



**Newsletter of the Rodentia, Insectivora, Lagomorpha & Scandentia
Conservation & Information Network of South Asia -- RILSCINSA**

Representing the IUCN SSC Specialist Groups Rodent (RSG) Insectivora (ISG) & Lagomorpha (LSG)

Volume 4, Number 1

April 2004

New RILSCINSA Members after October 2003

Bhattacharyya, Mr. T.P.
Zoological Survey of India
M-Block, New Alipore
Kolkata 700 053, W.B.

Khan, Mr. Ahmad
Conservation Biologist
C/o Pak-China General
Store, Nishat Chorok
Mugora-District Swat
NWFP- Pakistan

Mukherjee, Dr. Shomita
Wildlife Biologist
Kismet, Flat No.9, 48
Carter Road, Bandra
Mumbai 400 050,
Maharashtra

Patiath, Dr. Padmanabhan
Scientist, Kerala Forest
Research Institute
Peechi 680 653,
Trichur, Kerala

Pillai, Mr. Mohanan
Technical Officer to the
Chief Wildlife Warden
Dy. Director (Wildlife
Education)
Kerala Forest H. Qrs.
Vazhuthacaud
Thiruvananthapuram
695 014, Kerala

Rasheed, Mr. Tahir
House # D-1, Wahdat
Colony
Brewary Road Quetta
Balochistan, Pakistan

Sarker, Dr. Sohrab Uddin
Professor
Department of Zoology
University of Dhaka
Dhaka 1000, Bangladesh

Sinha, Dr. Yadunath Prasad
Zoological Survey of India
Gangetic Plains Regional,
11D, Rajendra Nagar
(Behind Telephone
Exchange)
Patna 800 016, Bihar

**Talmale, Mr. Shyamkant
Sukhadeorao**
Zoological Survey of India
Sector-29, Rawet Road
P.C.N.T. D.A. Post
Pune 411 044, M.S

Thapa, Ms. Joya
Research
SACON Field Station
Rashep-Dalep
P.O. Namphing
South Sikkim 737 134

**Total members in
RILSCINSA – 64**



Suggestions about Rodent Conservation

Y. P. Sinha *

Bihar is the place of Buddha, Mahavir and Ashoka who has taught us the lessons of peace, non-violence and value of animal life, but now-a-days I see everywhere violence and killing of animals including humans.

Poor people kill animals such as rats, squirrels, porcupines and many other small animals like frogs, lizards, several birds and bats to feed themselves to avoid starvation.

Not a single dignitary is giving attention towards conservation of these animals. They are defying the rules of nature. I don't want to blame the innocent and illiterate people of the villages because they simply obey the rich due to pressure.

It is impossible for them to survive without food and the government is neither giving any kind of service nor have they been provided any other kind of opportunities so that they can lead a better life. They do not know the language to read and learn about different species of rodents. As they don't know which species is in danger and which is found in large numbers they also collect endangered species of bats, rats etc. Therefore, public awareness among villagers is essential rather than to form a Government rule. The Government cannot save these animals only by making rules. Rules are only for knowledgeable people and not the illiterate person. To survive the poor kill rats, mice and bats and take them as food even without properly cooking as they cannot afford to purchase the supporting ingredients.

In this background scenario the implementation of conservation measures are never percolating to the grass root level specially when the administration efforts keep a blind eye to the animal at large as they are otherwise busy.

* Scientist B & Officer-in-charge, Zoological Survey of India Gangetic Plains Regional Station 11D., Rajendra Nagar (Near Telephone Exchange) Patna 800 016, Bihar

Taxonomic Revision for relevant to RILSCINSA' s Small Mammals

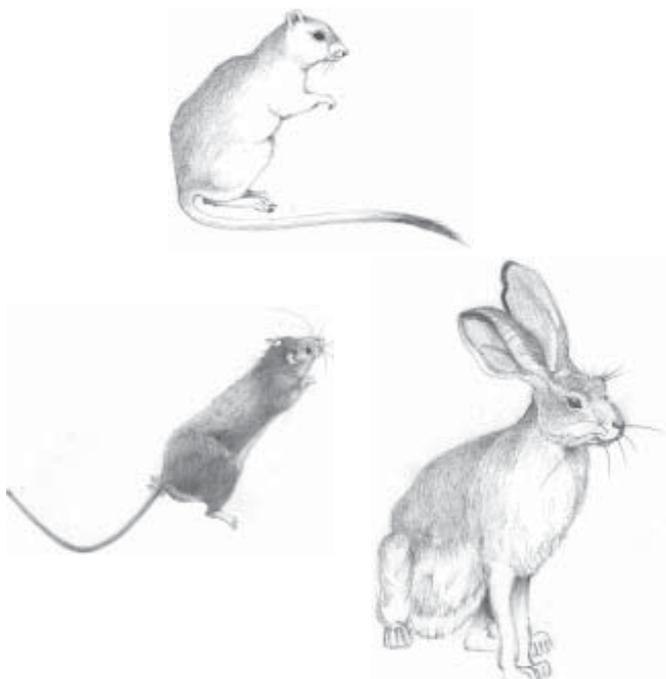
The much awaited third edition of the Mammals of the World by Wilson and Reeder is in press. This edition has many changes, the important ones for small mammals is in the increase in the number of bat species from 1001 to 1116 around the world. It is yet to be seen how many bats are new to the region of South Asia, or what taxonomic changes have occurred to the group.

Importantly, the Order Insectivora has been divided into three separate orders -- Afrosoricida, Erinaceomorpha and Soricomorpha. The first order Afrosoricida does not impact any South Asian insectivore fauna as the order is restricted to the African continent. The other two orders, as the names indicate are clear and more precise indicators of the differences in the groups between hedge hogs and shrews.

All the orders dealt under RILSCINCA have additional taxa listed by Wilson and Reeder. The adjoining table shows additional new species in the last column, which reflects new species described since the publication of the last edition and new species erected from taxonomic revision. In all, 56 new species of orders/families with representatives in South Asia are listed in the new publication.

Reference:

Wilson, D.E. and D.A. Reeder (In Press).
Mammal Species of the World. 3rd Edition.



	No. of Genera	No. of Species	No. of New Spp
Class Mammalia	1229	5416	257
Order Afrosoricida	19	51	6
Suborder Tenrecomorpha	10	30	5
Family Tenrecidae	10	30	5
Suborder Chrysochloridea	9	21	1
Family Chrysochloridae	9	21	1
Order Scandentia	5	20	-
Family Tupaiidae	4	19	-
Family Ptilocercidae	1	1	-
Order Rodentia	481	2277	128
Suborder Sciuromorpha	61	307	1
Family Aplodontiidae	1	1	-
Family Sciuridae	51	278	-
Family Gliridae	9	28	1
Suborder Castorimorpha	13	102	2
Family Castoridae	1	2	-
Family Heteromyidae	6	60	2
Family Geomyidae	6	40	-
Suborder Myomorpha	326	1569	96
Superfamily Dipodoidea	16	51	-
Family Dipodidae	16	51	-
Superfamily Muroidea	310	1518	96
Family Platacanthomyidae	2	2	-
Family Spalacidae	6	36	4
Family Calomyscidae	1	8	-
Family Nesomyidae	21	61	6
Family Cricetidae	130	681	53
Family Muridae	150	730	33
Suborder Anomaluromorpha	4	9	-
Family Anomaluridae	3	7	-
Family Pedetidae	1	2	-Suborder
Hystricomorpha	77	290	29
Infraorder Ctenodactylomorphi	4	5	-
Family Ctenodactylidae	4	5	-
Infraorder Hystricognathi	73	285	29
Family Bathyergidae	5	16	2
Family Hystricidae	3	11	-
Family Petromuridae	1	1	-
Family Thryonomyidae	1	2	-
Family Erethizontidae	5	16	2
Family Chinchillidae	3	7	-
Family Dinomyidae	1	1	-
Family Caviidae	6	18	2
Family Dasyproctidae	2	13	-
Family Cuniculidae	1	2	-
Family Ctenomyidae	1	60	5
Family Octodontidae	8	13	3
Family Abrocomidae	2	10	2
Family Echimyidae	21	90	13
Family Myocastoridae	1	1	-
Family Capromyidae	8	20	-
Family Heptaxodontidae	4	4	-
Order Lagomorpha	13	92	5
Family Ochotonidae	1	30	2
Family Prolagidae	1	1	-
Family Leporidae	11	61	3
Order Erinaceomorpha	10	24	1
Family Erinaceidae	10	24	1
Order Soricomorpha	45	428	18
Family Nesophontidae	1	9	-
Family Solenodontidae	1	4	1
Family Soricidae	26	376	17
Family Talpidae	17	39	-

REPORT: CAMP/GMA Workshop for S Asian Non-volant Small Mammals

Sally Walker

A Non-Volant Small Mammal (NVSM) Conservation Assessment and Management Plan (C.A.M.P.) Workshop and Global Mammal Assessment (G.M.A.) (hereafter referred as NVSM C.A.M.P. / G.M.A.) was conducted at Karl Kübel Institute, Annaikatti from 9-13 February 2004. Immediately following it a Training in Reintroduction, Conservation Breeding and Conservation Welfare was conducted from 13-15 February 2004 also at Karl Kübel Institute with a field visit to the Silent Valley National Park

The C.A.M.P. / G.M.A. workshop was attended by 30 odd NVSM researchers and taxonomists from South Asia as well as experts from other regions, including the Chair of the Rodent Specialist Group, Chair of the Reintroduction Specialist Group, Europe and Northern Asia, the IUCN SSC G.M.A. specialists and others.

