

HERPETOLOGY IN INDIA

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INTRODUCTION

Herpetology has always ranked a poor fourth or fifth in natural history interests in India. Since the days of Frank Wall and Malcolm Smith in the early part of this century, amazingly little has been added to our knowledge of Indian herpetology. However the last few years has seen an upsurge in herpetological work: laboratory, ecological and captive breeding. This paper summarizes activities in this field over the past decade. Where data is available, information on other countries of the sub-continent is included.

ORGANIZATIONS

The Zoological Survey of India (ZSI) (founded in 1916) is the Government's official agency for herpetological studies, survey and collection. It functions under the new Department of Environment in the Ministry of Science and Technology and publishes the prestigious records of the Zoological Survey of India and Bulletin of the ZSI. Based in Calcutta, ZSI has a network of substations throughout the country. ZSI herpetologists (see Table 1) are active mainly in the fields of survey and taxonomy. Since 1970 twelve amphibians and two snakes new to science have been described and surveys in endangered habitats such as Silent Valley in Kerala have been undertaken. ZSI is the Government's Scientific Authority under the Convention on International Trade in Endangered Species (CITES). The ZSI maintains one of the two large collections of preserved material in India.

The National Museum of Natural History in New Delhi which also functions under the Department of Environment and was started in the mid-1970's is in the process of organizing its own herpetological collection and staff.

The Bombay Natural History Society (BNHS) which was founded in 1883 is involved mainly in ornithological work but has a full-time herpetologist, a significant preserved collection and the Journal's "Miscellaneous Notes" invariably contain something on reptiles and amphibians. A majority of publications on Indian herpetology (including most of Frank Wall's work) have appeared in the Journal of the Bombay Natural History Society. The Curator is shortly publishing an illustrated book on reptiles and the Society is engaged in an important project to assess the implications of India's massive frog leg industry (an estimated 70 million frogs were killed in 1981).

The Madras Snake Park Trust (MSPT), is a private reptile research and public education centre. Since 1970 when World Wildlife Fund-India provided seed money to establish it, the Trustees initiated important surveys and conservation programmes for endangered reptiles. Initial crocodile and gharial surveys in 1972 and 1973 helped instigate the Government of India to start the well known crocodile project. Sea turtle surveys, a hatchery and head starting begun by the Trust has evolved into an extensive government effort to conserve sea turtles. Pythons captive bred at the park are being released in protected forests. A sister project of the MSPT, the Madras Crocodile Bank Trust (MCBT) has supplied 500 captive bred young mugger (*Crocodylus palustris*) to State run crocodile rehabilitation projects since its beginning in 1975. The Crocodile Bank has a freshwater turtle breeding programme with 21 species and is now internationalizing its scope to establish groups of crocodilians from other parts of the world. Besides indoctrinating the million and a half annual visitors to the Snake Park and Crocodile Bank, MSPT staff publish popular and scientific articles, have helped make several reptile films, give lectures and demonstrations throughout the country and have produced a field guide to snakes: "Common Snakes of India". The Trust publishes a newsletter "Hamadryad", maintains a reference collection of preserved specimens and has an extensive herpetological library. MSPT is the office of the Chairman of the Snake Specialist Group of the IUCN which held its first meeting in November, 1982.

The Central Crocodile Breeding and Management Training Institute in Hyderabad is the first government agency concerned solely with reptile conservation and management. It was set up with FAO/UNDP assistance and its main function is to train Forest Department personnel. Nearby, in the Nehru Zoological Park, hundreds of gharial (*Gavialis gangeticus*) and mugger are reared for release. Uttar Pradesh, Madhya Pradesh, Orissa, Bengal, Tamil Nadu and the Andamans also have crocodile rearing projects. Another Government project, to study and conserve the Pacific Ridley sea turtle (*Lepidochelys olivacea*) is based at Gahirmatha beach in Orissa where one of the world's largest mass nestings (arribada) takes place each February (300,000 nested in 3 nights on 8 kilometers of beach in February 1983).

