lake Palace and Rail Sadan (Jodhpur City), Lakhotiya Pond Garden (Pali City), Srisela (Pali), Khimel (Pali), Sheoganj City (Sirohi) and Bhinmal (Jalore).

They roost on various trees and all trees were old. The bats were found to roost on 8 different types of big trees i.e., Banyan (*Ficus bengalensis*), Peepal (*Ficus religiosa*),

Neem (*Azadirachta indica*), Ashoka (*Saraca asoca*), Tamarind (*Tamarindus indica*), Vilaiti amla (*Pithecaribium dulcae*), Jamun (*Syzygium cumini*) and Siris (*Albigia lebeck*). They were found to eat fruits of 7 trees - Banyan, Peepal, Almond, Guava, Ber, Neem and Mango in this region.

At present only two localities have been reported as roosting sites in Thar Desert, Balsamand Lake Garden (Prakash 1963) and Rail Sadan (Tak & Dookia, 2003) in Jodhpur city. In comparison to previous roosting sites in Thar Desert, which are old (more than 10 years) where fruiting trees were very less and availability of fruits was scarce throughout the year we want to add additional roosting sites. Now-a-days, the cropping pattern has changed and fruiting orchards are easily available for bats.

The economic value of fruits bats are well documented, they contribute a great ecological significance as seed dispersers and pollinators with a wealth of additional assets, which come along with these activities (C.A.M.P., 2002). Fruits bats play an important role in the regeneration of forests (Goyal & Sale, 1992). Goyal and Sale (1992) also made a strong recommendation that fruits bats be removed from the Vermin category (Schedule V) of the Indian Wildlife Protection Act, 1972. A strong request was also made in C.A.M.P. workshop for South Asian Chiroptera -2002, to shift fruit bats to a higher category, which will prohibit them from being destroyed or harassed with impunity.

Acknowledgement

We are very thankful to Head, Dept. of Zoology for providing us necessary facilities during the study and SD is highly thankful to Officer-in-charge, Desert Regional Station, Zoological Survey of India, Jodhpur for permitting him to do this study in Thar Desert of Rajasthan. Mr. Gulab Ram of Village Khimel is acknowledged for providing us assistantship during our visits to these areas.

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New CCINSA Members since July 2003

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Khan, Mr. Ahmad
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Store, Mingooa (Nishat
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Technical officer to
CWW and P.R.O.
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Kerala 680654

Wadatkar, Mr. Jayant S.
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Amravati 444 603,
Maharashtra

Total CCINSA members 137

New Dimensions for Training for CCINSA

CCINSA field techniques training has followed a format of calling participants from, first, all over India, and later from all over South Asia to attend training workshops. Also at these "regional" workshops we normally invite an external resource person with some special qualification. For the first training workshop we invited Dr. Paul Bates, author of *Bats of the Indian Subcontinent*. For the second training workshop we invited Dr. Paul Racey, Regius Professor and Chair of the Chiroptera Specialist Group.

Recently ZOO/CBSG, South Asia, administrator and host, for both the CCINSA and RILSCINSA (rodents, etc.) groups conducted a C.A.M.P. workshop for Non-Volant Small Mammals of South Asia. Many CCINSA members were present also. A numbers of "batters" are also "ratters" in the wildlife arena. Also at this workshop was our trainer for Non-volant Mammal techniques, Dr. Mike Jordan.

At the workshop Dr. A.K. Chakravorty, a participant who is both a batter and ratter asked me if it would be possible to organise a training for some interested students and other biologists in Mandya. In discussing this and pursuing a method, one thing led to another and the following scenario emerged :

-- CCINSA and RILSCINSA can collaborate on field techniques workshop, because the timing "works" for setting traps, putting up nets, catching bats, recording information, checking traps, etc. Time and money could be saved by training biologists to combine bat and rodent studies in fact, as well as training.

-- Both CCINSA and RILSCINSA have experienced field biologists who have also trained with our external advisors and resource persons. We will set up a "Training Team" of the most expert and interested to run smaller "in country" training for India which involves the team travelling to an area where a number of biologists live who are interested in bat and rodent field techniques training. The first such training will be in Mandya organised by A.K. Chavravorty sometime later this year.

-- External Resource Persons, such as Paul Racey and Mike Jordan, can start visiting other South Asian countries where there is virtually no expertise in surveying bats and rodents, such as Bangladesh and Pakistan.

-- The first such course will be in Karachi and Islamabad, Pakistan in October for bat and rodent field techniques led by Paul Racey and Mike Jordan hosted by Karachi Zoo, Zoological Survey of Pakistan, IUCN Pakistan, Pakistan Museum of Natural History and organised by CCINSA, ZOO and CBSG, South Asia.



Gathering evidence of the utility of bats: Training in Field Techniques for Ecological Studies of Chiroptera

C. Srinivasulu* and Sally Walker**



The Chiroptera Conservation and Information Network of South Asia (CCINSA) and the IUCN SSC Chiroptera Specialist Group joined with the College of Forestry, Kerala Agricultural University, Thrissur to conduct its second field techniques training workshop, from 28 July – 1 August 2003 sponsored by Chester Zoo and Marwell Zoo, U.K at Thrissur.

The first such workshop was conducted at Madurai Kamaraj University, School of Biological Sciences almost two years ago, ably led by Dr. Paul Bates from U.K. and author of the definitive book on bats of this region *Bats of the Indian Subcontinent*, (1997). He was assisted by Dr. M. S. Pradhan and Dr. Y. P. Sinha from the Zoological Survey of India. This workshop focused on general field techniques and taxonomy with a day spent on the IUCN Red List Criteria and Categories and the C.A.M.P. Workshop Process in order to prepare CCINSA members for the impending Chiroptera C.A.M.P. which was held last year in January.

The South Asian Chiroptera C.A.M.P. covered all 123 species of South Asian Chiroptera. After that workshop, which updated the output of the 1997 BCPP C.A.M.P. for mammals, CCINSA has continued to lobby very seriously to get fruit bats off the Vermin (Schedule V) list of the Indian Wildlife Protection Act, 1972 as ammended upto 1991. About one year ago, while pursuing that objective, we learned from Ministry officials that they required scientific evidence of the utility of fruit bats in India! There are plenty of published studies of the ecological utility of fruit bats from other tropical countries, but such evidence from this country was required to justify the removal of these controversial and misunderstood animals from the Schedule which permits anyone to capture, harass, torment and kill them with legal impunity.

Threatened bats of India

Fruit bats (Megachiroptera) -- total 5

Latidens salimalii Thonglongya, 1972 -- EN
Pteropus faunulus Miller, 1902 -- EN
Pteropus hypomelanus Temminck, 1853 -- EN
Pteropus melanotus Blyth, 1863 -- VU
Pteropus vampyrus (Linnaeus, 1758) -- EN

Insectivorous bats (Microchiroptera) -- total 24

Hipposideros diadema (E. Geoffroy, 1813) -- VU
Hipposideros durgadasi Khajuria, 1970 -- EN
Hipposideros hypophyllus Kock & Bhat, 1994 -- EN
Ia io Thomas, 1902 -- EN
Miniopterus pusillus Dobson, 1876 -- VU
Murina grisea Peters, 1872 -- CR
Myotis annectans (Dobson, 1871) -- VU
Myotis blythii (Tomes, 1857) -- VU
Myotis daubentonii (Kuhl, 1819) -- EN
Myotis montivagus (Dobson, 1874) -- VU
Myotis mystacinus (Kuhl, 1819) -- VU
Myotis sicarius Thomas, 1915 -- EN
Nyctalus leisleri (Kuhl, 1819) -- EN
Otomops wroughtoni (Thomas, 1913) -- CR
Philetor brachypterus (Temminck, 1840) -- EN
Pipistrellus savii (Bonaparte, 1837) -- VU
Rhinolophus cognatus Andersen, 1906 -- VU
Rhinolophus ferrumequinum Schreber, 1774 -- VU
Rhinolophus hipposideros (Bechstein, 1800) -- VU
Rhinolophus mitratus Blyth, 1844 -- VU
Rhinolophus subbadius Blyth, 1844 -- VU
Rhinolophus trifolius Temminck, 1834 -- VU
Rhinolophus yunanensis Dobson, 1872 -- VU
Taphozous theobaldi Dobson, 1872 -- VU



Participants pose with the world's largest bat (see hovering figure, left).
 Photo by C. Srinivasulu.