The C.A.M.P. and training were fully sponsored by the Knowsley Safari Park, Chester Zoo/North of England Zoological Society and the Universities Federation for Animal Welfare, all United Kingdom organisations. The C.A.M.P. Workshop Process was developed and is guided by the IUCN SSC Conservation Breeding Specialist Group assisted by its Regional and National Networks. CBSG with the C.A.M.P. process works closely with the Species Survival Commission and its Specialist Groups, particularly the taxon based specialist groups.

The Global Mammal Assessment, and indeed, all of what are known as the Global Assessments of SSC/CI, are part of the larger vision of IUCN Species Survival Commission. All of these assessments review the status of all species in different faunal groups using mapping, geographic distributions, threat assessments and documenting important habitats and threats for each species. The global assessments will help SSC achieve a larger objective of "producing relevant and accessible biodiversity assessments and analysis tools to enhance conservation and sustainable development decision-making". The data gathered will be kept in the SIS to jump-start data acquisition capacity in all groups. The data from the CAMP/GMA workshop will go back to SSC Specialist Groups.

These global assessments work synergistically with a Conservation Assessment and Management Plan, each providing breadth and depth of approach which is not complete in the other. The NVSM C.A.M.P. is the second attempt at combining these two dynamic processes, the first being for South Asian Amphibians.

ZOO / CBSG, South Asia has conducted many C.A.M.P. workshops with several objectives, one of which has been to see that South Asian endemics, many of which had not been assessed before, could be listed in the annually produced IUCN SSC Red List of Threatened Species. After years of frustration in dealing with the well-intentioned but complicated SSC Red Listing process, it seems the best way to achieve this is to cooperate with the global assessment project.

Previously in C.A.M.P. workshops, the all important mapping activities were not sufficiently well-organised and attempts to indicate localities on the maps provided by us led to mistakes and lacunae. The global assessment workshops use mapping as their primary tool and have acquired an excellent version of ARKVIEW, one of the best computer mapping programmes.

In the Small Mammal C.A.M.P. workshop, the G.M.A. team consisted of five persons, sufficient so that one G.M.A. member could sit in each working group with his laptop computer and mapping programme which was an improvement over the Amphibian C.A.M.P. / G.M.A.

Before the workshop G.M.A. experts met with ZOO / CBSG, South

Asia staff and John Williams from IUCN SSC CBSG to figure out the most optimal way to work together. John revised the C.A.M.P. Data Entry Programme somewhat to accommodate a few things from the G.M.A. One hundred and eighty-six species of Non-volant Small Mammals were assessed and Special Issue Working Group sessions were conducted.

Special Issue Working Groups are a particularly useful and practical component of a C.A.M.P. workshop, particularly if the C.A.M.P. is conducted with an active network such as RILSCINSA. Issues arise during discussion of the different species assessments which need to be discussed in the light of the entire taxon group as opposed to one taxa, or technical problems may arise for which the group needs to take long term action. It is also a very good opportunity for Network members to lay down practical suggestions and guidelines for the subsequent activities of the Network. When these Special Issue Working Groups are combined with an active Network, the output can form a sort of Network Action Plan, a blueprint for activities which the network administrator can use to help members implement their recommendations. The Special Issue Working Group recommendations are reproduced in full on the following pages.

A Draft Report consisting of all Taxon Data Sheets for all species, a summary list of Draft assessments, and the Special Issue Working Group recommendations was circulated to all participants at the workshop thanks to the C.A.M.P. Data Entry Programme and quick work by ZOO clerical staff. Participants were instructed to review the Draft and make comments and corrections. It will take some time to go through all the information collected, incorporate corrections and then produce a the Report. When the Report is published it will be a comprehensive and current scientific document on the status of Non-Volant Small Mammal of South Asia. With this document a whole array of activities will be put into motion which will improve the conservation prospects of NVSMs of SA in the long term.

Special Issue Working Groups

RILSCINSA Networking Activities, Training and Education Working Group. *Giovanni Amori, P.O Nameer, B.A. Daniel, Jonathan Bielby, P. Padmanabhan, Sanjay Molur, Mike Jordan, Ben Collen*

1. IUCN SSC South Asian Action Plans for Rodents, Insectivores, Lagomorphs

This document can be prepared by the regional network and specialist group members. Should be based on Specialist groups therefore a separate Action for Rodents, for Insectivores and for Lagomorphs. It may be initially web based and if funding can be obtained, a printed document could be produced. It should be technical but also available and understandable to implementing agencies. A small group of coordinators (steering committee) should be established for RILSCINSA. The general IUCN guidelines on Action Plan formation can be used. Giovanni Amori will provide the general guidelines.

Introduction

- ii. Chapters on each country
- iii. Taxonomic accounts (including subspecies)
- iv. Conservation Priorities
- v. References & Appendices

Next step to identify the list of chapters and species accounts and then start to identify the list of contributing authors. An editorial board is to be established.

Time frame: Manuscript of Chapters and endemic species

accounts to be completed by end 2004, for web publication in 2005, then non-endemic species accounts completed during 2005 for final publication (web and paper).

2. Training

i. A local Indian team can be formed to communicate field techniques training to different groups in different states in India. Requests have come from some regions and there could be a prioritisation of important areas. Could try to link in with other events. Maybe just 2 or 3 days each.

ii. Field study conducted as a training exercise, actual survey to inventory area, or species biology. Using reserve forest and private forest rather than protected areas and conducting a combined small mammal survey would be preferable. Would have to be 1–2 weeks.

iii. Research form that people complete to add to database as a way of capturing notes and observations that would otherwise go missed. Potential to publish those as notes in the ZOOS' PRINT JOURNAL. Format based on the C.A.M.P. datasheet will be explored and circulated for comment.

There may be a need for a more technical form to record standardised information from trapped specimens to assist in accurate identification, such as plantar pads, standard measurements, etc.

3. Education

Three tiers of target groups have been listed for education.

- i. Policy makers and academics: civil servants, forestry officials, college and university personnel, graduate students, etc.
- ii. Lay persons, e.g. adults both city and country
- iii. Young children - schools

A programme of education training for trainers was recommended. Training of teachers is particularly economical as every teacher will teach hundreds of students. Incorporate ecosystem-based concepts that link together the relationships between species such as the relationship between predator and prey.

Link together the networks of the Chiroptera and Rodent education networks under a 'Rats 'n Bats' banner to effectively combine educational resources. The Chiroptera network education packets are an ideal model for using to create similar small mammal material.

Discussion of computer key for common species that exists for some groups already (birds, trees, insects), available on CD and website. A similar module for bats and small mammals could be done by the same institution, via A.K. Chakravorty.

Discussion of a small booklet consisting of a line drawing of each species, and a description of their biology based on the taxon data sheets for use by educators. A more technical booklet on small mammals would also be useful. Instead of a printed field guide, a field "notebook" was proposed which is simple and cheap and could incorporate the growing pieces of detailed accurate information on each species which is being contributed by RILSCINSA field biologists.

Type specimens of South Asian small mammals are mostly found in a few museums outside this region, which makes it difficult to confirm the taxonomy of many species. It was proposed to visit these museums and straighten out the taxonomic questions for South Asian small mammals. As this will be an expensive but highly useful exercise, it was suggested that one could apply for a Darwin Initiative grant to complete this project. This will be done in collaboration with Chester Zoo, U.K. with help from Mike Jordan.

Research and Field studies Working Group

Sampath Goonatilake, A.K. Chakravorthy, Shomita Mukherjee, Shomen Mukherji, Meena Venkatraman, Joya Thapa, Wes Sechrest, A.R. Binu Priya

1. Protocols needed for funds and research and standards of research.
2. Priorities for research
3. Authenticity of biological information sheets. Strong support needed for any report/record.
4. Standardise data sheets (improvise existing ones) eg. available with Sri Lanka.

