

## Techniques in Keeping and Care of Amphibians in Captivity: Report on a Workshop



A unique workshop was held at the Arignar Anna Zoological Park, Vandalur, Chennai from the 22<sup>nd</sup> to 24<sup>th</sup> of September 2000. Unique because it really was the "first time in India" a workshop for keeping and breeding amphibians in captivity was conducted. Amphibians are not kept in any zoo in India except the Arignar Anna Zoological Park which has an amphibian complex. Considering the rate of decline of amphibians in nature and global concern over the disappearance of these indicator species, zoos need to pay more attention. Amphibians also have other features which can be good for zoos -- they are relatively cheap and easy to keep and breed; they have a short generation period and a large "clutch" size so that you get massive results in a very short time and they are "safe" for reintroduction programmes unlike tigers or lions or many other animals. Nobody has ever reported a maneating frog.

Jon Birkett, Curator of Amphibians and Reptiles at the Melbourne Zoo Reptile House, with an experience in keeping and breeding amphibians in captivity for a decade, was the primary resource person. His presentations reflected the experience he has had in this field and helped the participants appreciate the seriousness and attention necessary to keeping and caring for amphibians in captivity to make any positive contribution to their conservation in the wild. After mixture of presentations and practical work, the workshop concluded with everyone satisfied that they had learned quite a lot. There was an excellent turnout of 40 participants from many professions – zoo personnel, field biologists, veterinarians, conservationists, teachers, amphibian network members – and students.

The workshop was initially planned to be conducted at the Arignar Anna Zoological Park Zoo School complex. Due to an unfortunate incident at the Zoo, it was felt that the workshop would be better shifted outside of the Zoo and hence it was organised at the place of accommodation of the participants – at the Standard Motors Employees' Community Hall at Perungallathur, about 3 kilometers from the Zoo. The

### Inaugural ceremony

On the dias:  
Ranjit Daniels,  
Jon Birkett,  
Sally Walker,  
and Krishna  
Kumar



Learning how to prepare a vivarium for occupation by amphibians.



Melbourne Zoo resource person, Jon Birkett delivers one of his informational lectures on amphibian husbandry in front of the AA Zoo Amphibian complex.

accommodation, though very modest, was well tolerated by the 20 odd participants and nothing was lost from the workshop.

The inaugural was informal with Krishna Kumar, Director of Arignar Anna Zoological Park, Ranjit Daniels, Secretary of Chennai Snake Park Trust, Sally Walker, Founder Secretary of Zoo Outreach Organisation and Jon Birkett, Curator of Melbourne Zoo Reptile House opening the workshop.

Krishna Kumar welcomed the participants and conveyed in brief of the situation for conservation breeding in Indian zoos, which is more for bigger mammals, rather than amphibians. He hoped that this workshop would help him and his colleagues – the biologists, Manimozhi, Baskar, Sekar and forester, Perumal – to understand the details of keeping and breeding amphibians in captivity. AAZP is the first zoo in India to set up an amphibian exhibit and he hoped that their techniques would be evaluated as part of the workshop, with Jon's expert comments on their improvement.

Sally Walker narrated in brief the long history behind the organisation of the workshop and emphasised the need for such workshops on lower forms as the lower mammals, reptiles, invertebrates and amphibians would be the ideal candidates for scientific, meaningful and holistic conservation efforts that



**Sanjay Molur talks about the status of Indian amphibians**

zoos can take part in. She hoped that the Central Zoo Authority and all the zoos in India and South Asia would take up these levels so as to build a better image for zoos, do meaningful conservation and education work, and finally be able to reintroduce many of the smaller forms into the wild without causing grave danger to humans.

Jon Birkett delivered an excellent one-hour presentation on the status of amphibians globally with an emphasis on captive breeding complementing conservation efforts, with appropriate examples. He also emphasised the need and urgency to look at pathogenic diseases affecting amphibian populations around the world and zoos being a good research station to study the effects of such pathogens on populations.