Therefore, it seemed a good time to start promoting ecological field studies, which could turn up evidence of the tremendous positive impact which both fruit bats and insectivorous bats have on the ecosystem. There are some such studies ongoing currently but many, many more studies are required, both ecological as well as population, distribution, etc.

In the C.A.M.P. workshop, 5 fruit bats and 24 insectivorous bats were assessed as threatened in India. See list above.

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New topics were added to this workshop. As a result of the C.A.M.P. workshop, we now have very specific information about the bats of South Asia and can begin to educate people about them. Bat researchers themselves are the most effective educators as they are passionate about their field. Therefore, in the workshop a slot for education was scheduled. Also, some information about bats can best be gathered if one observes them up close and a few researchers in CCINSA keep bats, so a module on captive management was included as well.

CCINSA now knows of many bat researchers in India but other countries in South Asia are not so rich in researchers. Therefore CCINSA is trying to build up a community of bat researchers in the surrounding countries as well. For the workshop a group of 5 budding bat researchers from Bangladesh made the very long journey by train and also a group of 3 from Sri Lanka. In the coming years, we will try to find biologists in Nepal, Bhutan, Maldives and Pakistan who would take up bat studies. Finally, although India has more bat researchers than other countries, it is not sufficient to cover this important and large group sufficiently. Bats are the largest group of mammals in India -- 114 species out of about 400 mammals. There is much more work to do on bats so that we do not lose these extremely useful animals.

Resource Persons

The workshop was privileged to have **Dr. Paul Racey, Chair of the SSC IUCN Chiroptera Specialist Group** which CCINSA represents in South Asia. Dr. Paul Racey is Regius Professor of Natural History in the Department of Zoology, Aberdeen University, Scotland. Dr. Racey Co-Chairs the SSC IUCN Chiroptera Specialist Group along with Dr. Anthony Hutson, and an active bat researcher. He is active on many animal committees, including the Council of the London Zoological Society and the Inspection team for Welfare of Laboratory Animals, etc.



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

Paul's specific major projects are below

(a) Testing the wildlife corridors hypothesis

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

recording to test the hypothesis that bats move between occupied and vacant habitats along vegetation corridors.

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

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

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

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

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

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

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

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

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

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

(g) The effect of different logging regimens on bat community structure and ecology -- This project is supported by The Leverhulme Trust and will begin in June 2000 in Trinidad.

James Andrewes, Animal Technician for Chester Zoo's amazing bat enclosure, the Twilight Zone was resource person for the captive management module. James has had a lifelong fascination with natural history. He studied Conservation Management at Farnborough College of Technology and has worked at Chester Zoo since 1986. In addition to caring for the animals, he shows visiting dignitaries around the zoo, particularly the Twilight Zone which houses "his" Bats.



Resource persons also included senior biologists from Zoological Survey of India, **Dr. M. S. Pradhan** and **Dr. Y. P. Sinha**; and senior bat experts from Madurai Kamaraj University, **Dr. G. Marimuthu** and **Dr. Sripathi Kandula**. **Mr. P. O. Nameer**, our host also served as a Resource Person giving a fascinating demonstration along with his student, **Mr. Roby**, of preparing dry specimens of bats. Second author **Sally Walker** was resource person for education.



Inaugural

Luckins C. Babu, Associate Dean, College of Forestry; P. O Nameer, Assistant Professor, College of Forestry and General Convenor of the workshop; O. P. Kaler, IFS, Registrar KAU; Paul Racey, Regius Professor of Zoology, Aberdeen University and Chair, IUCN SSC Chiroptera Specialist Group; G. Marimuthu, Chair, CCINSA and Sally Walker, Convenor, CCINSA. Nearly everyone on the dias stressed the importance of appropriate legal protection of bats in their inaugural remarks.



Inaugural function in the KAU auditorium.

Workshop : Day 1

Bats are the 2nd largest animal group in the world. The total number of bat species in the world has gone up from 1001 to 1,111 according to Dr. Nancy Simmons, the premier chiroptera taxonomist in the world. Her checklist is to be published in Wilson and Reeder's long awaited latest edition of the book "*Mammals species of the world: a taxonomic and geographic reference*" which will come out sometime. In South Asia, bats make up the largest group of mammals. Bats are the only volant (flying) mammals.

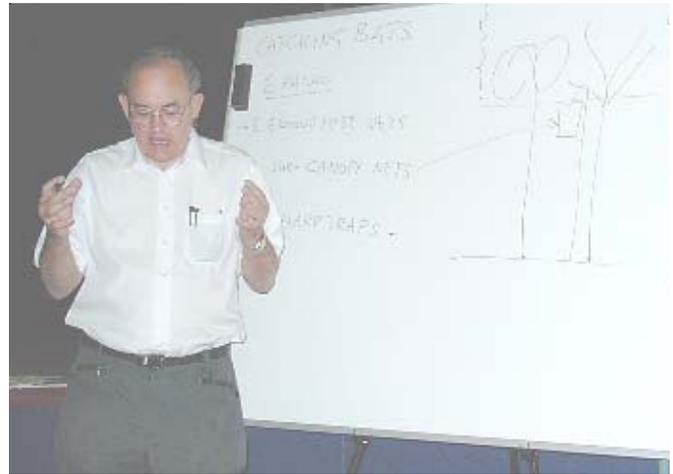
The objectives of this field techniques workshop were:

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

Every morning there was a lecture session, followed by a demonstration in the field in the afternoon, and bat watching and catching at night. Dr. Paul Racey was the primary resource person and for three days, without the use of slides or Powerpoint, he kept all participants glued to their seats during the day and on their toes at the demonstrations in the evening and at night.

DAY 1 -- Lecture

Surveys : Surveys are necessary first to determine what species of bats we have, e.g. presence / absence. Also for ecological studies, diet analysis, foraging guilds, habitat



Paul Racey lecturing participants

preferences need to be established by standardized survey techniques. By locating mist nets properly we can establish bats' feeding habits as to whether they are gleaners, aerial insectivores or frugivores. Surveys help determine the seasonality of reproduction. Mist netting also helps us know the habitat preferences of bats. Studies indicate that bats use woodland edges, unimproved grasslands, and water is much preferred.

Bat detectors : Species can be separated by sophisticated ultrasound bat detectors and molecular analysis. Bat detectors convert the ultrasound frequencies emitted by bats to frequencies audible to humans. The calls recorded through a recording medium can be studied by using computer software called the Bat Sound or AVISOFT. This kind of analysis provides 80% accuracy in the identification of species of bats emitting that frequency. The minimum distance required for proper detection is 30m in a clear night (sometimes it depends as it has been observed that at distances more than 100m the bat detector can detect the presence of bats pretty clearly) to 10m on a rainy or humid night.

Methods : Dr. Racey described different kinds of methods used for catching bats include ground mist nets, sub canopy nets, harp nets or -- for best results -- a combination of all the three. He demonstrated the use of ground mist nets and sub-canopy nets in the afternoon at a fruit orchard.

Bat bites : He discussed that bat bites and their implications including diseases carried by them. European Bat Lyssa Virus is a rabies-like virus occurring in European countries that causes death in a few weeks of infection. EBLV I was reported from Serotine (*Eptesicus serotinus*) while EBLV II has been found in Daubenton's Bat *Myotis daubentonii*. Cholera can be contracted from *Hipposideros speoris*. Juliet Vanitharani related that this species was reported to have caused cholera in selected areas of Tamil Nadu.