Referees for screening proposals

1. Prioritize areas for initiating research
2. Taxon specific surveys based on Data Deficient (DD) species from C.A.M.P.
3. Greater emphasis on ecology, population trend surveys rather than inventories
4. More emphasis on utilization aspect – e.g. Giant squirrels
5. Application of research to conservation
6. Ecological importance of rodents
7. Threats need to be identified
8. Request ZOO to supply information on DD species (irrespective of status)
9. Some species occur in natural and cultivated areas – a comparison of their ecologies in these different habitats
10. Globally restricted DD species should be given a higher priority over widespread species

Geographical areas priorities for research were northeastern India, Jammu & Kashmir, Western Ghats, Sri Lanka – central montane region

Recommendations were made for specific research activities for the following Data Deficient species : *Eupetaurus cinereus*, *Diomys crumpi*, *Alticauda albicauda*, *Alticauda blandfordi*, *Calomyscus hotsoni*, *Crocidura hispida*, *Crocidura nicobarica*

CR and EN species in Andamans or Nicobar *Crocidura andamanensis* and *Crocidura jenkinsi*. Sri Lankan species recommended to be prioritised for study : *Solisorex pearsoni*, *Suncus dayi*, *Suncus fellows-gordini* and *Suncus zeylanicus*

Population and threats research included *Suncus ceylonicus*, *Mus fernandoni*, *Feroculus feroculus*, *Suncus montanus*, *Mus mayori*, *Rattus montanus*, *Srilankamys ohienis*, *Vandeleuria nolthenii*, *Funambulus layardi*, *Petinomys fuscopapillus*
Several other species were prioritised for different conservation activities as well.

Methods

1. Genetic studies (populations and taxonomy) for restricted species and disjunct populations
2. Training in sample collections
3. Identification protocols, standardize keys
4. Long term studies for CR and EN species. Prioritise studies (e.g. long term for CR, EN species and quick surveys for DD species)
5. Involve universities in research (local universities)
6. Identify referees for screening proposals.

Taxonomy Working Group

T.P. Bhattacharyya, S.U. Sarker, S.S. Talmale, S.S. Saha, Y.P. Sinha, C. Srinivasulu

1. Capacity Building
 - a. Centre for identification (authentic)
 - b. Parataxonomy at least to species level
 - c. Utilisation of experts – enlisting resource persons interested in small mammal taxonomy.
2. Application of advance technology in taxonomy
 - a. Taxon with specific status complications need to be assisted by advance techniques as the need may call for in collaboration with

suitable institutions

b. Prioritisation of those taxa with conflicting taxonomic status opinions and DD species

3. i. Standardisation of workable key for identifying

a. Museum specimens

b. Live specimens in field

ii. Compilation of Atlas' (each order separately) drawings of key identification characters to aid identifications

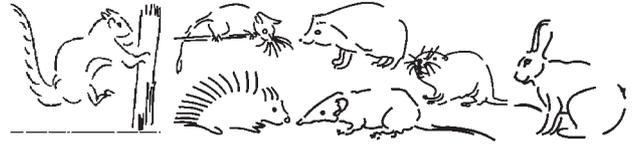
iii. Establishment of retrievable data base on valid taxon, synonyms, subspecies, museum collection catalogues, in collaboration with concerned authorities of countries of SA

4. Legislation should be passed so that it is mandatory

a. That a fair share of the voucher specimens of any taxa collected from any region in south Asia be deposited in the national

zoological collection of the concerned country and mention may be made in publications.

b. that any fresh / currently procured collection based on which revisionary / redescription / new record of any taxa in south Asia has been made should also be deposited in the National Zoological collection of the concerned country and mention may be made in publications.



Conservation Assessment and Management Plan CAMP Workshop for Non-volant Small Mammals of South Asia: Rodents, Insectivores, Scandents and Lagomorphs

South Asian Non-volant Small mammal C.A.M.P Workshop held 9-13 February 2004, Coimbatore, India			
DRAFT Status of Endemic species			
Scientific name and authority	Common name	Prelim Status	Criteria
Rodentia			
<i>Alticola albicauda</i> (True, 1894)	White-tailed Mountain Vole	DD	
<i>Alticola blanfordi</i> (Scully, 1880)	Scully's Vole	DD	
<i>Alticola roylei</i> (Gray, 1842)	Royle's Vole	EN	B1ab(ii,iii)
<i>Biswamoyopterus biswasi</i> Saha, 1981	Namdapha Flying Squirrel	CR	B1ab(iii); D
<i>Calomyscus hotsoni</i> Thomas, 1920	Hotson's Mouse-like Hamster	DD	
<i>Cremnomys elvira</i> (Ellerman, 1947)	Large Rock rat	CR	B1ab(iii) + 2ab(iii)
<i>Diomys crumpi</i> Thomas, 1917	Crump's Mouse	DD	
<i>Eupetaurus cinereus</i> Thomas, 1888	Woolly Flying Squirrel	DD	
<i>Funambulus layardi</i> (Blyth, 1849)	Layard's Striped Squirrel	VU	A3c+ B1ab (iii)
<i>Funambulus sublineatus</i> (Waterhouse, 1838)	Dusky-striped Squirrel	VU	B2ab (i,ii,iii,iv)
<i>Millardia kondana</i> Mishra & Dhanda, 1975	Large Metad	VU	D2
<i>Mus famulus</i> Bonhote, 1898	Bonhote's Mouse	VU	D2
<i>Mus fernandoni</i> (Phillips, 1932)	Ceylon Spiny Mouse	EN	B1ab(i,ii,iii)
<i>Mus mayori</i> (Thomas, 1915)	Mayor's Mouse	EN	B1ab(i)
<i>Petaurista magnificus</i> (Hodgson, 1836)	Hodgson's Flying Squirrel	VU	A2c, B1ab (iii,v)
<i>Petaurista nobilis</i> (Gray, 1842)	Noble Giant Flying Squirrel	VU	A2c, A3c
<i>Platacanthomys lasiurus</i> Blyth, 1859	Malabar Spiny Dormouse	VU	B2ab(i,ii,iii)
<i>Rattus burrus</i> (Miller, 1902)	Miller's Nicobar Rat	VU	D2
<i>Rattus montanus</i> Phillips, 1932	Nillu Rat	EN	B1 ab(iii), B2ab(iii)
<i>Rattus palmarum</i> (Zelevor, 1869)	Zelevor's Nicobar Rat	VU	D2
<i>Rattus stoicus</i> (Miller, 1902)	Andaman Rat	VU	D2
<i>Ratufa indica</i> (Erxleben, 1777)	Indian Giant Squirrel	VU	A2c, A3c
<i>Ratufa macroura</i> (Pennant, 1769)	Grizzled Giant Squirrel	VU	A2c, A3c
<i>Srilankamys ohiensis</i> (Phillips, 1929)	Ohiya Rat	EN	B1ab(iii)
<i>Vandeleuria nolthenii</i> (Phillips, 1929)	Ceylon Highland Tree Mouse	EN	B1ab(iii) + B2ab(iii), B2c
Insectivora			
<i>Crocidura andamanensis</i> Miller, 1902	Andaman White-toothed Shrew	CR	B1ab (iii, iv)
<i>Crocidura hispida</i> Thomas, 1913	Andaman Shrew	DD	
<i>Crocidura jenkinsi</i> Chakraborty, 1978	Jenkin's Andaman Spiny Shrew	CR	B1ab(iii)
<i>Crocidura miya</i> Phillips, 1929	Sri Lankan Long-tailed Shrew	EN	B1ab(iii); B2ab(iii)
<i>Crocidura nicobarica</i> Miller, 1902	Nicobar Shrew	DD	
<i>Feroculus feroculus</i> (Kelaart, 1850)	Kelaart's Long-clawed Shrew	EN	B1ab(iii) + 2ab(iii)
<i>Solisorex pearsonii</i> Thomas, 1924	Pearson's Long-clawed Shrew	EN	B1ab(iii) + B2ab(iii)
<i>Suncus dayi</i> (Dobson, 1888)	Day's Shrew	EN	B1ab(ii,iii) + B2ab(ii, iii)
<i>Suncus fellowes-gordoni</i> Phillips, 1932	Ceylon Pygmy Shrew	EN	B1ab(iii) + B2ab(iii)
<i>Suncus montanus</i> (Kelaart, 1850)	Hill Shrew	VU	D2
<i>Suncus zeylanicus</i> Phillips, 1928	Ceylon Jungle Shrew	EN	B1ab (ii, iii) + B2ab(ii,iii)
Lagomorpha			
<i>Ochotona thibetana</i> (Milne-Edwards, 1871)	Manipur Pika	VU	B1a (iii), B2a(iii)
Scandentia			
<i>Tupaia nicobarica</i> (Zelevor, 1869)	Nicobar Tree Shrew	VU	D2

The complete list of South Asian mammals in the Harvard Collection

The April issue of the Journal of the Bombay Natural History Society published a very important listing of South Asian mammals in the Harvard Collection. The authors, K.M. Helgen, John Mathew and C.A. Monta were very happy to note of RILSCINCA's interest in obtaining more information as to the distribution, collection details including the date of collection, nature of specimen, the collector's name and the collection number. This project of compiling information was done by K.M. Helgen with the help of the other two authors as the second author, John Mathew, an Indian, was interested in listing the collections from the museum for reference back home. They shared the details of their study with us when we expressed this need for one for our upcoming Non-volant Small Mammal Conservation Assessment and Management Plan Workshop. All this information is also transferred into the CAMP database, but is available with us for if you wish to have it. Please email us at zooreach@vsnl.com or zoocrew@vsnl.net with a request for this document and we will send you an Excel file by email. Below this we have pasted a small portion of what is available. This is also a good opportunity to provide due credit to the compilers of this humongous task, which is mostly ignored or relegated to a taxonomist's wishlist. This is to encourage anyone interested in pursuing small mammal taxonomy with it's implications for conservation to note that such valuable data exists and can be put to good use even after a century.