Soon after the inaugural, lectures began with the first presentation from Ranjit Daniels on "What are amphibians". He touched upon topics such as taxonomy, identification, differences between groups, the recent nomenclature confusions and fielded many questions from interested participants. His talk was followed by Sanjay Molur's presentation on the status of Indian amphibians, which was presented from the results of the Conservation Assessment and Management Plan workshop for amphibians in 1997. Sanjay also brought in elements of the networking effort and the results till date, with stark statistics on the status and threat to amphibians because of physical threats and threats due to lack of focus in amphibian studies in India. Later, Ranjit again spoke on his experiences in keeping amphibians in captivity while at the Indian Institute of Science.

Jon Birkett, the main resource person at the workshop had well-prepared lectures on various topics in keeping and caring for amphibians in captivity. From his invaluable experience, he had put together slides and notes on different topics for very easy understanding of the concept for beginners such as those in the workshop. To complement his presentations, he also made use of the vivarium provided to show the different aspects of preparation and care, as a practical demonstration exercise. The Melbourne Zoo has, in its decade-long



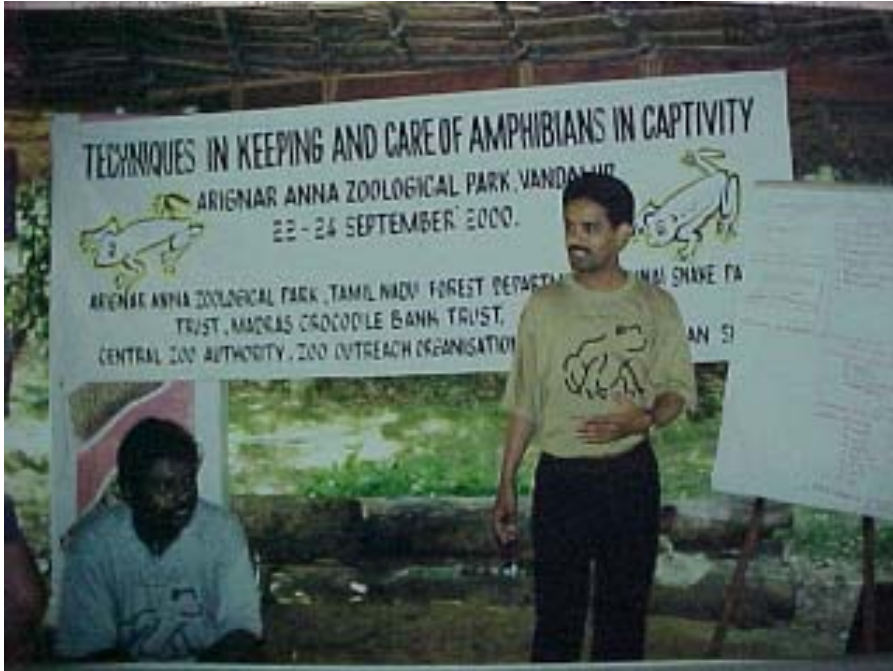
**Briefing Book prepared by Jon Birkett and the Melbourne Zoo**



**Manimozhi of AAZP actively involved in a practical demonstration.**



**A working group assessing the AAZP's amphibian enclosure.**



The workshop also met at the Zoo. Rathinasabapathy of Coimbatore Zoo summarises the report of his working group.



There was much interest in enriching the unique vivarium donated by Melbourne Zoo to Arignar Anna Zoological Park for their amphibian programme.