Topics related to postnatal growth, relationship between tooth wear and age, roost count techniques and problems faced in deploying mist nets in forested areas with large wildlife were discussed at length.





Dr. Racey demonstrates erection of mist nets

Fieldwork on Day 1

After a demonstration of mist net erection, participants erected 6 mistnets in Sapota orchards. Paul explained the use of mats for collecting bat faeces for dietary analysis. The mat can be made from indigenously available jute or any other easily available material. Faeces can be easily collected from it to monitor the diet of both insectivorous and frugivorous bats.

Later, participants collected specimens of Greater Short-Nosed Fruit Bat *Cynopterus sphinx* in the nets and learned to remove the netted bats without causing them any pain or injury. A few animals were taken back to the venue to show participants how to take morphometric measurements before releasing.



Mats for collecting bat faeces for analysis

DAY 2

Dr. Racey discussed taxonomy of bats, emphasizing the need for a dichotomous key for easier identification of species of the region. The key in preparation was passed around and made available to participants for use and review. Dr. Racey taught the importance of DNA analysis

and methods for taking biopsy punches of wing membrane of bats. Examples of cryptic species have been discussed in light of the methods used for identification of problem species or subspecies pairs. Echolocation calls of *Pipistrellus* species of United Kingdom fall in the same range but the DNA analysis showed at least 11% divergence between the species.



Releasing a bat from mist net without pain to either man or animal

He described the reproductive biology of bats in brief and methods to assess the reproductive stage among male and female bats. He related the importance of hair cuticular pattern and shape of the baculum, their efficacy and problems related with these studies.

Fieldwork on Day 2

Participants erected 5 mist nets in forest ecosystem and observed them. A specimen of Asiatic Yellow Bat *Scotophilus heathii* was collected in the mist net. After having taken the morphometrics the bat was released. A canopy net was erected and explained. The use of mats for collecting bat faeces was also explained in more detail.



Dr. Racey demonstrating how to measure bats





A demonstration led by Sally Walker on how to educate children on bats using education packets

DAY 3

Marking and tracking techniques

Dr. Racey described the use of forearm rings (phalange ring), reflective tape on rings, cyalume (it produces a bright cold light) in capsules, and necklace as well as the use of radio tracking, its advantages and disadvantages. He also discussed methods of faecal analysis to know the diet of bats. He related methods for collection of faecal pellets using cloth bags and plastic sheets both from bats in roosts and those mist netted. He also elaborated on the faecal pellet analysis methodologies and basic methods for identifying dietary components of frugivorous and insectivorous bats.

Fieldwork on Day 3

The participants were taken to a cave roost of the Fulvous Fruit Bat *Rousettus leschenaultii* in Peechi-Vazhani Wildlife Sanctuary. No collections were made.

DAY 4

Dr. M.S. Pradhan, Deputy Director, Z.S.I., Pune gave an interesting talk on Chemotaxonomy and its importance for the first lecture of the day.

James Andrewes, an Animal Technician from Chester Zoo UK described aspects of captive management and husbandry of bats. He said having good knowledge of the behaviour of bats in the wild was important for effective captive management. He also discussed enclosure designs and furnishing of the enclosures. He described the importance of environmental parameters including temperature and humidity, emphasizing their effects on bat behaviour and biology in captivity. He stressed the role of good husbandry, reproductive success and well being of captive bats.

Sally Walker, Convenor of CCINSA, showed slides of the various educational programmes about bats which had been conducted by both CCINSA members as well as zoos, NGO's and school teachers. She also led a demonstration of some activities possible using the materials provided in the Bat Education Kit. She also stressed the need for

disseminating information about the utility of bats for healthy ecosystems.

Fieldwork on Day 4

Dr. Racey demonstrated the use of bat detectors to know about the presence of bats in any given habitat. He reviewed ground mist netting, canopy netting and introduced catching of bats from the roost site. After capturing a specimen of *Cynopterus sphinx* and two specimens of *Hipposideros ater*, Dr. Racey related taxonomic tips for identifying these bats to participants.

DAY 5 - Q&A, Valedictory and Goodbyes

Paul Racey brought up several issues which had been raised during the workshop and spoke about them in detail, such as research prioritisation, animal welfare in research etc. Participants raised other queries regarding foraging guilds, bat detectors, radio tracking, conservation data base, bat behaviour, etc. that Prof. Racey clarified during the morning session. The Valedictory session was conducted at 12:00 noon after which the workshop participants had lunch and then set off for a visit to Guruvayur Temple and its elephant kraal before dispersing.



Babu from Bangladesh, Sampath from Sri Lanka and Mahesh from Pune setting up a mist net



Group photograph



Draft Research Guidelines for the Chiroptera community of South Asia-- CCINSA

At the 2nd Chiroptera Training Workshop themed on Ecological Techniques and Captive Breeding, we held a discussion of various research techniques being used by different individuals and institutions studying Chiroptera in this region. The workshop made a recommendation that we, as a community, formulate Guidelines for Research on Chiroptera in South Asia.

As it happened, Dr. Sharoukh Mistry, an Indian bat researcher teaching in the United States, had the same idea about the same time. Shortly after the meeting we received a message from Dr. Mistry suggesting that guidelines for research was advisable for CCINSA. We replied to him that the subject had come up in the workshop and suggested that since he also had the same idea, that he draft the first round. Dr. Mistry has kindly done so and it is included below for your information and comments. Dr. Mistry also included a copy of *Draft* Resolution No. 4.6 Guidelines for the Issue of Permits for the capture and study of captured wild bats from the session of the Meeting of Parties Sofia, Bulgaria, 22-24 September 2003 as a reference point, and we have published it here for your reference in the following pages.

DRAFT Guidelines for the Study and Conservation of Indian Chiroptera

The Chiroptera Conservation and Information Network of South Asia (CCINSA), cognizant of the fact that

- India has a high diversity of bats, with over 10% of the world's species
- the 114 bat species represent over ¼ of all Indian mammals
- 25% of Indian bats have populations that are threatened, and 11% are endangered
- bats provide essential ecological services via pollination and seed dispersal of native plants
- bats grant important economic functions by reducing populations of insects such as moths and mosquitoes that are crop pest or carry disease
- only two species are currently protected under the WPA
- the stability of populations is unknown for most species in India
- bat research and conservation activities are necessary and encouraged

hereby propose the following guidelines for those considering research or conservation activities involving bat species in India.

We also recommend that government and non-government agencies, that provide permits and/or funding for activities related to bats in India, ensure that these guidelines are adequately addressed by all parties involved in any such activities.

1. Persons wishing to conduct activities relating to bats should be knowledgeable of the current conservation status of the bat species in question, its biology, and the major threats to that species.
2. No research or activity should be undertaken that may harm the conservation status of a bat species. This includes any activity that may cause disturbance to roosting sites, their environs, or affect population levels.
3. Activities related to endangered species should be highly restricted unless the individual(s) can show cause as to why such work is necessary and that their activities will not harm the species.
4. Passive monitoring methods (study of echolocation calls, visual observations, use of infrared cameras, etc.) should be employed whenever possible.
5. Non-capture methods (e.g., the study of feces to examine food/prey preferences) are preferred whenever possible.
6. All non-invasive techniques should be exhausted before resorting to other means such as capture, marking, radiotracking, tissue sampling or specimen collection.
7. Capture methods, when used, should be appropriate to the study, humane, and not cause any injury. Care should be taken to ensure that capture in and around a roost does not lead to a decrease in the use of that roosting site.
8. Appropriate marking techniques may be used when necessary. However, caution should be exercised to ensure that the marking method does not affect the bats or increase mortality.
9. Radiotracking methods should be employed when justifiable, and when appropriate care has been taken to ensure that the transmitter does not affect the behaviour of the bat.
10. Tissue samples, when necessary for genetic analysis, should be collected in accordance to established methodologies, such as a wing punch, and should not harm the bat.
11. Collection of specimens without verification of population stability is strongly discouraged.
12. Caution should be exercised when studying bats during sensitive times of the year, such as hibernation or reproductive periods.
13. Individuals should have training, or be under direct supervision of experienced individuals, in the proper use of appropriate methods for non-invasive observation, capture, handling and marking.