Order/Species	MCZ No	Nature of Specimen	Collector	Location
Rodentia				
<i>Alticola montosa</i>	13659	Skull & Skin	W. L. Abbott	Min Nai, Kashmir
<i>Apodemus rusiges</i>	23518	Skin	C.M. Crump	Kashmir, Sangri
<i>Bandicota bengalensis bengalensis</i>	5195	Skull	M.M. Carleton	India, Kullu Valley
	57915	Skull & Skin	R. Paynter	India: W. Bengal, Kallinpong, Tarkhola
	5196	Skull & Skin	M.M. Carleton	India, Kullu Valley
	5198	Skull & Skin	M.M. Carleton	India, Kullu Valley
	5199	Skull & Skin	M.M. Carleton	India, Kullu Valley
	5200	Skull & Skin	M.M. Carleton	India, Kullu Valley
	5201	Skull & Skin	M.M. Carleton	India, Kullu Valley
	5202	Skull & Skin	M.M. Carleton	India, Kullu Valley
	5203	Skull	M.M. Carleton	India, Kullu Valley
	5204	Skull	M.M. Carleton	India, Kullu Valley
	5206	Skull & Skin	M.M. Carleton	India, Kullu Valley
	5207	Skull	M.M. Carleton	India, Kullu Valley
	5208	Skull & Skin	M.M. Carleton	India, Kullu Valley
	5209	Skull & Skin	M.M. Carleton	India, Kullu Valley
	5210	Skull & Skin	M.M. Carleton	India, Kullu Valley
	5231	Skull & Skin	M.M. Carleton	India, Kullu Valley
<i>Bandicota indica indica</i>	27558	Skull & Skin	W.W. Phillips	Sri Lanka, Central Province, Gammaduwa, Mousakande
	27559	Skull & Skin	W.W. Phillips	Sri Lanka, Central Province, Gammaduwa, Mousakande
	29473	Skull & Skin	W. Schofield	Sri Lanka, Nurwara Eliya
	32509	Skull & Skin	W. Schofield	Sri Lanka, Dimbulla
<i>Bandicota indica nemorivaga</i>	5311	Skull & Skin	M.M. Carleton	India, Ambala
<i>Callosciurus erythraeus erythraeus</i>	21740	Skull & Skin	H. Stevens	India, Assam
<i>Callosciurus erythraeus erythrogaster</i>	57903	Skull & Skin	N. Manimukh & R. Paynter	Bangladesh: Chittagong Hills, Mahallya
<i>Callosciurus erythrogaster</i>	57904	Skull & Skin	R. Paynter	Bangladesh: Chittagong Hills, Mahallya
<i>Callosciurus ferrugineus ferrugineus</i>	1927	Skin	_____	Myanmar
	1928	Skin	_____	Myanmar
<i>Callosciurus prevostii</i>	5823	Mtd. Skin	H.A. Ward	S. India, Admiralty Forest
<i>Callosciurus pygerythrus blythi</i>	57900	Skull & Skin	R. Paynter	Bangladesh: Sundarbans, Burigoalni
	57901	Skull & Skin	R. Paynter	Bangladesh: Sundarbans, Burigoalni
	17851	Skull & Skin	H. Stevens	India: Assam, Rungagora, Dibrugargh
<i>Callosciurus pygerythrus lokroides</i>	57902	Skull & Skin	R. Paynter	Nepal: Putikhet, Nuwakot
	1922	Skull & Skin	W. Theobald	E. India
<i>Callosciurus pygerythrus mearsi</i>	57894	Skull & Skin	R. Paynter	Bangladesh: Chittagong Hills, N. Manimukh, Mahallya
	57895	Skull & Skin	R. Paynter	Bangladesh: Chittagong Hills, N. Manimukh, Mahallya
	57896	Skull & Skin	R. Paynter	Bangladesh: Chittagong Hills, N. Manimukh, Mahallya
	56897	Skull & Skin	R. Paynter	Bangladesh: Chittagong Hills, N. Manimukh, Mahallya
	57898	Skull & Skin	R. Paynter	Bangladesh: Sylhet, Baramchal
	57899	Skull & Skin	R. Paynter	Bangladesh: Sylhet, Baramchal
<i>Cannomys badius</i> subsp.	27445	Skin & Skel.	W. Schofield	Myanmar, Shwegyin
	30256	Skull	W.A. Lang-Schofield	Myanmar
	6024	Skel.	E. Gerrard, Jr.	India
	968	Skull	W. Theobald	India
	969	Skull	W. Theobald	India
	1929	Skin	W. Theobald	Myanmar
	1930	Skin	W. Theobald	Myanmar
	3617	Skel.	W. Theobald	India

Report on the Training Workshop on Reintroduction, Conservation Welfare and Conservation Breeding with Special Emphasis on Non-volant Small Mammals

C. Srinivasalu* and P. O. Nameer **

A training workshop on reintroduction, conservation welfare and conservation breeding with special emphasis on rodents and insectivores was held at Karl Kübel Institute, Anaikatty, Coimbatore in southern India from 13th to 15th February 2004. This training workshop was organised by RILSCINSA, the Rodent, Insectivore, Lagomorph, Scandents Conservation and Information Network of South Asia RILSCINSA and Zoo Outreach Organisation. It was jointly conducted by IUCN SSC Reintroduction Specialist Group (South & East Asia), and the Conservation Breeding Specialist Group, CBSG-SA. More than 30 participants from the small mammal network a combination of CCINSA and RILSCINSA from India, Sri Lanka and Bangladesh attended the workshop along with other biologists. External resource persons for the workshop were Dr. Mike Jordan (Chair, IUCN SSC ReSG, Europe and Central Asia and Curator of Mammals, Chester Zoo) and Dr. Giovanni Amori (Chair, IUCN SSC Rodent Specialist Group and CNR Institute of Ecosystem Studies, Rome). A number of scientists from India also shared their expertise as resource persons, e.g. M. S. Pradhan, Dy. Director ZSI, Sujit Chakraborty, Chair, RILSCINSA, Retd. ZSI, S.S. Saha, S.S. Talmale, ZSI, and Shomen Mukherjee, Israel. The workshop was jointly facilitated by Sanjay Molur and Sally Walker of WILD and, ZOO and representing also RSG, South and East Asia and CBSG, South Asia. Sanjay Molur initiated the workshop on the 13th evening by introducing Dr. Mike Jordan and giving an overview of the Workshop agenda.

Day 1 Agenda

1. Lecture: Introduction and small mammal diversity by Dr. Mike Jordan
2. Lecture: Overview of rodent conservation - a global perspective by Dr. Giovanni Amori
3. Lecture: Small mammal conservation in South Asia by Sujit Chakraborty

Mike Jordan began his lecture on global small mammal diversity of the world by outlining the plight of numerous species that contribute to more than 75 percent of the known mammal diversity of the world. Despite their obvious importance, small mammals are considered as pests and are under constant threat due to control and management actions taken against them by humans throughout their global range. In fact, non-volant small mammals are among the most beautiful living organisms, Mike said, and proved this point by showing dozens of slides of beautiful rodents and insectivores which also indicated their diversity.

Among small mammal diversity, the non-volant forms are more diverse in number, size, distribution and ecology. The rodents, distributed widely except certain Arctic islands, parts of West Indies, New Zealand, many oceanic islands and Antarctica, express diversity in size ranging from the smallest Harvest Mouse (*Micromys minutus*) weighing 2-4 g to the largest Capybara (*Hydrochaeris hydrochaeris*) that usually weighs 50 kg with some adult males scaling 80 kg. Rodents are mostly represented by the murids - rats and mice (65%) but also include a variety of other forms too. Mike went on to elaborate on the diversity with respect to form, shape, size, feeding behaviour, social behaviour, niche utilization, breeding ecology, etc. with appropriate illustrations as examples. The extant murids are even more diverse than they appear to be.