The workshop would not have been possible without the help of the following organisations:

Melbourne Zoo, Australia  
 Friends of Rare Amphibians of the Western Ghats (FRAWG)  
 American Association of Zoo Keepers, Minnesota Zoo Chapter  
 Arignar Anna Zoological Park, Vandalur  
 Fauna and Flora International

We are extremely thankful to the above institutions and the individuals below who were instrumental in the organisation of the workshop  
 N. Krishnakumar, Chris Banks, Jon Birkett

experience of keeping amphibians, developed a basic design for a vivarium (terrarium for amphibians and reptiles), which can be manipulated to suit any condition from just exhibition to breeding of frogs to keeping tadpoles. He had sent in the design for the vivarium much before the workshop and a full-scale glass vivarium was constructed by the Zoo's ex-veterinarian, Dr. Paul Fredericks. The vivarium was used for demonstrating all the various aspects to building and manipulating the enclosure for specific purposes. The topics covered by Jon during the workshop include the following:

1. Importance of captive breeding for amphibians
2. Enclosure design
3. Captive husbandry – water management
4. Veterinary care
5. Diet
6. Breeding frogs and
7. Husbandry of tadpoles.

Details of each of the topics can be seen in the Agenda of the workshop which follows.

During the course of the workshop, Manimozhi from AAZP and Dr. G.K. Bhat from JCBM College gave talks on their projects. Manimozhi explained his zoo's efforts in keeping amphibians in captivity and also the field research that was organised to study amphibian fauna of Kanchipuram District as part of the wildlife studies funded by the Tamil Nadu Forest Department. Dr. G.K. Bhat from JCBM College at Sringeri, Karnataka, is reputed for his knowledge on caecilians, the limbless amphibians, and has had the experience of keeping them in captivity for some time. His talk on this lesser known group of amphibians created much interest among the participants, which was also much appreciated. His input at the workshop was quite crucial because 24 species of amphibians in India belong to the caecilian families.

Apart from talks and discussions, there were practical sessions on enclosure design, water management, construction, filtration system, substrate selection, etc., which would follow the specific topics discussed by Jon. There was a field visit to a wetland nearby in Vandalur to give the experience of night frogging for participants. A session on evaluating the AAZP's amphibian

enclosure was held in the afternoon of the second day, followed by working groups on their comments, improvements and suggestions on the next morning at the zoo site itself. The results from these discussions are published along with this report and will be used, where feasible, by the AA Zoo to improve their amphibian enclosure.

On the last day of the workshop, participants were taken to Chennai Snake Park Trust for a tour of their facility and their recently initiated amphibian enclosures. Ranjit Daniels also showed some slides of his captive facility developed for amphibians during that visit. The participants then dispersed from the Snake Park to their respective destinations.

### Acknowledgement

The Workshop was made possible because of the tireless efforts of Chris Banks, Director of Conservation, Melbourne Zoo and Jon Birkett, Curator of the Reptile House, Melbourne Zoo, Melbourne, Victoria, Australia as well as Krishna Kumar, A. Manimozhi, N. Baskar and Shekar of the Arignar Anna Zoological Park, Vandalur which hosted the workshop along with the Forest Department of Tamil Nadu. The Chennai Snake Park Trust, Central Zoo Authority and Madras Crocodile Bank Trust were the collaborators. Zoo Outreach Organisation, Conservation Breeding Specialist Group India Amphibian Special Interest Group and the Amphibian Network of South Asia were the organisers and coordinators.

The Melbourne Zoo needs special mention because the workshop would not have been possible but for their support in flying Jon to India and for paying for some parts of the workshop arrangements. A packet of Material was also given to the participants at the workshop, which included the extremely informative manual on amphibians in captivity prepared by Jon Birkett. A set of stamps released on frogs by the Australian government along with a sticker on biodiversity as well as food and accommodation for the workshop were the other items Melbourne Zoo sponsored.

The Arignar Anna Zoo should be particularly acknowledged for their excellent handling of a crisis which could have spoiled the workshop. They were clear and calm and took care of the crisis and their solidering on so that the workshop could still take place. With the exception of the formal inaugural and validictory, nothing else was missed. Their arrangements and hospitality and enthusiastic participation were particularly appreciated by the participants.

On its part, the Zoo Outreach Organisation made a handbag with the workshop logo, a workshop T-shirt and various other publications ZOO brings out. Anybody interested in having a set of the workshop items can write to ZOO. The cost of the bag with T-shirt and manual is Rs. 300.00. Cost of the manual seperately will be Rs. 150.00.