Draft Resolution No. 4.6 : Guidelines for the Issue of Permits for the Capture and Study of captured wild Bats

Doc.EUROBATS.MoP4.12a, Session of the Meeting of Parties, Sofia, Bulgaria, 22 – 24 September 2003, *Draft Resolution No. 4.6*

(Note of the Convenor of the Intersessional Working Group) At the 8th Meeting of the Advisory Committee (Norway, May 2003) it was concluded that the Annexes 1 and 2 of Draft Resolution No. 4.6 need further review (see AC8 Record, page 8). However, since the AC 8 Meeting no further comments were received so far. Thus the Annexes will be reviewed before adoption at MoP 4.

Guidelines for the Issue of Permits for the Capture and Study of captured wild Bats

The Meeting of the Parties to the Agreement on the Conservation of Populations of European Bats (hereafter "the Agreement")

Aware of the fact that bats are particularly vulnerable to disturbance at certain stages of their life cycle;
Recognizing the value of the capture and marking, and other studies of captured bats, to develop effective methods and support efforts to conserve bat populations;
Recognizing also that such activities can have negative impact on the welfare of individual bats or on their populations;
Recalling that Article III (1) of the Agreement prohibits the deliberate capture, keeping or killing of bats except under permit from its competent authority;
Agrees to the following guidelines for the control of activities involving bats captured from the wild:

1. The capture of wild bats for research and conservation purposes should be licensed;
2. Licences should be issued by designated nature conservation authorities. If the authorities do not have competence in the study of bats and their conservation, they should seek the advice of a body competent for the provision of advice on bat conservation and management. Licences should be issued for a fixed (renewable) term;
3. An additional licence may be required for 'invasive' techniques in accordance with any existing Experiments on Animals Acts or Animal Welfare Acts;
4. The awarding of a licence should be subject to minimum standards set by the licensing authority. Applicants should demonstrate competence in the activities to be licensed;
5. Licences should identify permitted techniques and equipment for capture, marking and taking of samples of tissue, according to appropriate experience;
6. There should be a reporting procedure in operation for activities carried out under the licence;
7. There should be a central record of banding and other long-term marking data;
8. There should be quality controls in operation for the equipment used in 5 above, including for sources/suppliers

of equipment and materials used for equipment;

9. Range states may restrict the carrying out of any of the activities in 5, such that they are:
 - allowed only under any specified circumstances
 - not allowed in particular specified circumstances (e.g. during hibernation or parturition periods)
 - restricted for use only in approved specified projects
10. There should be systems in operation to control the taking of bats (dead or alive) from the wild for laboratory or museum research, etc., and for their rehabilitation where appropriate;
11. There should be systems in operation to deal with:
 - infringements of licences
 - carrying out of licensable activities without an appropriate licence.

Annex 1

Notes for the guidance of national authorities

Ref. para 3.

An 'invasive' technique for these purposes is one which involves the removal of tissue or the subcutaneous implanting of a foreign body.

Ref. para 5.

Capture

Approved methods of capture include:

- taking by hand
- taking by hand net
- taking by funnel or cone trap
- taking by harp trap
- taking by mist net

Taking by hand. Bats should be lifted off their roost, rather than pulled which can damage toes or claws

Taking by hand net. Nets should be of a fine or very small mesh material, such as that used in nets for entomologists (e.g. butterfly net). Hand nets should not be made with mist netting or as used for landing nets of fishermen, etc. Hand nets should always be held static (not moved or waved to catch bats in flight).

Taking by harp trap. Training is required to set the correct tension of the wires.

Taking by mist net. Considerable training is required in setting of mist-nets correctly and extraction of bats (and any birds that may co-incidentally get caught).

- For the capture of bats from building or tree roosts the use of hand, hand net, funnel/cone trap and harp trap are preferred and mist nets should be avoided wherever possible.
- For most purposes harp traps are easier and safer to use than mist nets (and require less training than mist nets).
- Mist nets should not be used for emergence trapping at caves used by large numbers of bats.



Marking and taking of tissues. The following activities should be individually licensed:

- banding or ringing
- light tagging
- radio-tracking
- use of transponders (Passive Integrated Transponder [PIT] tags)
- other specified marking
- taking of samples of tissues (e.g. blood for parasite/disease investigation, flight membrane for DNA)

Ringing (banding). For long-term population and migration studies, and identification of previously trapped animals. Only rings supplied by a recognized national or international organization should be used. Rings should have an inscription with at least an internationally recognizable address and individual identifying code (number).

Light tagging. Used for very short-term observation of bats foraging behaviour, or possibly to locate roost sites. There has been concerns expressed about potential damage to bats from leakage of the medium carrying the fluorescence where this is not sealed in a bite or scratch-proof container.

Radio-tagging. For medium-term studies of foraging (time, habitat, behaviour) and for roost finding. Radio-tags should be kept to a maximum of 5% of the mass of the bat.

Transponders (PIT tags). PIT tags are small integrated circuit chips enclosed in a biologically inert glass capsule. They can be inserted subcutaneously (an invasive technique) or glued externally (a non-invasive marking procedure). They are commonly c.12 mm long and less than 2 mm wide. They can be used for long-term studies. They give individual identification, but only at very close range.

Other specified marking. This may include short-term marking techniques, such as tattoos, safe paints or other colour marking, fur-clipping. Ear or toe clipping should not be approved, and nail-clipping only for special circumstances (e.g. baby bats to identify individuals until they are old enough for more traditional marking, e.g. rings).

Tissue sampling. All techniques require particular training. *Training:*

For licensing, there should be:

- guidance on training and levels of experience/competence required
- approved sources of appropriate equipment
- guidance on field use of such equipment

Training. All techniques require special training, including in matters of health and safety.

Sources of equipment. Licence should only be issued for the use of special high quality, smoothed metal, lipped (flanged) bat rings which have been designed to minimise the risk of damage to the bats wing membrane. No licence should be issued for other types of rings. Appropriate ring sizes should be used for each bat species and are listed in Annex 2. Note that the way ring sizes are measured may

vary between manufacturers.

Use of equipment. Information can be found in Kunz (1988) and Mitchell-Jones & McLeish (1999). In the early stages the researcher should be overseen in the field by someone experienced with the technique and aware of constraints or limitations of the technique and how to resolve problems that may arise and which may threaten the bats and/or the equipment

Reporting procedure. It should be a requirement of licensing that the licensee submit regular (e.g. annual) reports of activities carried out under the licence. Licensee should be encouraged to report any practical problems or concerns arising from the techniques employed.

Record of marking data. A national central record of all bats ringed (banded) or otherwise long-term marked should be maintained. It should be a requirement of licensing that annual records of all bats so marked should be submitted to that central register.

Ref. para. 8.

The availability and suitability of equipment will vary. Sources and suppliers will change. New equipment will become available. The national authority or its advisers should keep aware of the most appropriate equipment available for the intended work.

Ref. para.9.

The national authority or its advisers must decide if there are activities, which they consider, are inappropriate for their country. Restrictions to activities may involve a total ban (for all or for selected species), may be restricted to avoid particularly sensitive periods or vulnerability through behavioural aspects of bats or particular bat species, or may be restricted to particular projects on selected species.

Ref. para.10.

Bats should only be killed for research purposes if the research is fundamental to the understanding of bat conservation issues and there is no alternative mechanism of achieving the required results.

Bats should only be taken into captivity for research purposes if the research is important to the understanding of bat conservation issues, if the institution has adequate facilities to maintain the bats in captivity (including flight space), if the bats are to be kept in captivity for a limited length of time (e.g. no more than three months), and if there is every expectation that the bats can be rehabilitated to the wild at their site of origin.

Literature

Kunz, T.H. (ed) 1988. *Ecological and Behavioral Methods for the Study of Bats.* Smithsonian Institution Press, Washington & London. 533pp.