Murids are rapid breeders that give birth to precocial or altricial young that vary in terms of litter size and breeding seasonality too. *Acomys dimidiatus* young are active right from birth and possess big ears and open eyes. The Andean Leaf-eared mice belonging to the genus *Phyllotis* have leaf-like large ears. In some cases diversity within the subfamilies too are evident as indicated by the subfamily Arvicolinae that includes a variety of genera. The genus

Alticola (high mountain voles) includes diurnal semi-fossorial specialists dwelling above the snow line. The genus *Dicrostonyx* (Collared Lemmings) includes short stockily built animals occurring in treeless arctic tundra and, remarkably, develops third and fourth claws in winter. The Musk Rat (*Ondatra zibethicus*) has partially webbed hind foot with 'swimming fringe' made of a row of closely set short stiff hairs, and laterally flattened scaly (almost hairless) tail. The genus *Ellobius* (mole-voles) include specialized fossorial microtine with round head, reduced eyes and ears, small claws, and large incisors. Among the gerbils the arid to semi-arid habitat dwellers, some are unique as the Fat-tailed Gerbil that stores fat in its tail that is used up during the lactation lasting 3 to 4 weeks. The forms belonging to Nesomyinae, like the Giant Jumping Rat (weighing up to 1-1.5 kg), are endemic to Madagascar and are under threat due to exotic rodents introduced on the island.

The family Sciuridae, representing 13% of the rodents, are also global in distribution. As the squirrels are more diurnal thus having good colour perception, they express a large variation in body colouration too. They are among the most beautiful rodents. They vary in size from a small highly arboreal squirrel to larger strictly arboreal giant squirrels to large heavy set (6-7 kg) semi-fossorial marmots. The flying squirrels with the skin stretched between their fore and hind limbs are capable of gliding a considerable distance in high canopy forests. Among the other rodents, some examples include the brightly coloured South American arboreal spiny rats, small pocket mice, kangaroo-rats, jerboas, gophers, dormice, naked mole-rats, beavers, gundi, porcupines pacas, chinchillas, capybara and others are unique.

Pygmy Shrew (*Suncus etruscus*), belonging to the order Insectivora, is among the smallest mammals of the world. This order includes small to medium sized animals having voracious appetites. The *Sorex minutus* weighing about 2.5 to 3.5 g has to eat every four hours to avoid starvation. This makes them poor candidates for captive rearing. The forms belonging to the genus *Sorex* are more difficult to keep in captivity than that of genera *Crocidura* and *Suncus*. Like the rodents, the shrews too display a wide range of adaptive behaviors and some of them have even taken to semi-aquatic life, like the *Neomys fodiens*, *Nectogale elegans*, *Chimmarogale himalayana*, etc. The moles are fossorial and are also good swimmers like the Desmans. The tenrecs that had been earlier classified under the order Insectivora are now treated distinctly.

The order Lagomorpha is represented by 70 odd species. In the New World it is represented by the genus *Sylvilagus*, while in other regions the genus *Lepus* is widespread. Among the hares and rabbits some are habitat specialists and the Volcano Rabbit of Mexico is endemic to volcanic regions. The pikas represent the genus *Ochotona* that characteristically has smaller ears and are upland to alpine dwellers.

The order Scandentia is represented by tree shrews that are very few in numbers and are restricted to the Old World regions.

Mike wound up the lecture by indicating that the small mammals, although representing 60% of the known mammal diversity, are a neglected group of animals when compared with the large mammals which get the largest portion of attention and support.

* Wildlife Biology Section, Department of Zoology, Osmania University, Hyderabad – 500 007, Andhra Pradesh

** Asst. Professor, College of Forestry, Kerala Agricultural University, Thrissur 680 656, Kerala

The second lecture was delivered by Dr. Giovanni Amori and dealt with the rodent conservation scenario. Between 1982 and 1993, rodent diversity increased by 17.5% the world over and the trend still continues. A crude estimate based on a comparison drawn with the primate diversity suggests that there may be around 3400 species of rodents in the world. Rodents are very essential as they sustain predators of various sizes and kinds. Rodents are under severe threat due to natural and anthropo-driven extinctions. In the last 500 years 53.5% of the mammal extinctions are those of rodents. With as many as 369 species at the threshold, the oriental region is rich in threatened species. Dr. Amori emphasized the fact that correct interpretation of the issues is better for conservation issues. Rodents that had been carelessly introduced have negatively affected the native fauna. For example, *Rattus norvegicus* has resulted in the extinction of *Sphenodon punctatus* in select areas in its range; *Rattus rattus* has led to the extinction of *Mystacina robusta* in Europe, while *Mus musculus* affected small invertebrates and many plant species. In some areas to control such exotic rodents, small carnivores were introduced, a measure that led to faster depletion of more native endemic fauna than anticipated. Introduction of the Grey Squirrel in England and mainland Europe has slowly replaced the native squirrel from its range. After deliberating on these issues, Dr. Amori listed the following recommendations -

- i) promote taxonomic research on relict population or species known only from few specimen,
- ii) prevent further invasion,
- iii) create more protected areas for conserving rodents,
- iv) evaluate the effects of changing ecological conditions on threatened species,
- v) establish coordinated breeding account and
- vi) increase knowledge on behavioural ecology.

Dr. Sujit Chakraborty, Retired Scientist from Zoological Survey of India and Chair, RISCLINSA, delivered the third lecture 'Small mammal conservation in South Asia'. He outlined the sparser nature of mammal diversity, and went on to emphasize that due to their pre-adaptability they are widespread and exhibit diversity in body size and behaviour. He felt that the 'small mammals' do not have a clean taxonomic entity and that those which are less than 5 kg in body weight are "small mammals". Small mammals play a crucial role in the ecosystem as they help in predator-prey relationship, act as ecosystem regulators, affect plant composition, soil type and drainage too.

He opined that all South Asian countries have been witnessing a steady increase of population of improvised human leading to changes in agricultural practices and unplanned exploitation of bioresources that directly affect the mammalian assemblages in the region. To counteract this bleak situation, actions need to be taken and the positive thing, he said, was the growing and conscience effort to conserve wildlife, habitat and species, research and law, etc. He pointed out that except for habitat management that also affects small mammals, all other efforts deal with or address charismatic large mammals. He felt that the role of and conservation status of small mammals need to be emphasized to as many citizens as possible as without their help the conservation programme fails and does not serve any purpose. Dr. Sujit indicated that small mammals also live in areas outside the protected area networks and many are synanthropic. They are hated by humans as their activities are thought to be against human well being and have been under severe threats due to drastic control measures meted against them. He indicated that due to the intensive agriculture activities taken up after the Indira Gandhi Irrigation Canal in the Thar Desert region many small mammals had been locally wiped out from many localities.

Diverting from the actual happenings unfolding on the ground where the small mammals dwell, Dr. Sujit went on to say that small mammals are also neglected in regard to appropriate legislation. He pointed out that the environmental impact assessment studies carried out restricted themselves to charismatic large mammals and the small

mammals are affected in a larger way due to this negligence. He further went on to say that the Indian Wildlife Protection Act lists bats, rats and mice as vermin and this requires urgent attention as many of the species belonging to these groups are threatened in the wild, warranting full protection, without which they are likely to become extinct. Furthermore, many species unknown to science may become extinct before discovery. Illustrating the case of the Marsh Mongoose *Herpestes palustris*, a recently described Indian mammal becoming extinct due to wetland reclamation, Dr. Sujit feared that we may be losing some restricted range species if we do not take necessary actions now. He emphasized on the role of *ex situ* conservation of such priority species. He suggested that sufficient momentum for this cause has been lacking, and unable to meet the needs of the decline of many known life forms. To this effect, Dr. Sujit placed the blame on the scientific community and emphasized that a sound conservation management plan requires baseline data including an area-specific inventory of flora and fauna, and actual trends of their population in the wild. Prioritizing these would result in achieving conservation goals in the long run.

The last lecture of the day was delivered by Dr. Mike Jordan. He spoke on "Starting a reintroduction project - IUCN fundamentals - considerations before release". In his talk, he highlighted the basic principles to start a reintroduction project and fundamental considerations for release of stock in the target area. He emphasized that release of the captive bred animals for the purpose of reestablishing or supplementing wild populations is an important aspect of conservation. Furthermore he stressed that the management and manipulation of population is the crux of conservation measures directed at a particular species. He projected some case studies including that of Bald Ibis, Elephant, Bustards, Water Vole, insects, snails and some plants, as examples.

He then outlined the types of releases undertaken during reintroduction processes. These include,

- i) Reintroduction [re-establish an extirpated population in wild],
- ii) Restocking/Supplementation - increase an existing population by releasing individuals from other viable populations,
- iii) Benign Introduction - establish a population outside the native range, and
- iv) Translocation - movement of wild individuals from one site to other.