Herpetology at the University level is disappointingly scarce; there are till now less than 10 Indians with herpetological Ph.D's. Snake chromosome work has been done at Calcutta University, studies on diurnal rhythm of lizards at Tirupati and some work on physiology in the past at Varanasi Hindu University, and significant amphibian studies at Utkal University, Orissa. Zoology professors sometimes assign herpetological projects to undergraduates but as choices of studies are oriented to the very sparse job market it is not surprising that interest in this field is highly exceptional.

World Wildlife Fund-India has been deeply involved with reptile conservation since its beginning. They have produced a slide programme on snakes and sponsored surveys of endangered reptiles, and educational snake exhibitions around the country.

The Calcutta Snake Park, Sundarvan at Ahmedabad and the reptile sections of several Indian zoos such as: Nandankannan Biological Park in Orissa, Trivandrum Zoo, Ahmedabad Zoo, Delhi Zoo and Hyderabad Zoo educate millions of visitors with their reptile displays. Only Sundarvan has an educational programme and reptile care and housing have definite problems at some zoos. The Department of Environment is being urged to address zoo improvement to develop them more specifically as educational tools and captive breeding centers.

The Central Government's Department of Environment has a Director of Wildlife in New Delhi who has four regional Asst. Directors each with a small staff in Delhi, Calcutta, Bombay and Madras. They work together with the Wildlife Wing of the State Forest Department to enforce the Wildlife Act. Many herpetological infringements go undetected though an occasional seizure of several thousand skins is made. In most areas of crocodile occurrence (except the Andamans) protection is effective and the gharial and mugger in particular are making a dramatic comeback.

Foreign inputs:

A number of eminent herpetologists from other countries have come and worked on herpetology of the Indian subcontinent since the 1960's including: 1. Sherman A. Minton (Pakistan) — checklist and key; 2. Carl Gans (India, Sri Lanka) — uropeltids; 3. Robert Bustard (India) — crocodilians, sea turtles; 4. Walter Auffenberg (India) — monitors; 5. Yoshio Sawai (India, Sri Lanka, Burma) — snakebite; 6. Robert Inger (India) — museums, Kerala rain forest; 7. Edward O. Moll (India) — freshwater turtles.

AMATEUR HERPETOLOGY

Amateur herpetology is practically non-existent. Though the occasional tortoise is a long term household pet, parental stigmas about reptiles (even geckos and skinks are considered poisonous) are probably the main reason for the lack of amateur involvement. The lack of illustrated guides to the reptiles and amphibians also detracts from potential amateur interest. Madras Snake Park Trust has a "volunteer" programme that has helped several students accumulate data and experience for further academic or vocational work. At present two of these young herpetologists are employed fulltime, one (J. Vijaya) on captive breeding and field studies of freshwater turtles and the other (Shekar Dattatri) on captive breeding and field surveys of two taxa under pressure, the python (*Python molurus*) and king cobra (*Ophiophagus hannah*).

Because of public and religious interest in snakes, several men have been setting up displays in various parts of the country in which they sit in a room full of snakes for weeks at a time. Advertised as "yagnas" (religious experience) they attract lucrative crowds but end up with hundreds of starved snakes. Two of these showmen have died from snakebite in the last two years; the wildlife authorities have now banned yagnas in many states.

TRIBALS AND COMMERCIAL HERPETOLOGY

Tribal people such as the Irulas of Tamil Nadu have long been the main suppliers of a wasteful reptile skin export trade which though now banned, still flourishes illegally in some areas, notably Madras and Calcutta. Thousands of snake catchers thus now have no legitimate cash income, and being nomadic tribals, no crops. The Irula Snake-catchers Cooperative Society was established in 1978 and now with Government permission, Irula tribals catch 5000 snakes per year, extract venom and release them back to the wild. This sustained use of snakes for a valuable resource is the kind of self-help economically deprived tribals need. They are highly skilled snake-catchers, and indeed had their own comprehensive reptile taxonomy long before our Linnean classification. The Cooperative is busy collecting data on scat contents from hundreds of snakes and is beginning to accumulate recapture data on the marked, released snakes.

Tribals also account for the killing of perhaps 70 million frogs per year for the frog leg export trade, most to the United States. Moves to regulate the industry (which earned India US \$12,000,000 in 1981) have been only partly successful while workers at BNHS and Utkal University in Orissa have undertaken studies on factors affecting frog survival and their ecological value.