Mitchell-Jones, A.J. & McLeish, A.P. (eds) 1999. *The Bat Workers' Manual.* Joint Nature Conservation Committee, Peterborough. 138pp.



Annex 2. Recommended ring sizes for European bat species

The ring sizes quoted represent the approximate internal diameter in mm of the oval at its widest point when the gap is closed to 1 mm. 2.9 mm rings are in the 'narrow' design unless otherwise stated. These suggestions are based on experience from Germany, The Netherlands and UK, with estimates (in brackets) for other species.

Rousettus aegyptiacus ?
Taphozous nudiventris [5.5]
Rhinolophus blasii [4.2]
Rhinolophus euryale [4.2]
Rhinolophus ferrumequinum 4.2
Rhinolophus hipposideros 2.9
Rhinolophus mehelyi [4.2]
Barbastella barbastellus 2.9
Barbastella leucomelas [2.9]
Eptesicus bottae [2.9/4.2]
Eptesicus nilssonii [2.9]
Eptesicus serotinus 4.2/5.5
Myotis bechsteinii 2.9 (+ wide)
Myotis blythii 4.2/5.5

Myotis brandtii 2.9
Myotis capaccinii [2.9]
Myotis dasycneme [4.2]
Myotis daubentonii 2.9
Myotis emarginatus [2.9]
Myotis myotis 4.2/5.5
Myotis mystacinus 2.9
Myotis nattereri 2.9
Myotis schaubi [2.9/4.2]
Nyctalus lasiopterus [5.5]
Nyctalus leisleri 4.2/3.5
Nyctalus noctula 4.2/3.5
Otonycteris hemprichii [5.5]
Pipistrellus kuhlii 2.9
Pipistrellus nathusii 2.9 (+ wide)
Pipistrellus pipistrellus 2.9/2.4
Pipistrellus pygmaeus 2.9/2.4
Pipistrellus savii [2.9]
Plecotus auritus 2.9
Plecotus austriacus 2.9
Vespertilio murinus [4.2]
Miniopterus schreibersii [4.2]
Tadarida teniotis [5.5]

Feature writing by CCINSA Members : reprinted from Nature Diary

My Pocket Bat

Kumaran Sathasivam

Position yourself at a height above the ground such as on a rooftop – at sunset time. As the sun goes down, you are likely to notice that the air comes alive with bats. Most of them are very small ones, materializing as though from nowhere, uttering feeble twitters as they fly about.

The smaller bats you see are probably pipistrelles, insect-eating creatures. There are several species in the pipistrelle group. The two most widely distributed ones in South India are the Coromandel pipistrelle and the Pygmy pipistrelle. These are both dark in colour and very similar in appearance. The Coromandel Pipistrelle is slightly larger, but these pipistrelles are among the smallest mammals in the world. The Pygmy Pipistrelle weighs just 2 grams! This makes a number of insects larger.

Small as they are, pipistrelles are efficient insect devouring machines. Insect eating bats are known to consume as many as 1000 insects per hour – one insect every three or four seconds! Pipistrelles feed on beetles, ants and wasps, crickets and grasshoppers, flies and mosquitoes, moths and termites. Clearly, without the bats, we would have a lot of insect pests to deal with. During daytime, pipistrelles hide in any crack or hole that gives them protection; as they are so small, this can be anywhere – between the tiles of a roof, behind picture frames, in a hole in a wall or a tree, under the bark of a tree or among dried leaves. This explains the dramatic way in which they turn up in the evenings.

Once I had to go away from home for a few days. I hung out a shirt to dry on a line indoors just before leaving. On returning, I took the shirt off the line to iron it, and from the pocket emerged a very annoyed pipistrelle! It flew about for a while and spent the whole day hanging from the ceiling in a huff.

from Nature Diary-14. 32, Jantar Mantar, Children's Science Observatory, May June 2003

*29, Jadamuni Koil Street, Madurai, Tamil Nadu 62500



CCINSA BAT CLUBS

In 2003 the Chester Zoological Gardens Education Department agreed to sponsor the development of a CCINSA Bat Clubs programme. It took months to develop and prepare materials for this project. We created a kit of materials and simple Draft Guidelines intended to fascinate and delight young people from grammar school even up through undergraduate school. We selected a group of people who had showed both interest in Bat Clubs and also aptitude in education to "test drive" our CCINSA Bat Club Kit.

The first round of Bat Club items consisted of a Bat Kit Case (these are primarily items for organizers), a box of items to give out to Bat Club Members, a set of Guidelines and an evaluation request.

The Guidelines have been kept very simple and flexible because CCINSA Bat Clubs are experimental and also to allow organisers to develop their own ideas and test them with what we have supplied. They have been asked to write up their experience with their Club, tell us what items worked well and why, what did not work and why and what other activities they want to carry out.

Listed on the subsequent page is a list of all the items and our concept or reason for including them. The first list includes items which are sent to organisers in the kit. The second list includes items which are to be sent to organisers month by month, as and when they complete other activities to our mutual satisfaction, and also so that they will get something new every month or two for the Club.

If the organisers write their own ideas and experiences with their Bat Club this information will be included in the next iteration of the Guidelines.

Participant organisers have to fill out a form indicating their willingness to participate in the CCINSA Bat Club Experiment and agreeing to implement their Club soon and use all materials within a few months time. This is so that we can finalise items for the next batch of CCINSA Bat Clubs, with the benefit of their experience.

The next batch will be improved and organisers will be eligible to get a replacement set of items which they had to give away to members, and start another Club with a new set of students or neighbourhood kids, or others. Organisers can also stick with the same group if they like, or, select a few from that group to help them start up with a new group of youngsters. The latter is ideal as it takes kids to a different level and ensures their interest and development.

Guidelines for Bat Club meetings

We send organisers a simple sheet of Guidelines for organizing Bat Club activities. It is a "work in progress" and its evolution will depend on organisers and their experience.

The Guidelines give an idea as to what kind of problems might come in even such a simple thing as a kid's bat club and provides some possible solutions. In India and other parts of South Asia as well, any kind of association or club is often used for political, personal or pecuniary reasons. We have tried to structure the CCINSA Bat Clubs so that they are oriented towards one ultimate objective, e.g. helping bats, either directly or indirectly and learning about them in the process. We want this one principle made crystal clear to the kids – that they are not to use the club for anything except bats.

Although we have given suggestions for meeting agendas, this is completely up to organisers. Some organizers would lay more stress on field visits (and may be in circumstances where this is not difficult to arrange), while others may find field visits nearly impossible. So organisers have room to innovate. We know that there must be many gaps in the items we send, these guidelines, the CD, etc. but we are too close to this to see them all. We are starting a CCINSA Bat Club at ZOO (led by B. A. Daniel) so that we will see first hand how it all works.

We will ultimately send an evaluation form for organisers to fill out soon so that they can comment on every item and its effectiveness or problems and to add ideas and activities that they have devised or found in other books, tested and found to work well.



CCINSA BAT CLUB GUIDELINES

Organisers of CCINSA Bat Clubs

The Guidelines below are meant to guide organisers of CCINSA Bat Clubs. They are not rules, but many of them have been taken from our years of experience of working with groups and may be taken seriously. We do not, however, want to smother your own creative ideas.

Target Group

Any group of young people the organizer wants to put together – school class, neighborhood kids, civic group's kids (Kiwanis, Lions, etc.), orphanage, nature club, etc.

The Club

-- The Club will function better if simply structured. Try to be informal and conduct many activities. It is advisable to avoid making or permitting a President or Group leader among youngsters. Each activity could have a different "Activity Leader" to give all the kids a chance. As the organizer, try and involve the kids in some of the decisions but avoid hierarchies among the kids.

-- Try and limit the number of kids in the club to a manageable number – 20-30 is ideal. Arranging field trips will be difficult even with so many. You can even have a Club with 10 members, if you feel it is more workable. Less than 5 or 6 will not be productive however.