He pointed out that reintroduction processes are part and parcel of the conservation actions aimed at many species that are critically threatened in wild due to their small numbers and fast declining habitat quality. He clarified that reintroduction processes should not be driven by requirement to dispose a stock, but should be integrated within the whole conservation strategy in case where natural recolonization is unlikely or very slow. One should consider reintroduction only when the reasons for the extirpation or extinction of the natural population have been addressed. He also emphasized that the reintroduction programme should be driven by *in situ* not *ex situ* concerns. He went on to outline the advantages of reintroduction programmes ranging from rapid increase in the number and range of the taxon in question, decrease in fragmentation, development of chosen key sites, awareness among the public about the conservation actions and needs, and further research potential including radio telemetric, pathologic and other such inter-disciplinary studies. However, he mentioned that the reintroduction programmes could be very costly and of a complex nature. Being multi-disciplinary in nature it requires involvement of teams of experts from various fields as captive breeders and managers, veterinarians, field biologists, habitat managers, etc. He also pointed out that the potential ecological impact of the target species being reintroduced needs to be critically looked at. In this regard, he illustrated the hypothetical example of beaver reintroduction in the United Kingdom where they were present in the past and as lately as 1100 AD. Since that time the ecology of the wilderness areas in United Kingdom might have drastically changed and the beaver, if introduced now, may not adapt itself to the new habitat, or may greatly affect the habitat thus affecting directly many

more species native to the place.

Speaking about restocking/supplement, Mike emphasized that it should be undertaken to increase genetic variability in a small population and also if the natural rate of population growth is very slow. Furthermore, it is also at the crux of meta-population management of fragmented populations. However, he reemphasized that restocking should be driven by *in situ* not *ex situ* conditions, should never be done to bolster declining populations without addressing the reasons that led to the decline of natural population, and also should never be done merely to dispose of excess captive stock. He went on to describe the advantages of restocking including increase of genetic variability, ease of release site selection (as the existing population makes it much easier), and secure slow growth rate population. He then reviewed the disadvantages of restocking/supplementation. This process could have an ecological impact as increase in density of animals leads to decline in habitat quality and functions at a low level due to carrying capacity constraints. It also increases the potential for disease spread and also raises the post release monitoring difficulties.

He advised that 'introduction' should be considered only when there is no remaining area left within the species' native range, should be integrated within the whole conservation strategy, and when reasons for the non-occurrence had been documented and addressed carefully. 'Introduction' should be taken on a smaller scale with a reversible component addressed, at first, to curb any negative impacts that may result due to 'introduction'. He also emphasized that translocation must be considered only when it is 'Conservation-driven', and the donor population is secure and productive. Also important is to settle matters related to mitigation and habitat destruction or damage with protocols for its avoidance clearly outlined. Translocations must be done only between genetically /ecologically similar populations. The advantages of translocations include cost efficiency (being a low cost exercise), requires little infra-structural facilities, potential survivorship of the translocated animals, and addition of the genetic variability within wild populations. However, the disadvantages include its negative impact on wild populations due to the unpredictability of supply stock, problems pertaining to demographic issues, and conflict of removal and release timing as many animals are greatly affected by this factor.

He went on to elaborate the consideration of site, habitat issue and release protocol. He emphasized that before reintroduction/translocations projects are initiated, the issues pertaining to the target animal/plant, site of release, reintroduction and restoring, release protocol, kind of release (hard vs. soft release), monitoring, spatial distribution, release season, number of releases, pre-release and release timing be addressed carefully and scientifically. He stressed on the fact that the pre-release timing is a significant component in a release programme. One should also take into consideration the legal and local issues as well as the economic values attached with the project.

Reintroduction projects lead to pooling of the enhanced expertise, transfer of skills, shared responsibility, shared accountability, increased funding opportunities, enhanced future collaboration, and also increased chance of success. These projects should be undertaken as multi-disciplinary and multi-tasking programmes involving all agencies that could contribute for its success. The last talk ended with a discussion on Rhino release from Kaziranga to Gorumara and also that of Red Panda from Darjeeling zoo to Sangrila Protected Area. The success as well as failure stories are milestones in reintroduction programmes and one must learn lessons from all attempts.

Day 2

The day began early as the participants gathered at 0500 hrs to board two mini vans headed for Silent Valley National Park for a field visit. The visit to the National Park was preceded by a half-day lecture session that was held at Mukkali - the base camp of the

National Park. After reaching Mukkali by 0720 hrs, participants enjoyed watching birds and squirrels before having their breakfast. The days' proceedings began at 0900 hrs with a lecture on 'Setting priorities for reintroduction and captive breeding' by Dr. Mike Jordan.

Agenda

1. Lecture: Setting priorities for reintroduction and captive breeding by Mike Jordan
2. Lecture: Identification of small mammal species through owl pellet analysis, by S.S. Talmale (Zoological Survey of India, Western Regional Station, Pune).
3. Lecture: Some field techniques for studying rodents by Shomen Mukherjee (Ben Gurir University, Israel).
4. Lecture: Conservation status of Indian rodents as per IUCN Red List categories by Dr. M.S. Pradhan (Scientist, Zoological Survey of India, Western Regional Station, Pune).
5. Lecture: Small mammal welfare and handling by Dr. Mike Jordan.
6. Field visit to Silent Valley National Park.

In his first lecture of the day Dr. Mike Jordan clarified that captive breeding programmes and reintroduction programmes are fully integrated with field conservation measures. Liaisons between field biologists and captive managers are very important for conservation. The reintroduction programmes need to surpass political boundaries and take a holistic approach with conservation of the species as the main goal. He illustrated this with the example of *Cricetus cricetus* reintroduction programme undertaken by Belgium, Holland and France, the countries collaborating to bring out guidelines in their national language to save the animal from extinction and to initiate captive breeding plans. With only one country doing so and the taxon being greatly neglected the chances are bleak for its revival from the brink. Threats on populations having a limited number of mature individuals have immense impact, thus timely action has to be taken to insure that the population can increase with sufficient genetic viability to survive for the long term. In such cases, guidelines need to be formulated before it is too late. Clear mandate to initiate a captive breeding programme also is essential. Collections of captive breeding stock are to be planned in such a way that a sufficient amount of mature breeding pairs could be left in the wild so as to not affect the population in case the captive breeding programme fails. It is, in fact, too late to begin a captive breeding programme and plan for reintroductions when the population in the wild is very low. Captive breeding and management can serve two purposes including i) population management, and ii) education. Species selection for reintroduction needs to be carefully planned as disease risks and its potential on the wild population greatly outweighs all other reasons. Mike also indicated that the IUCN Red List, which is global in its focus, fails at the level of local prioritization of the status of a particular taxa in the region (unless that taxon is endemic to the area) but stressed that national level assessments caters to this need. The IUCN Technical guidelines on the management of the *ex situ* population for conservation has wide implications towards this cause. He also elucidated the role of Taxon Advisory Groups in the different regional zoo associations in the interpretation of the guidelines. He felt that the listing of the species from the region that globally requires captive breeding should be given top priority, as many of these are potentially reintroduction candidates.

Following this Dr. Mike briefed the participants about the role of the Reintroduction Specialist Group in terms of captive breeding programmes. This led to the discussion on the role of zoos and field biologists, and the need for creating and establishing liaisons between the two in India to initiate captive breeding programmes. He answered some questions and summed up his lecture.

The next presentation was by S.S. Talmale, who talked about identification of small mammal species through owl pellets. He indicated that the secondary source of information gives us information about many untrapable species of small mammals. This lecture was followed by a presentation by Mr. Shomen Mukherjee that dealt with the field methodology that he and his team were

following to study gerbil behaviour in arid regions of Israel.

After the tea break, Dr. M.S. Pradhan briefed the participants about the conservation status of Indian rodents as per legislation and IUCN red listing categories and felt that it was now time to accord correct conservation status to the non-volant small mammals and the mention of rats and mice as 'vermin' may be changed accordingly to include only the recognized and listed rodent pest species. During the group discussion that followed Dr. Pradhan's presentation, Mr. Mohanan Pillai elaborated on the conservation acts in place within India from British era till date, and felt that in the current context the definition of the term 'wildlife' has been changed and cases like this has been leading to many problems related to conservation-based action recommendations and other related problems.