SLAKEBITE

In 1972 the senior author was associated with a snakebite survey undertaken by Dr. Yoshio Sawai of the Japan Snake Center. The results provided the first reliable statistics on snakebite and mortality (Sawai and Honma, *The Snake*, 1976). Haffkine Institute, Bombay is the main producer of antivenom serum in the country but deaths from snakebite remain high (about 10,000 per year) because of lack of adequate distribution and publicity. Village people believe in old folk remedies (usually herbs and chanting) which date from pre-antivenom days, and usually come to hospital when all else fails (and the unfortunate patient may be beyond recovery).

Workers at the Safdarjang Hospital in New Delhi have done pioneering research on use of other drugs like neostigmine in snakebite treatment. A snakebite symposium, sponsored by the Department of Pharmacology, Madras Medical College and Madras Snake Park Trust was held on 12 August 1977 in Madras.

NEIGHBOURING COUNTRIES

Aside from Sherman Minton's work in Pakistan little herpetological action has been heard from there in recent years though M.S. Khan has contributed updated checklists to "Hamadryad" in recent years.

Nepal and Bhutan have remained herpetologically blank with only a few notes from visiting workers to the former country and a brief crocodylian survey by Bustard (FAO 1980) in the latter.

The latest herpetological work in Burma has been snakebite studies by Dr. Sawai (in litt, 1982), a crocodile survey by Graeme Caughley (FAO, 1980) and an updated checklist of Burmese reptiles by G.H. Hundley (Forest Department, Rangoon, 1964).

Bangladesh has had some recent work done on snake distribution (Rashid, S.M.A., *Snakes of Bangladesh*, M.Sc. Thesis, Dacca University, 1975) under the guidance of Dr. M.A. Reza Khan, Dacca University. A survey of the crocodile resource was made by the senior author (Whitaker, ITC/UNCTAD, 1982).

Sri Lanka has seen considerably more herpetological activity than India's other neighbours. The Colombo Museum recently published a book on Sir Lankan snakes and Loris, the journal of the Nature Protection Society, often has notes on reptiles and amphibians. Snakebite studies were recently carried out (Ada Silva, *The Snake*, 1981) and it seems that there is a semi-official approval of snakebite "clinics" which employ several strange "remedies" including snakestones and magic stone bathtubs. The authors carried out a crocodile survey on the island in 1977 (Whitaker and Whitaker, *JBNHS*, 76:1, 1979). The massive injection of foreign aid to Sri Lanka in recent years is unfortunately killing off forest and wildlife more effectively than have human activities in the past hundred years. Rain forest species and relict hill taxa like the lizards *Cophotes*, *Lyriocephalus* and *Ceratophora* may soon be in danger of extinction.

LEGISLATIVE AND FIELD PROTECTION OF AMPHIBIANS AND REPTILES: A FEAST/FAMINE PROBLEM

Twenty species of amphibians and reptiles are protected under Schedule I of the Wildlife (Protection) Act, 1972, affording them complete protection from exploitation. Many of the rest are on Schedule IV under which licensed trade is permitted. The export of most reptiles and amphibians is strictly controlled even for legitimate scientific work. Predictably, the laws are not enforced with great success in the field and massive exploitation, particularly of some snakes, the monitors and many of the turtles, goes on. The most effective control has been the export ban.

The frog harvest remains more or less out of control, some reptiles have unpopular habits and habitat loss is becoming critical for many hill forest taxa. But somehow there are still an abundance of herps to be seen in most parts of the country, particularly if you are with an Irula tribal.

The prospects of undertaking some serious studies on reptile population dynamics and their ecological value on this sub-continent were recently enhanced when Bangladesh became interested in the role of varanid lizards in crop pest control (Whitaker, FAO, 1982). We are always telling people how valuable reptiles are ecologically — how nice it would be to have the data!

