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AArk Newsletter No. 9, December 2009

The Amphibian Ark team is pleased to send you the latest edition of our e-newsletter. We hope you enjoy reading it.

The Amphibian Ark

Meet the Amphibian Ark's Steering Committee! (Part 2)

Kevin Zippel, Program Director, Amphibian Ark

In the last AArk Newsletter we got to know some of the members of the AArk Steering Committee. In this issue, we'd like to introduce some of the other members, and our new WAZA representative, Chris West.

[Read More >>](#)

Sri Lankan Amphibian Conservation Needs Assessment workshop

Richard Gibson, Taxon Officer, Amphibian Ark

An Amphibian Conservation Needs Assessment workshop was recently held in Sri Lanka, and facilitated by AArk Taxon Officer Richard Gibson.

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Amphibian husbandry training in Brazil

Ron Gagliardo, Training Officer, Amphibian Ark

Over thirty students attended the first AArk Amphibian Husbandry Workshop in Brazil in September. This workshop followed the AArk Conservation Needs Assessment workshop that was held in Sao Paulo in August.

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Amphibian Ark Husbandry Essentials workshop, Panama

Ron Gagliardo, Training Officer, Amphibian Ark

A three-day husbandry training course was held in October in El Valle de Anton, Panama. The agenda covered specific husbandry techniques, captive reproduction and climate control but also had special focus on veterinary care, health and nutrition and food colonies.

[Read More >>](#)

Sri Lankan capacity-building extravaganza

Richard Gibson, Taxon Officer, Amphibian Ark

A week-long Amphibian Conservation Husbandry course was held in Kandy, Sri Lanka in November, which included a series of lectures, discussion sessions, and practical workshops.

[Read More >>](#)

Amphibian Conservation Research Guide

Robert Browne, Research Officer, Amphibian Ark

To focus amphibian research on the needs of conservation breeding programs the Amphibian Ark has developed an Amphibian Conservation Research Guide. The guide is supported by documents that expand particular topics, and that provide examples of projects.

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The FrogMatters internet blog – Posts from the Amphibian Ark

Kevin Johnson, Taxon Officer, Amphibian Ark

Have you visited Amphibian Ark's FrogMatters blog? The blog was developed in September 2007, and several months ago, it was handed over to AArk staff to continue its success.

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continue its success.

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News

GoodSearch.org – Supporting the Amphibian Ark has never been easier!

What if the Amphibian Ark earned a donation every time you searched the Internet? Or how about if a percentage of every purchase you made online went to support amphibian conservation? Well, now it can!

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Chytrid fungus: new developments in our understanding

Kevin Zippel, Program Director, Amphibian Ark

Some recent investigations into chytrid fungus are shedding new light on our understandings about the disease.

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Amphibians in the news

Some interesting reading about recent events in the amphibian world from recent copies of the Amphibian Ark's Monthly Activity Reports

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Darwin's frog conservation efforts in Chile

Ron Gagliardo, Training Officer, Amphibian Ark

Amphibian Ark's Training Officer, Ron Gagliardo recently visited Chile to observe the projects focused on protecting Darwin's frog *Rhinoderma darwinii*.

[Read More >>](#)

New breed and rear for release program commenced for *Geocrinia alba*

Helen Robertson, Director Animal Health and Research, Perth Zoo

Perth Zoo has a long history of working with a number of the local *Geocrinia* species. They have recently embarked on a head-start program for the Critically Endangered *Geocrinia alba*.

[Read More >>](#)

2009 northern corroboree frog breeding results

Carly Humphrys, Wildlife Officer, Tidbinbilla Nature Reserve

This year's northern corroboree frog breeding success at Tidbinbilla Nature Reserve came as a tremendous tidal wave!

[Read More >>](#)

Regional updates on biobanking activities

San Diego Zoo's Institute for Conservation Research, in California, and the Laboratory of Cryopreservation of Genetic Resource, Institute of Cell Biophysics (Russian Academy of Sciences) in Moscow provide updates into their amphibian cryopreservation work.