-- Choose a name for your club and register with CCINSA so that no CCINSA Club will have the same name.

-- Invite and select members (if not done already)

-- Order t-shirts printed with your Club name for kids when you know the number and sizes of your Club members. If your club is very large (e.g. more than 30) maybe t-shirts could be saved for later, and they could be a reward for good participation, best activity, or some such. We also want to avoid kids coming to a Bat Club to get the free things and then disappearing !



Chart out simple Aims and Objectives with the club members (some examples follow:)

- Learn about the usefulness of bats
- Educate other children and local people about bats
- Learn to identify bats

Make simple rules with the club members for functioning of the Club (these should be similar to CAMP ground rules ... these keep group dynamics positive). Making the rules with members will be useful for teaching value lessons to the children but insure that they themselves don't make them too strict for the club to work well or to exclude minority groups, etc.

- Be on time for meetings
- Try to attend all meetings; inform the organizer if you cannot attend
- Raise your hand before speaking
- Don't interrupt others when they are speaking
- Bat Club is about bats – keep other issues out.
- Whatever makes your club run without mean-minded behaviour.

Basic Functions of the Club

- The members of a CCINSA bat club work towards:
- Learning about bats, their behaviour, role in the ecosystem, utility to man and myths
 - Meeting others who want to learn about bats and participating in group activities for fun as well as study
 - Learning basic observation and recording techniques
 - Passing on their interest, enthusiasm and knowledge to other groups

Club meetings

- The organizer can decide on the number of meetings and the duration of each meeting upon his/her convenience taking in to consideration the members schedule.
- The organizer can use the materials in the Bat Club kit box (suitcase) to conduct some activities; more items will be provided from time to time and definitely in next three four months.
- The organizer should instruct the kids to enter the activities of each meeting in the passport and emphasize its importance.
- Each organizer is provided with a Bat Club Letter Pad. The organizer should write the name of his/her club on it and use it to send to schools to explain about the club or for a press release. Letters should not go out without the name and address of the Bat Club and the Organiser.
- A Bat Calendar is also included in the kit for the organizer to put it up in the Club meeting venue and plan the meetings and field trips.
- A CD is enclosed with the materials, which contains information on bats that can be used by the organizer to prepare a presentation or a lecture. It contains Power Point presentations which have some slides that may be useful in making your own presentation. These Powerpoint presentations have not been prepared for kids; you have to make your own.
- Stationery items (gum, stapler, etc) are also provided for some activities which require them.
- Select a name for your Bat club with the help of your members. – you can introduce this idea and let them think about it till next meeting. You can also make this a contest and have members vote on the best name. Or you can select the name yourself.
- Write the name of your Bat club on the large mobile and hang it up in your meeting place or on the door so kids will feel they are entering a special place.
- Request a letter from parents to be handed in the next meeting stating their willingness for kids to attend the bat club meetings. (Find ways to involve parents as they also need to be educated and may help with transport to field sites).

- Find a way to determine if the kids are willing to attend all or most of the meetings before giving the entire packet of materials.
- In the case of group activities, the kids can be divided into four groups and the names of groups can be of bats such as Leaf-nosed bats, Horse-shoe bats, Flying foxes, Free-tailed bats etc. This will help them learn types of bats (explained by you) as they play.

Meeting Suggestion

- Some suggestions on what can be done in each meeting are given below. The organizer can modify it based on his/her creativity, convenience and time frame.

Meeting 1 – suggestions:

- Register the members' names and obtain their contact address and phone number (be sure they have given parent's names and contact information).
- Explain briefly about bats and their importance and CCINSA's mission.
- Hand out the brown covered Bat packets, one per student.
- Introduce basic Rules and Regulations of the Club with the help and agreement of members
- Present a plan for next six months and ask if kids can attend meetings at those dates and time.
- Schedule date, time and venue for next meeting
- Education activity : (very important for first meeting) Ask participants to take out their masks and get the kids to do an exercise that emphasizes the difference between fruit bats and insect bats. That will help them leave the very first meeting with specific information and maybe a skill. Explain about the two types of bats and their food habits (refer table below). There are also photos in the CD which, if you have facilities, you could show.

Fruit bats and Insect bats	
Fruit Bats	Insectivorous bats
Eat fruits, nectar, pollen	Eats bugs, beetles, mosquitoes, etc.
Have large eyes	Have tiny eyes
Excellent eyesight	Poor eyesight
Excellent sense of smell	Echolocate to detect food
Large in size	Smaller in size
Dog-like face; long tongue	Small face with modified nostrils to echolocate
Small ears	Large ears with independent movement
Flight: Soar	Flight: Flutter
Pollinate & disperse seed	Control harmful insects
Carry fruit to the roost	Catch and eat insects during flight

Meeting 2 – suggestions

- Distribute Bat Passport: Give instructions on the first exercise (if and when you are relatively sure of your members).
- Give Bat Club ID Card (if and when you are relatively sure of your members).
- Give a Bat Badge and the Bat Bag (if and when you are relatively sure of your members).
- Distribute bat poster – ask them to count the number of bats in the poster.
- Give a short lecture on tools used for bat field studies.

Meeting 3 – suggestions

- Take members to a bat tree, building or a temple nearby and observe bats.
- Explain about roosts (habitats) and adaptations.
- Suggest that they talk about this trip in their class afterward, if a time is set aside for telling about such activities.
- Ask them to be prepared to discuss this trip in the next meeting.



Meeting 4 – suggestions

- Discuss the field trip from the last meeting with the members; have some questions for them all ready.
- Give a talk on myths about bats referring to your Bat Education Guidelines which are also on the CD.
- Activity of the day: Bat cards, Spin the wheel
- Ask the kids to write their opinion and experience in the Bat Club in the post cards we have provided and send it to CCINSA office.
- Home work: Ask kids to make notes on what people in their neighbourhood think of bats (make them read it out in the next meeting)

Meeting 5 – suggestions

- Take members to another outdoor site where bats can be observed.
- If that is not possible, try to arrange a presentation from the materials on the CD or some other activity using the materials in your kit or which are sent to you, such as a game in the Bat Education guidelines.
- Discuss homework assignment from last meeting : what people in their neighbourhood think of bats.

Meeting 6 – suggestions

- Discuss field trip from previous meeting
- Distribute Bat book labels.
- Discuss threats faced by bats
- Go through the passport and ask the kids to give a report on their activities in the Club.
- Stamp the passport with the CCINSA rubber stamp for those who have completed it.

(If this is the last meeting, try and plan a little ceremony)

We have many items for Bat Club organisers in addition to the starter kit such as Bat wing chart, Bat mobile for kids, Bat stickers, Bat stencil, Bat bookmark which they can distribute to their members as when appropriate.