Brij Kishore Guria, Scientist at Central Zoo Authority, was sorely missed as he is the pioneer in keeping and breeding amphibians in captivity when he was working at Coimbatore Zoological Park. Brij suffered an attack of asthma before the workshop and was not permitted to move by his doctor. He sent copies of his excellent handbook "Captive Care of Common Indian Frogs and Toads" as well as a reprint sufficient for all participants. Brij designed an attractive poster as well which will be sent to participants along with their group photo and certificate.

## WORKING GROUP REMARKS -- AA ZOO AMPHIBIAN COMPLEX ENHANCEMENT EVALUATION

Arignar Anna Zoo is the first to start and maintain an amphibian complex. They had an old enclosure which was lying vacant and with a minimum of funds and a maximum of hard work and creativity, they -- led by Mr. Manimozhi who has a particular interest in amphibians -- started the first amphibian captive facility in any Indian zoo.

The AA Zoo was interested to have their experiment evaluated and subjected themselves to comments from participants who were assigned to two working groups for this task. Participants viewed the enclosure, heard comments and a presentation by Jon Birkette and made their suggestions in groups which met outdoors in the zoo itself. The list below are some problems with the enclosures and solutions suggested by the Working Groups.

### Group I

#### 1 Problem : Visibility

Remedial suggestions :  
Tilted glass (10-30°)  
Shaded visitors side  
Display should be lowered/vise-versa  
Water level to be brought in line with glass front  
Background - slope towards the front  
Glass fronts  
Species-specific enclosures  
Common T.N. (Chennai) species

#### 2 Animal Requirements

Suitable micro-habitat as per species requirements  
Size based on species habits/habitat  
arboreal  
terrestrial  
burrowing \* special attention-interpretive graphics.  
aquatic  
creepers on back wall  
Floor- sandy  
pebbled  
grassy  
marshy  
leaf litter  
plants  
logo  
combining all  
Hillock background - can be removed for certain species  
water percolation- floor to reflect this requirement.

#### 3 Water

pH factor/temperature  
humidity- maintained@ ? %  
individualised ponds/drainage  
plumbing  
water quality  
water source (well water)  
biological filters?  
alternatives

#### 4 Light

Natural lighting/Sunlight  
Avoid litter falling on cage roof

#### 5 Feeding

insects  
Wild/capture  
light tap/pheromone taps.

#### 6 Access (Keeper)

entry for cleaning glass insides  
flexibility (minimised disturbance)  
door modification to seal cracks/  
predator proof / escape proof

#### Interpretation

General interpretive message  
infront of the exhibit (Wetlands  
with where frogs fit) wet land -  
frog Life cycle of the frog  
(graphic)  
Status in India /T.N./Chennai/  
Arignar Anna Zoological Park  
individual - species specific /  
enclosure graphics  
Common name  
local name  
scientific name  
distinction  
habits  
features id  
breeding  
food - wild /captive  
size  
Transparent acrylic with back  
light

#### English/Regional

Sound box / effects  
Interactive electronic exhibits  
Awareness & interest in keeper/  
keeper talks  
Brochures/pamphlet/stickers (on  
request)  
Media involvement - Amphibian  
week/schools involvement

#### Group Members

1. A. Manimozhi
2. Raju Vyas
3. Saju K. Abraham
4. R. Rajarathinam
5. B. Rathinasabapathy
6. Humayun Taher
7. Gowrishankar. P.
8. P. Kannan
9. O.R. Bhende
10. M.V.R. Ravikumar

## Group II

### Merits/Demerits

#### Suggestion - Renovation

- 1) Short term /2) Long term

#### Merits

- 1) Presence of terraria
- 2) Outdoor exhibit (attempt)
- 3) Ideal location (Ambience)
- 4) Attempted water circulation (Centralized)
- 5) Public awareness