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Table 1. Directory of herpetological workers in the Indian region*

S.No.	Name	Address	Speciality
1.	L.N. Acharjyo	Nandankanan Zoo P.O. Barang Dist. Cuttack Orissa — 754 005	Veterinary Officer, captive breeding
2.	Dr. R.N. Banerji	Consultant in Medicine & Chief of the Department of Haematology & Nuclear Medicine Safdarjang Hospital New Delhi 110 016	Snakebite
3.	Satish Bhaskar	c/o, Madras Snake Park Trust Raj Bhavan P.O. Madras — 600 022	Sea Turtles
4.	Basanta Kumar Behura	c/o, Post-Graduate Dept. of Zoology Utkal University Ravenshaw College Cuttack — 3 Orissa	Post-Graduate Professor of Zoology
5.	S. Biswas	c/o, Reptiles Section Zoological Survey of India 27 Chowringhee Road Calcutta — 13	Survey, taxonomy, Curator
6.	B.C. Choudhury	c/o Nehru Zoological Park Hyderabad — 500 264 Andhra Pradesh	Field studies, teaching and captive husbandry of crocodilians — mainly mugger
7.	J.C. Daniel	Bombay Natural History Society Hornbill House Shahid Bhagat Singh Road Bombay — 400 023	Survey, taxonomy, Curator
8.	Shekar Dattatri	c/o Madras Snake Park Raj Bhavan P.O. Madras — 600 022	Survey, general herpetology popular articles, herp photography, captive breeding
9.	P.J. Deoras	c/o Haffkine Institute Parel Bombay	Venoms, book

10. S. Kar	Saltwater Crocodile Research/ Conservation Unit AT/PO Dangmal Via Rajkanika, Cuttack Dist. Orissa	Field studies, teaching and captive husbandry of crocodilians
11. C.S. Kar	Gahirmata Marine Turtle Reserve & Conservation Centre Post Via State Bhaya Rajanagen District Cuttack-754225 Orissa	Field studies on breeding biology of the olive ridleys sea turtles
12. M.S. Khan	Department of Zoology Talimul Islam College Rabwah Pakistan	General herpetology
13. M.A. Reza Khan	Asst. Professor Dept. of Zoology University of Dhaka Dhaka Bangladesh	Survey and general herpetology
14. A.G. Sekar	Bombay Natural History Society Hornhill House S.B. Singh Road Bombay-400 023	Collection, taxonomy, ecology, distribution of amphibians
15. S. Maharana	Manager Damodar Valley Corporation Soil Conservation Department (Crocodile Farm) Hazaribagh Bihar	Crocodile biology and captive breeding
16. P. Mohanty-Hejmadi	Utkal University Vani Vihar Bhubaneswar 751 004 Orissa	Life cycles of Indian frogs and toads
17. R.S. Pillai	Zoological Survey of India (Southern Regional Office) Santhome Madras — 600 004	Survey, taxonomy of Indian amphibians
18. Tej Prakash Vyas	c/o Dr. S.C. Shivale 72 Baniya Wadi Dhar 454 001 Madhya Pradesh	General herpetology
19. M.V. Subba Rao	Dept. of Environmental Sciences Andhra University Visakhapatnam Andhra Pradesh	Lizards, crocodiles, thermodynamics, general herpetology, popular articles
20. M.V. Rajendran	3i Davaloga Street Palayamkottai Tirunelveli-627 002	General herpetology, public education, uropeltids
21. C. Sharma	Superintending Zoologist Desert Regional Station Patodi House Poata Lines, B. Road Jodhipur Rajasthan-342 006	
22. B.D. Sharma	Mountain Eco-conservation and wildlife Society of India P.O. Box 18 Jammu 180 001 Jammu & Kashmir	General herpetology of northeastern India Professor & Secretary
23. Ansem da Silva	Faculty of Medicine University of Sri Lanka Peradeniya Campus Sri Lanka	Snakebite, taxonomy and distribution of snakes
24. L. Singh	Calcutta University Calcutta	Chromosome karyotyping of snakes and crocodilians