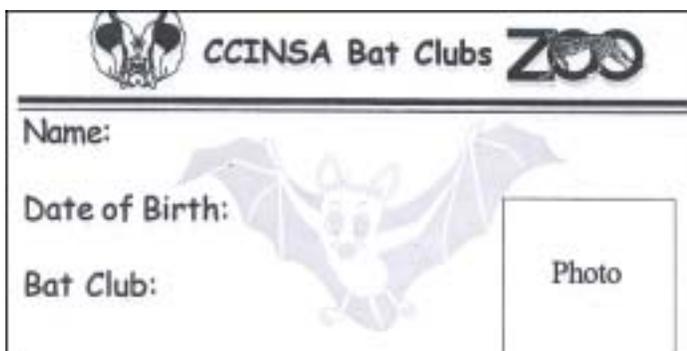


CCINSA Bat Club — ITEMS IN CBC KIT AND EXPLANATION

List of items for organisers	Explanation
<i>Canvas bag – Bat Club Kit box</i>	Handy suitcase for you to keep all of your (CCINSA Bat Club) CBC items together for meetings with your group.
<i>Guidelines for Activities (General)</i>	Set of games and activities which will keep enlarging and changing
<i>Guidelines for Organisers to use the Bat Club kits</i>	Hints for CBC Organisers to get more out of their Club and of CCINSA
<i>T-shirt guide</i>	T-shirt designs from which you can choose one design, select sizes and colours available and have the name of your CBC printed on.
<i>Spin the Wheel (large)</i>	This is a toy one sees in shops, modified to be all about bats and the threats to them. There are many games that can be played with this wheel. You get a big one and every member gets his own small one.
<i>Rubber stamp</i>	For official" documents – a "seal" for you to stamp members field reports etc. in the Passport (described later)
<i>Bat club board (simple hanging mobile)</i>	This is to hang on the door before meetings or on the wall of your meeting place. It has a blank for the name of your bat club.
<i>Tools Punch, Gum, Tape roll, Scissors, pins</i>	These are items that you might have around <i>Stapler and the house</i> for your club members to do some of the activities we have planned. We can't perpetually supply these but we can get you started !
<i>CCINSA letter pad</i>	This is for you to use to invite kids to join, or send to schools to explain the club or issue a press release, etc.
<i>Bat calendar</i>	For planning your club meetings and outings
<i>CD of bat articles, PPT presentations, Photos, art, Bat Report, Summary, etc.</i>	For your use as you see fit. For the photos and art work credit the photographer or artist as designated or credit ZOO and CCINSA
Items for kids	
<i>ID card</i>	Identifying them as a Member of the CBC
<i>Bat Passport (36 pages)</i>	A booklet made to look like a passport for the kids to fill up with their reports, field notes and bat sightings.
<i>Badges</i>	A CCINSA Bat Club Badge
<i>Back of Bat cover - poster</i>	An A3 poster with a "game" – bat count and information about how scientists study bats and what they use.
<i>Spin the Wheel (small)</i>	Member version — small
<i>Patch (logo)</i>	Cloth patch to be pinned or sewed on an item of clothing – maybe for them to always wear to meeting.
<i>Book labels</i>	Bat labels for kids to cut out themselves
<i>Bat cards</i>	Flash cards with a multiplicity of methods for playing and learning.
<i>Packet</i>	A CCINSA educational packet, the same one you have been using.
<i>Mask head band</i>	Different kind of mask for photo ops
<i>Shoulder bag</i>	A bat bag for carrying all their gear. You can put what you want them to get the first meeting in this bag and ask them to bring the bag every meeting.
<i>Bat Summary</i>	Printed and illustrated Summary of the Bat CAMP
<i>Post cards</i>	Addressed to CCINSA – for the kids to write to us and tell us if they like the CBC ! This is very useful for us to send our donors.



Some future items	Explanation
Colour Poster	Attractive promotional poster about bats
Bat Wing/Arm chart	This item is for organisers to get kids to stand against it and understand the relative size of bats
Bat mobile	A cute mobile for kids to make and tie themselves, with good ecological messages !
Stickers	A selection of stickers with bat care messages on them.
Stencil	A plastic stencil for kids to draw their own bats.
Magnetic bookmark	For fun
Necklace	For fun
Others will come !	For fun and learning



CCINSA Bat Clubs ZOO

Name: _____

Date of Birth: _____

Bat Club: _____

Photo




Two cards with bat illustrations and text. The top card has a header 'I am doing the best I can to help my bat' and the bottom card has a header 'I am doing all I can to help my bat'.



Some Bat Club Kit Items



Bat Education in India - supported by CCINSA

Zoo Outreach Organisation, which hosts and administers CCINSA has produced 12,000 "Just Bats About Bats" Education Packets in the last two years and distributed 9,500 to 65 organisations in India and other South Asian countries. Every Wildlife Week, Earth Day and Animal Welfare Fortnightly we offer these packets, as well as Bat C.A.M.P. Summary booklets free of cost to zoos, NGO's and schools who will agree to conduct a programme specifically on bats.

These Educational Packets and summary booklets have been funded by Chester Zoo, Bat Conservation International (BCI), Flora, Fauna International (FFI), Metro-Toronto Zoo and Riverbanks Zoo. The following are a couple of reports programmes within the year including those conducted by our CCINSA Bat Club Organisers.

Please refer our website CCINSA Newsletter to see colour photographs illustrating these programmes. That is <www.zoosprint.org>.

Report of Bat lecture in SPROUTS' Environment Awareness Camp for Tribal and Municipal School Children and Teachers of Thane District, Maharashtra

SPROUTS conducted a 5-day workshop on Environmental Awareness for 30 children and 10 teachers from Tribal and Municipal Schools of Thane District, Maharashtra from December 13-17, 2003.



A special lecture was given on the importance of Bats and their role in maintaining ecological balance. Students and teachers discussed problems relating to bat conservation and went through the bat packets which were distributed to them after the lecture.

Students also tied rakhis to each other and vowed to save bats in their vicinity and work towards increasing awareness about Bat conservation and their role in our day-to-day survival.

Submitted by Anand Pendharkar, SPROUTS, Mumbai.

NZP is "Just Bats About Bats"

Bats are some of the most misunderstood of animal taxa. Very few people are sensitive to the problems they face in the wild today. Hence, the education department at the National Zoological Park, New Delhi was very keen to conduct a programme on bats for school students. The programme was designed using information and "Bats about Bats" packets sent to the zoo by Zoo Outreach Organisation, Coimbatore. The programme was organised on 18th December, 2003 by inviting 44 children from Apeejay School, Sheikh Serai. Ms. Avanti Mallapur, a volunteer from the Wildlife Protection Society of India (WPSI), helped in conducting the programme along with staff of the education Department. The information on bats was sent to the students in advance. Since the zoo does not house bats, it was decided to conduct a craft workshop wherein the children would make a model of bats using their imagination and concepts learnt at the zoo. For this workshop, the zoo provided some material and asked the students to bring other items that might help them.



Mr. Riaz Khan first took the students around the zoo. After that, Avanti by using masks and photographs to explain the various types of bats and discussed various issues such as levels of human tolerance of bats and the need to conserve them. After the discussion, Ms. Shikha Nalin explained about various materials that the students received in the educational packets and asked the students to work in groups of four to design bats of their own. They were supplied with cardboard, black-paper, beads, fevicol, balloons and newspaper and were free to use other materials like colours, scissors and old socks that they had brought with them.

The children were then asked to complete a jumble work puzzle on bats but because of lack of time could not complete it at the zoo. The children took it to school and their teacher was asked to reward the student who finishes the puzzle with maximum number of correct entries in least time. The teacher in her feed back appreciated the programme and emphasised the need for more curriculum oriented program at the zoo.

Submitted by Ganga Singh, National Zoo, New Delhi



Bats star in Celebration of the Wildlife Week at B.C. Zoo Pune

Mr Anil Khaire, Director, Bahinabai Choudhary Zoo, organized the wildlife week celebration on 3 October 2003 in collaboration with Center for Environment Education (CEE-Central). The activities of the celebration included a workshop on Bats. The workshop began at 10 a.m. Around 50 students belonging to 8th and 9th standard from Kamalnayan Bajaj School along with their four teachers participated. The first event of the workshop was conducted by a small girl, Miss. Falak, S. Khan of class III from St. Ursula High School. She spoke about the classification of bats. An audio visual presentation about the behavior, morphology, anatomy, ecology, feeding, population status, navigation, migration, myths and how bats can be saved, etc. was conducted using power point, charts, pictures and write up. Post lunch, all the students participated in many games related to bats. The first game was about the sense of smell in a mother bat, by which she recognizes her pup among millions of bats. Six students acted as mother bats while other six acted as pups. All the pups were given different smells of spices and perfume. Mothers were asked to smell them. Later each mother was blind-folded and had to locate her pup among all the children. This activity was appreciated by all. Next was Rakhi race. In this, the Rakhis of Bat Kit, provided by Zoo Outreach Organisation, were laid on a table. All the girls picked and tied them on boys' hand. After these games a brain storming session was conducted with a quiz on bats, crossword and an activity sheet was distributed among all students where connect the dots were performed. At the end of the workshop the certificate of participation was handed over to the students by Ms. Sanskriti Menon, Officer-in-Charge from the Center for Environment Education.