The last presentation of the day was made by Mike who talked about 'small mammal welfare and handling' illustrated with beautiful slides. He emphasized that the trap design should take into consideration the animal behaviour and requirements. Animal handling should be humane, and care should be taken not to harm the animal physically and also reduce stress to the animal. To subdue the captured animal use of isoflourine is far better than ether or chloroform as both these lead to irritation and tissue damage. While using anesthesia it is advisable to either blow it into the anesthetic chamber or use a canister so as to avoid any direct contact of the chemical with the animal. Marking of the animals could be done using ear tags (that should be properly attached as too loose or too tight ear tags cause physical damage to the animal), pit tags (these should be placed on the back between the shoulders) and hair clipping (most desirable as it is non-intrusive). The pit tags should be inserted under the skin of the animal from the head to back direction to ensure long lasting of the tag within the animal's body. He further went on to explain about keeping records and monitoring burrows, feeding sites, tracks and footprints to enable one to monitor the health conditions and welfare of the animals at the release sites.

After lunch, participants took an hour and half duration bus ride through lush green rainforest tract of the Western Ghats to reach the Silent Valley watch tower site from where they took a 1.5 km forest transect observing footprints, scats and droppings, and also scanned the canopy for non volant small mammals. Participants observed many species of birds, Nilgiri Langur, Lion-tailed Macaque, Indian Giant Squirrel, frogs and lizards.

Day 3 Agenda

1. Lecture: Protocols for Small Mammal Reintroductions by Dr. Mike Jordan
2. Demonstration: Public education for small mammals: Active learning - bats as case study by Sally Walker (Zoo Outreach Organisation, Coimbatore) and Gigi Joseph (Periyar Tiger Reserve, Kerala)
3. Discussion: Case studies in conservation action coordinated by Dr. Mike Jordan.
4. Lecture: Preservation of specimens by Dr. S. S. Saha (Retired Scientist, Zoological Survey of India, Kolkata).
5. Discussion: Reintroductions for South Asia and other loose ends coordinated by Dr. Mike Jordan, and Mr. Sanjay Molur (Chair, Reintroduction Specialist Group [South and East Asia]).
6. Vote of thanks and distribution of certificates.

The proceedings of the day began at 0900 hrs with a lecture on 'Protocols for small mammal reintroductions' delivered by Mike. He started by highlighting the fact that fragmentation is a major threat with or without habitat loss, invasive species, or habitat degradation. He stated that fragmentation can be overcome by natural recolonization and reintroduction. The former process is a slow one while the latter one can be initiated with proper planning and ensures curbing the ill effects of fragmentations.

He outlined the 4 phases of reintroduction/restocking programme as

- i) the feasibility study,
- ii) the pre-release phase,
- iii) the release phase, and
- iv) the post-release phase.

Feasibility study is the first phase that aims at putting the available literature on biology of the target species, predator-prey relationship and its effect on the target species, habitat issues, habitat known to be used, and availability; technicality of reintroduction, breeding stock etc. to gain insights on the ecology and habitat of the area where reintroduction is to be made and target animals' resilience. This phase should come out with an answer as to whether the reintroduction programme is feasible or not, and if not, why.

Further he outlined the key consideration for the pre-release phase. He stressed the fact that reintroduction is a sequential process and needs to be planned on a timeline. Attention should be paid towards of the sources of animals (as wild-caught translocated animals have problems of unpredictability), threats to wild population (reintroduced animals may pose threat to the existing wild population), and, age and sex composition (problems with right age and sex composition at the right time is very much needed). For this, the captive bred release stock works well as the above-mentioned factors can be manipulated according to the need of the programme. With respect to small mammals that have high reproductive rates, it is easy to start a breeding stock in captivity to begin a reintroduction. Captive breeding practices should take care of the appearance of recessive genes.

Mike said that for the success of a reintroduction programme the next important factor that needs to be taken in to consideration is the choice of the right release site. Continuity of habitat in all seasons used by target animals need to be dealt with before release. Long-term management at release site is also to be addressed. Best habitats of target species needs to be addressed. Health screening is a vital issue in reintroduction programmes as when targets are released, pathogens and parasites related with them are also released. Health screening would help reduce hazardous outcome. The procurement of stock should be from the nearest, largest stock, as the stock being bred and reared in the vicinity of the release site would have the adaptability factor that would ensure their well being at release site.

He also emphasized that it is important to pay attention towards the timing of release. It is common practice that release of the animals should be done when mortality is low and breeding is in progress to enhance survival success. Wrong dating of release would lead to failures. It is always safe to release the stock when they are just about to breed. The number of individuals in a release stock should also be taken into consideration as small mammals are prey base, and only a few hundred animals would doom the project. To compensate loss due to natural predation pressure, a sufficiently large number of release animals would take care of initial mortality and predators. For example, the intrinsic value of individuals - assuring 70% over wintering habitat, 1 animal released in spring would equal to 3.34 animals released in autumn, or 1 animal released in autumn would equal to 0.30 animals released in spring. That is with 95% over winter mortality/habitat loss, 1 released animal in spring would equal to 10 animals released in autumn, or 1 animal in autumn would equal to 0.03 animals released in spring. This kind of understanding about the behaviour of animal population in relation to their ecology, habitat and climatic features go a long way in reintroduction programmes. Furthermore the demography of release group should also be taken in to consideration. Age and sex ratio needs to be balanced. Social structure needs to be understood. Social animals need to be reintroduced as a 'unit'. Preferably avoid releasing late pregnant and lactating females.

Talking about release techniques, Mike indicated that it could be done either by physical release (where animals are taken to a release spot and released by hand by picking them out of the box) or by enclosure release (simple to sophisticated method, it ensures the

recommended conditions are similar to that of release site). At this point Dr. Mewa Singh pointed out that animals learn and such controlled release in release site in enclosure would prepare the animal for success. While undertaking release of the latter kind the ecology and behaviour of the target animal need to be considered too, as some animals behave differently with respect to sex. For example, male hares are territorial and would not survive due to their behaviour if subjected to this kind of release methodology.

The post-release phase is the most important component of the reintroduction programme. It gives us the opportunity to learn and improve what works and what does not. After release, monitoring can be done by using different techniques ranging from marking the released animals by foot tags, radio tags, tattoos, ear tags, etc. Their survivability and movement can be tracked by using nest boxes, cages, hair strip etc. It is also important to know their reproductive behaviour and the reintroduction programmes success could also be assessed by measuring success by reproduction as indicated by number of young per litter, recruitment, field signs of reproductive activities and burrow counts.

Site management and intervention is also an important component of the post release phase. Habitat destruction should be curbed/checked. Continued support from locals inhabiting the habitats where the animals are released is important and could be useful for intervention to check damage to the habitat or the released animals. Predation pressure and sick animals need to be checked. Most importantly the public relations part through community educational awareness programmes through public media should be taken up during this phase to let other stakeholders know about the importance of conservation of animals in the wild and the role of reintroduction programmes in conserving the flora and fauna.

The second programme of the day began at 1130 hrs with Ms. Sally Walker, Founder /Director of ZOO describing the importance of education in a conservation programme. She said that field biologists made excellent educators as evidenced by the programmes conducted by several bat biologists in this region. She reviewed the material developed by ZOO that is used to educate people about animals and their conservation importance.

This was followed by a participatory education exercise conducted by Gigi Joseph (Education Officer at Periyar Tiger Reserve, Kerala) who selected five participants to act like fruit bats and challenged them to collect as many fruits as they could find which he had scattered throughout the conference hall. This game was followed by a game debate between utilities of fruit bat and other bats. All the participants interacted in this productive debate. This was then followed by a demonstration with placard and a jingle eulogizing fruit bats - *Bats are good ! Bats are great ! Without Bats we'd have no food on our plate !*

This session was followed by a pre lunch discussion at about 1200 hrs. Participants interacted with the resource persons and shared their views about reintroduction programmes and various scenarios pertaining to reintroductions. It was felt that scientific research on role of non-volant small mammals in ecology be encouraged. Their pestiferous and non-pestiferous roles etc. need to be studied in detail. Guidelines on primate reintroduction were briefly discussed. Dr. Mike Jordan also emphasized the efficacy of holistic conservation-motivated decision-making for establishment of taxon in any given area and its continued survival. Prof. Sarkar from Bangladesh remarked that the rodents in Bangladesh are under control pressure and are rapidly declining from select areas. It was also felt that the pest control measures are more generalized and many non-target species are also getting affected. Dr. M.S. Pradhan indicated that the ICAR is now focusing on biocontrol measures and are shifting away from chemical based pesticides for rodent control in India. Dr. Sujit Chakraborty indicated that pest management and conservation management was on a war-footing with respect to 2006 bamboo flowering in Northeast India, an area that harbours the bulk of endangered and endemic non-volant small mammal species.

He feared that it would be detrimental in case mass rodent control programmes are undertaken.