25. Ranil Senayanake	41 Gregory's Road Colombo-7 Sri Lanka	General herpetology, amphibians
26. L.A.K. Singh	Central Crocodile Breeding and Management Training Institute Bahadurpura Hyderabad — 500 264	Field studies, teaching captive husbandry of crocodilians, mainly gharial
27. S.K. Talukdar	Zoological Survey of India Indian Museum 27 Chowringhee Road Calcutta 700 013	Survey, taxonomy
28. N.E. Vad	Block No. 15, 4th Floor (KSA Building) Shrinivas Building Bhavanishankar Road Dadar Bombay — 28	Venoms, work on <i>Echis carinatus</i>
29. J. Vijaya	Madras Crocodile Bank Trust Vadanemmeli Village Mahabalipuram Road, Perur P.O.	Freshwater turtles, tortoises: survey, field study, captive breeding
30. Romulus Whitaker	Madras Snake Park & Madras Crocodile Bank Trust Raj Bhavan P.O. Madras — 600 022	Survey, general herpetology, public education, captive breeding
31. Zai Whitaker	Madras Snake Park & Madras Crocodile Bank Trust Raj Bhavan P.O. Madras — 600 022	Survey, crocodilian behaviour, popular articles editor: Hamadryad
32. Irula Snake Catcher's Cooperative Society (50 members)	c/o Madras Snake Park Raj Bhavan P.O. Madras — 600 022	Venoms, general field herpetology
33. T.S.N. Murthy	Zoological Survey of India Santhome Madras 600004	Herpetological survey, uropeltids, popular articles
34. Dipak Mitra	Calcutta Snake Park 35 Hindustan Park Calcutta	Exhibition, venom extraction
35. Neelinkumar Khaire	Poona Serpentarium Poona-Satara Road Poona 411009	Exhibition
36. B.K. Saha	c/o Dr. S.G. Saha Raidighi Rural Hospital P.O. Raidighi West Bengal 743383	Snake distribution and status in W. Bengal

*Based on biodata received by us, this list may not be complete; the authors invite any corrections and additions to the list.

Table 2. Publications of herpetological interest in the Indian region

A. Newsletters/Journals	Address	Annual overseas subscription
1. Journal of the Bombay Natural History Society (regular herpetological notes and articles)	Hornbill House Shahid Bhagat Singh Road Bombay — 400 023 <i>India</i>	£6.50
2. Hamadryad, Newsletter of the Madras Snake Part Trust (herpetology only)	c/o Raj Bhavan P.O. Madras — 600 022 <i>India</i>	US\$ 4 airmail US\$ 2 seairmail
3. Makara, Newsletter of the Central Crocodile Breeding & Management Training Institute (crocodiles only)	Hyderabad — 500264 <i>India</i>	information not available

4. Cheetal, Journal of the Wildlife Preservation Soc. of India (occasional non-technical herpetological articles)	7 Astley Hall Dehra Dun India	information not available
5. Indian Forester (occasional technical herpetological articles)	c/o The Business Manager Indian Forester P.O. New Forest Dehra Dun, U.P. India	US\$ 18.00 US\$ 9.00
6. Journal of the Zoological Society of India (herpetological notes and articles)	Plot No. 300, Unit III Kharavela Nagar Bhubaneswar — 751 001 Orissa India	\$15.00 (Half-yearly)
7. Loris, Journal of the Wildlife and Nature Protection Society of Sri Lanka (occasional non-technical herpetological notes)	Chaitiya Road Marine Drive Fort Colombo-1 Sri Lanka	information not available
B. Books	<i>Address</i>	<i>Price</i>
1. Snakes of India (by P.J. Deoras) 1965, 1970, 1978, 1981	National Book Trust-India A-5, Green Park New Delhi — 110 016 India	Indian rupees 13.25
2. Common Snakes of India- A Field Guide (by Romulus Whitaker) 1978, 1982	The Macmillian Company of India Ltd 4 Community Centre Naraina Industrial Area Phase I New Delhi 110 028 India	Indian rupees 16.00
3. Snake Fauna of Sri Lanka (by P.H.D.H. De Silva) A Publication of the National Museum of Sri Lanka	Department of Government Printing Colombo Sri Lanka	Information not available
4. The Book of Indian Reptiles (by J.C. Daniel) In press — 1983	Bombay Natural History Society Hornbill House Shahid Bhagat Singh Road Bombay — 400 023 India	
5. Fauna of British India (by M.A. Smith)	Vol. I Turtles, tortoises, crocodilians Vol. II Lizards Wildlife Publications 520 N. Dixie Highway Hollywood, Florida 33020 USA Vol. III (Reprinted 1981) Today & Tomorrow's Printers and Publishers 24B/5 Deshbandhu Gupta Road New Delhi 110 005 India	\$16.00 \$23.50 \$50.00