Submitted by Daizy Neelofer Khan, Wildlife Biologist

Email: daizynkhan@yahoo.com

Report of "CCINSA Bat Club" of Megamix

We have officially hosted the CCINSA Bat Club of Megamix on 2nd Feb. 2004 at 12 noon. We took the opportunity to set up the Bat Club with a range of enthusiasts. We selected a group of active people with several years of experience in environmental activities. Their activities will be meaningful for the conservation of bats and their habitat. The Megamix Branch of CCINSA Bat Clubs is aged from 10-65 years.



CCINSA Bat Club" of Megamix

Activities Feb 2004 -- The first activity took place on 2 February 2004 at the Conference Hall of Megamix Nature Club in Dhakuakhana with 34 participants between 12-20 years. Mr. Narendranath Dutta, Lecturer, Dept. of Zoology DHK College and Dr. Amal Dutta, Ethnobotanist, Secy., Megamix Nature Club and myself were trainers. Classroom topics included 'What is Biodiversity', 'Biodiversity and Bats', 'What to do as an young Bat-Naturalist'. Outdoor activities included a) Match paper cutouts to find the hidden mammal and (b) a game about habitat loss. Participants were given Packets entitled 'Just bats about bats!' along with a Certificate of Participation



Another programme entitled 'Introduction to and Conservation of Bats' was conducted on 19 February in the afternoon at the Campus of the Forest Range Office in Jonai for 19 participants between 10-16 years. Mr. V.K. Singha, Forest Range Officer, Jonai gave an inaugural speech. Trainers were Debojit Phukan and Ram Prasad Upadhyay, State Resource Person, National Green Corps, Assam. The programme was held under a large tree by arranging chairs, black-board and tables. Classroom teaching included 'Know about our forest', 'Biodiversity and Bats' and 'What we can do to protect the Bats and other animals and their habitat'. Outdoor activities included 'What is my name among the mammals?' and the Web of Life game. Packets of 'Just Bats about Bats' and a Certificate of attendance was given to participants.

Submitted by Debojit Phukan, CCINSA - Bat Club, Megamix Branch, Dhakuakhana, 787 055, Lakhimpur, Assam.

Email: debojitphukan@indiatimes.com





Sprouting Batters

dispersal which have direct relationships for the balance of nature indirectly to save human race from extinction. Certain burning issues of North East India (NEI) responsible for decrease of chiropteran diversity even before discovery were related, such as habitat loss (by destroying hill and hillocks for gravels, stones, land fill, we are losing lots of natural bat caves; deforestation for Jhum cultivation, timber smuggling, felling big tall trees for agriculture and construction of houses in the plains minimize fruit bat roosting sites, etc.), lack of awareness, lack of research, medicinal use of bat flesh to cure certain diseases such as asthma in NEI. At the end of the lecture participants made commitments to care for bats and to help the Troop in future to check the bat community of this region.

After the lecture, Troop members distributed the leaflet published by the society. Mr. Ali displayed all the specially designed bat education materials prepared by Zoo Outreach Organisation (Z.O.O.), Coimbatore for the occasion, to the participants. Finally a bat game entitled "Foraging at Dusk" was played with the young school children, wearing bat masks, as it is the most common scene they will come across after the programme in the evening in their places.

The programme was attended by 48 school children from five different schools along with teachers from the host School, chief guest, Mr. Aziul Hoque, Headmaster, J.N.S. School and local public & media persons. Mr. Abdul Hakim Choudhury, Organising Secretary of BAT, gave a brief lecture on the necessity of bat conservation and concluded with a vote of thanks.

Submitted by Md. Azad Ali, Bat Assessment Troop (BAT), 1 Bat House, B.N. College Road (W), P.O. Bidyapara, Dhubri 783 324, Assam

"Animal Welfare Fortnightly – 2004" in Garo Hills, Megalaya, with an Awareness Programme for Conservation of Bats. In connection with 'Animal Welfare Fortnightly, 2004', Bat Assessment Troop (BAT) which has been recently selected as a CCINSA (Chiroptera Conservation and Information Network of the South Asia) Bat Club from North East India, organised an awareness programme for Conservation of Bats on 21.01.2004 at Jawaharlal Nehru Secondary School, Phulbari, West Garo Hills District, Megalaya. It was the first ever awareness programme on bat fauna in the State.

As a first part of the programme the very significance and need for celebrating Animal Welfare Fortnightly, which has direct impacts with the welfare of mankind also, was explained to the participants by me followed by a main lecture on bats for the fulfillment of the programme theme. The lecture contents were general information about bats, worldwide diversity, bat habitat, ecological and economic importance of bats like, pest control, pollination, seed



Bat March

The following persons have started CCINSA Bat Clubs :

Dr. Juliet Vanitharani, Sarah Tucker College, Tirunelveli, TN

Mr. Debojit Phukan, Megamix Nature Club, Lakhimpur, Assam 787055

Mr. Azad Ali, Bat Assessment Troop (BAT), Guwahati, Assam

Dr. C. Srinivasulu and Dr. Bhargavi Srinivasalu, Department of Zoology, Osmania University, Hyderabad

Dr. Santosh Kumar Sahoo, Conservation Himalayas, Shimla, H.P.

Dr. B.A. Daniel, Scientist, & Zoo Outreach Organisation Staff, ZOO, Coimbatore, T.N.



Bat Club activities of Sarah Tucker College, Tirunelveli

The bat research team consisting of Dr. Juliet Vanitharani, her four Ph.D. scholars and the bat club members of Sarah Tucker College has an excellent record in terms of the bat conservation in Tirunelveli. A pathetic sight of a wounded flying fox *Pteropus giganteus* provoked the team members to make an arrangement for a mega bat conservation awareness programme during the Wildlife Week. On October 6, 2003 the team organized a thought provoking, informative oratorical competition. A slogan bearing colourful poster competition was also conducted to celebrate Wildlife Week with the theme of 'bat conservation' inside the campus. On 6 October Mr. H. Venu Prasad, IFS, the District Forest Officer Tirunelveli circle inaugurated the competition. He with the help of Mrs. Chandralekah Johnson, Head of the Zoology Department and Dr. Janet Wilson, Reader in English evaluated the competition. On November 17, 2003, club members organized a marvelous bat conservation field trip to the roosting sites of *Hipposideros ater* and *Hipposideros speoris*. From December to March, the III year B.Sc. Zoology bat club members even did small projects on feeding behaviour, diversity and scent marking behaviour of bats and submitted the same to the Manonmaniam Sundaranar University for the partial fulfillment of their B.Sc. Degree. On March 29, 2004, certificates were awarded to all the participants and a report about the bat club members was presented in the valedictory function of the college union. The team is continuing with several ambitious research programs and working as part of the crusade to save bats in their natural habitats.



Students with an injured *Pteropus giganteus*

Submitted by Dr. Juliet Vanitharani, Director Bat Club, Sarah Tucker College, Tirunelveli -7



Batting in a old house



Students examining bats caught in the mist net

CCINSA Bat Club Activities in Andhra Pradesh

We adopted two schools to educate children about nature conservation in general and lesser known fauna (including bats) in particular. Then we conducted bat conservation education programmes targeting school children (3 occasions), under graduate students (1 occasion) and post graduate students (4 occasions). We also collaborated with Andhra Pradesh State Forest Department in celebrating Vanya Prani Saptah and delivered lectures, conducted awareness games for two days targeting school children from four schools. We also advised municipal corporation authorities about the role of insectivorous bats in controlling insects, especially mosquitoes, in urban areas. Finally, we conducted a study on the effects of illumination in Borra Cave. While in the Cave, a bat conservation education programme was targeted at tourists visiting the cave.

Submitted by Dr. C. Srinivasulu & Bhargavi Srinivasulu, Wildlife Biology Section, Department of Zoology, University College of Science, Osmania University, Hyderabad.