#### Demerits

- 1) Subjects (Animals) are not visible
- 2) Continuous water circulation — Not terrarium specific — Possibilities of diseases cross-infection.
- 3) Cemented terraria — No scope for quarantine measures
- 4) Exposure to natural extremities
- 5) Lack of monitoring facilities
- 6) Keeper accessibility is inconvenient and traumatic
- 7) Interpretation not in vernacular and inadequate bio-information
- 8) Terraria too deep
- 9) Terraria landscape not species-specific

#### Remedial suggestions

##### Keeper Access

Entry covered by graphics  
Graphics to be displayed on the keeper access doors

##### Reduction of reflection (visitors)

- a) Darken visitors pathway around the terraria with shelter or shade
  - b) Slanting glasses
- Roofing  
— Fiberglass top  
— Skylight  
— Thatching

##### Water management

- 1) Separate (Individualized)
- 2) No reuse of water
- 3) Perforated pipes on the roof to control moisture

##### Landscaping within terraria

Species-specific

##### Long term:

- 1) Expansion (New)
- 2) Scientific research and inputs
- 3) Evaluation of success of renovation and plan for future.

- 1) G.K. Bhatt
- 2) N.V.K. Ashraf
- 3) Surya Adoor
- 4) Girish Kadadevaru
- 5) G. Ramaswamy
- 6) Y.M. Naik
- 7) Sabu Thomas
- 8) Nikhil Whitaker
- 9) Daniel Ayyachamy
- 10) Buddhe
- 11) Binu Priya, A.R.
- 12) Bhasker
- 13) Chelmala Srinivasulu

## Agenda

### 22 September 2000 – Day 1

Welcome remarks and introduction to the workshop N. Krishnakumar

Importance of captive breeding in conservation Sally Walker

Global status of amphibians- Jon Birkett

- Importance of amphibians as environmental indicators
- Global declines in amphibians
- Global conservation networks
- Causes of declines – various threats,

What are amphibians? Ranjit Daniels

Status of amphibians in India -- Sanjay Molur

Importance of captive management - Jon Birkett

- Captive breeding as tool to conserving biodiversity
- Captive displays as an education tool for conservation
- Risk associated with captive reproduction and reintroduction – the need for quarantine
- Romer's Tree Frog – Case study-Hong Kong

Amphibians in captivity -- Ranjit Daniels

Enclosure design -- John Birkett

- Dividing frogs into groups for husbandry
- Understanding the link with water
- Principles of enclosure design
- Selecting construction materials
- Examples of enclosure design
- Artificial rockwork – the use of fiberglass, concrete..

Demonstration of how to construct a terrarium

Frogging at night -- A. Manimozhi/Jon Birkett

### 23 September 2000 – Day 2

Captive husbandry – managing water - Jon Birkett

- pH, hardness, manipulation, nitrite, nitrate
- Methods of filtration – mechanical, biological, chemical
- Aeration
- Temperature control

Demonstration/ practical exercise – filtration, flow-through method -- Jon Birkett

Amphibian captive breeding programme at AAZP -- A. Manimozhi

Care of caecilians in captivity -- G.K. Bhat

Evaluation of AAZP's amphibian enclosure -- A. Manimozhi

Veterinary care -- Jon Birkett

- Important diseases and treatment
- Quarantine protocols

Diet -- Jon Birkett

- Feeding frogs
- Variety/availability/breeding food animals
- Importance of gut fill in food animals
- Importance of UV lighting

Practical session on constructing a frog display

### 24 September 2000 – Day 3

Practical group work on enhancing AAZP amphibian displays Breeding frogs -- Jon Birkett

- Importance of analogue species
- Importance of keeping it simple
- Role of diet in successful reproduction
- Using seasonal triggers to stimulate reproduction
- Effects of splash zone and rain chambers

Husbandry of tadpoles -- Jon Birkett

- Enclosure selection
- Water quality/cleaning
- Feeding tadpoles
- Tadpole density
- Management of metamorphosis
- Acquisition/transportation of frogs/ tadpoles

Valedictory function

Trip to Chennai Snake Park Trust