Matters relating to debates between 'captive breeders' and 'wildlife biologists' regarding captive breeding programmes were also discussed. It was felt that for some taxon under severe threat, captive breeding programmes for increasing their numbers from the critical minimum viable population to a point where it becomes self-sustaining, is urgently needed. Reintroduction is for continued survival of the taxon, which was resurrected from the minimum viable population number in areas where they were once wildly occurring. It was also felt that zoos in South Asia are not sufficiently into captive breeding programmes. Universities and institutions can kick-start such conservation breeding programmes before it is too late. The discussion ended with the answer to a question raised by Dr. Sujit Chakraborty as to when or at what stage one can declare a reintroduction programme a success. Answering him Mike said 'till the habitat gets a self sustainable viable population'.

After lunch the proceedings began with a group photo session and a lecture by Dr. S.S. Saha on preservation of the specimen. Dr. Saha began with a short presentation on procurement and preparation of the specimen. He emphasized that a voucher specimen is needed for authentication and should be deposited with a centrally recognized collection where researchers can access them for further studies. The whole specimen or even part of it can be procured and prepared for preservation. The preservation could either be of dry type or wet type, for the latter, specimen needs to be fixed in formaldehyde or formalin solution. The wet preservation technique uses either the fixatives diluted with alcohol or alcohol itself for storing the specimens. Dry specimens can be that of treated skins either flat or rolled, and skulls or the whole skeleton. Before the specimen is prepared for preservation external measurements are to be taken. For skins cautious use of arsenic soaps has been advised. Techniques for preserving badly mutilated specimens and also in cases where no chemical preservatives are available too were outlined. Importance of skulls and bacula for taxonomic studies was also highlighted and cleaning and preservation techniques were explained in brief.

After this the group discussion session began with Dr. Mike Jordan elucidating his role in listing taxon that needs urgent captive management programmes based on the C.A.M.P. database, and also initiate captive management training programmes for data deficient species of the region. The participants felt that habitat improvement scenarios need to be utilized to start reintroduction programmes.

Then the participants brainstormed on the likely candidates for kick starting captive management programmes with some feeling that the threatened category species need to be addressed first while some felt that due to lack of experience Least Concern species should be taken up. After deliberation it was agreed to take up a two-pronged approach with

- i) immediate initiation of captive breeding programmes on critically endangered status taxon to ensure their survival and,
- ii) begin a series of projects on taxa of Least Concern status to build capacity. Alternatively, it was felt that that top priority needs to be given to species that are Critically Endangered both at global and national levels, second priority to those that are Endangered and Vulnerable and third priority to those that are Near Threatened. It was thought advisable to initiate projects on third priority category to gain insights on species listed in second priority class without much biological information.

The discussion wound up with a case presentation by Mike on Harvest Mouse *Micromys minutus* reintroduction project undertaken in United Kingdom to give an insight to the participants about the needs, planning and execution of a reintroduction programme.

The programme ended by 1600 hrs with a vote of thanks and

distribution of certificates to the participants who then committed themselves to various causes for non volant small mammals.

Personal Commitments made by participants:

- **Joya Thapa** - focus on rodent conservation in her study
- **Y. P. Sinha** - help in identification of bats and study more bats
- **C. Srinivasalu** - Help compile the taxonomy guide booklets
- **S. S. Saha** - would solve some sticky taxonomical problems
- **S.U. Sarkar** - work on small mammals in Bangladesh
- **M. S. Pradhan** - Anything for helping rodent identification. Would enable access to all ZSI collections and any other help from ZSI
- **P. Padmanabhan** - take up survey small mammals of Kerala, Silent Valley NP in next 2 years
- **K.M. Pillai** - include non-volant mammals in KFD. Help in legislation. Will publish about Rodent conservation and breeding in the March issue of "Aranyan". Assist field study permission to PA's in Kerala.
- **Shomita Mukherjee** - Will not look at rodents only as prey
- **Shomen Mukherjee** - Publish rodents studies & do more serious research
- **Mike Jordan** - help someone study captive management at Chester Zoo
- **W.L.D.P.T.S. de A Sampath** - Conduct studies in Sri Lanka
- **T. Bhattacharya** - provide information on DD species
- **Sujit Chakraborty** - All support for conservation of all species
- **S. S. Talmale** - Systematic & help in identification of rodents
- **Gigi Joseph** - teach children to be friends of rodents; survey of small mammals of Periyar Tiger Reserve
- **Mewa Singh** - keep notes on small mammals during primate work
- **H.N. Kumara** - keep notes on small mammals.
- **Thomas Nelson** - highlight significance of small mammal conservation in Parambikulam
- **Nandini Rajamani** - Commit to work on small mammals.
- **P. O. Nameer** - Continue work on the field studies on small Mammals and try captive breeding common rodents & insectivores
- **Sanjay Molur** - focus more on small mammal study, publish short notes on species account in Zoos'Print Journal
- **Sally Walker** - catalyse and help coordinate several ideas generated in and inspired by this workshop, e.g., organize field techniques workshops more locally with indigenous trainers and combining chiroptera and rodentia training in one workshop; incorporate many of the working group recommendations from the CAMP workshop into CCINSA and RILSCINSA; help Nameer to develop the "handbook" for rodent field biologists; push the "bats n rats" education programme.

Note on the Non-volant Small Mammal Network, RILSCINSA

In about 1999, Zoo Outreach Organisation announced the formation of the Rodent, Insectivore Scandents Conservation and Information Network (RILSCINSA) using seed money from the Society for Preservation of Species and Populations, Munich, Germany. After a few months the Network had 31 members who had sent their C.V. and list of publications. Today the network has 64 members.

The network and its objectives were formulated largely as a result of the poor showing rodents made during the BCPP C.A.M.P. workshop in 1997, that is that although rodents and insectivores made up nearly 30% of the mammalian diversity of India, 25% of the list of 118 species assessed were categorised as Data Deficient! The network aimed to link together rodent field researchers and their field knowledge throughout India. A few months later, as ZOO extended its mandate to South Asia, Bangladesh, Bhutan, India, Nepal, Maldives, Pakistan, and Sri Lanka were added to this and our other networks. Objectives aimed to :

1. promote the study of all rodents and insectivores, prioritising DD species
2. assemble a checklist of rodents and insectivores of SA
3. catalyse and help organise C.A.M.P. workshops and training exercises of rodent specialists of South Asia
4. follow up such workshops with recommendations to local, state, national and regional wildlife authorities
5. undertake a set of specific "tasks" utilising the 1997 BCPP C.A.M.P. for guidance
6. research funding sources for field surveys
7. bring out a newsletter of current rodent and insectivore
8. prepare a Directory of rodent and insectivore specialists of South Asia

Dr. Sujith Chakraborty, Retd. Scientist of Zoological Survey of India is RILSCINSA Chairman. Sally Walker is Convenor and Administrator. Sanjay Molur is Red List Advisor.

RILSCINSA is fully sponsored by the **Knowsley Safari Park** which has insured that all of RILSCINSA objectives have been realized or set up as permanent, ongoing projects. We hope Knowsley will continue to support RILSCINSA as the output of the C.A.M.P./GMA and the Special Issue Working Groups have issued in a whole new set of objectives and projects for this Network.

**NO PHOTOS ? Not here. Go to our new website
www.zoosprint.org
Click Rat-a-tattle. Check out other things as well !**



Editor: Sally Walker
Editorial advisors : S. Chakraborty, S. Molur
Editorial assistant: A.R. Binu Priya

Rat - a - tattle is the occasional Newsletter of the Rodentia, Insectivora, Scandentia and Lagomorpha Conservation & Information Network of South Asia or RILSCINSA. This is Vol. 4, No.1, April 2004.

RILSCINSA is for Ratters in Bangladesh, Bhutan, India, Nepal, Maldives, Pakistan and Sri Lanka.

Rat - a - tattle and the activities of RILSCINSA are fully funded by the Knowsley Safari Park, North England, United Kingdom.

RILSCINSA,
29-1 Bharathi Colony, Peelamedu
Coimbatore 641 004 T.N.
Ph. 422 2563 159 Fx. 422 2563 269
Email : zooreach@vsnl.com
Websites: www.zooreach.org; www.zoosprint.org





Mike Jordan, Lead Resource Person lectures at Silent Valley on conservation breeding and conservation welfare.



Small Mammal workshop participants at Silent Valley. Photo by SW.



Nameer, Mike and Sanjay admire one another's photos during the field trip. Photo by SW.



Dr. Pradhan and Dr. Chakraborty commit to conservation by exchanging rakhis. Photo by SW.



Participants chant the praises of much maligned bats. "Bats are good. Bats are great ! Without bats, we'd have no food on our plates. Photo by SW.



Dr. Giovanni Amori, IUCN SSC Rodent Specialist Group Chair and Dr. Y. P. Sinha, ZSI Chiroptera taxonomist search for fruits in their role as bats in the education session. Photo by SW.



Group photograph of the CBSG/RSG Training Workshop in Reintroduction, Conservation Welfare and Conservation Breeding for Small Mammals . . . what are they laughing at ?