[Read More >>](#)

AMACZOOA report

Yolanda Matamoros, President of the Mesoamerican Association of Zoos

Yolanda Matamoros provides an update on Mesoamerican amphibian conservation projects.

[Read More >>](#)

An update from the Association of Zoos & Aquariums

Shelly Grow, Conservation Biologist, AZA

A number of AZA institutions continue with their amphibian conservation projects. Here is an update on some of them from the past three months.

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Amphibian awareness education programs during India's Wildlife Week 2009

R. Marimuthu, Education Officer, Zoo Outreach Organisation/CBSG, South Asia

In India, Wildlife Week is a unique national level mega-event and it is celebrated every year in the first week of October to raise awareness of the importance of wildlife to millions of people in different age and social groups.

[Read More >>](#)

Year of the Frog funding supports projects in Zoo and Aquarium Association (Australasia) institutions

Chris Banks, Coordinator, Conservation Partnerships, Zoos Victoria

The Zoo and Aquarium Association (Australasia)'s Field Conservation Committee has recently completed the process of receiving and reviewing nine projects to receive funds raised by Association member institutions during the Year of the Frog (YOTF) campaign.

[Read More >>](#)

Meet the Amphibian Ark's Steering Committee! (Part 2)

Kevin Zippel, Program Director, Amphibian Ark

In the [June AArk Newsletter](#), we got to know the [AArk Executive Committee](#), which comprises representation from each of our three parent organizations: the IUCN/SSC [Conservation Breeding Specialist Group](#) (CBSG), the IUCN/SSC [Amphibian Specialist Group](#) (ASG), and the [World Association of Zoos and Aquariums](#) (WAZA). Since that time, Gordon McGregor Reid has stepped down after a lengthy term as WAZA representative on our Executive Committee. We express our most sincere gratitude to Gordon, who has been a champion of our cause with his generous support and guidance. Our new WAZA representative is Chris West, who introduces himself here.

Chris West, WAZA Representative

I describe myself as a veterinarian and zoologist with a strong vocation for conservation and environmental stewardship. For the last fifteen years this vocation has been expressed through working in conservation-orientated zoo organizations, Chester, London and, now, Adelaide, where I am CEO of Zoos South Australia/Conservation Ark, Professor of Zoology at Adelaide University and Professor of Biodiversity Conservation at Flinders University.

Before joining the zoo world I spent time in academia and the corporate sector. I see that zoos can...can...and must act as a force for the good in conservation as they have a huge potential audience and resource base, but I believe that any solutions to the immense challenges we face will be found through complementary cooperation with an emphasis on securing the 'front line' as much as possible and being wholly objective and dispassionate in the application of smart evaluation and priority setting. That said I also believe that we must demonstrate passion as well as present rational arguments in seeking to expand public and political support for conservation. We have to somehow connect what is happening out in the wild with peoples' everyday existence and concerns; which brings me to AArk and the integrated approach and dedication of its team.



We all know the 'call to arms' phrases relating to the amphibian crisis; the 'greatest extinction since the dinosaurs', etc. My experience is that it still isn't penetrating the public consciousness enough and because I care very much about this I volunteered to get involved. If we cannot raise our game for amphibians then when will we? I really admire what the AArk team has done and, from experience on other Boards, see that my role is to enable an excellent team to fully realize their carefully thought-through plans. I look forward to working with you and will be catching up with all aspects of the AArk in the next few months.

AArk Steering Committee

The Executive Committee oversees the Steering Committee, which itself brings together representatives from the entire AArk stakeholder community. The Steering Committee is the AArk's primary conduit for sharing information quickly throughout our global network, and for seeking direction from our stakeholders on AArk's strategic directions (see Fig.1, [AArk's organizational hierarchy](#)).

The Steering Committee currently has twenty-one members, including thirteen representatives of regional/national zoo associations, three from the private sector, and one each from communities for academia, aquariums, botanical gardens, ISIS, and natural history museums. We met five Steering Committee members in the [September Newsletter](#); here, we meet two more, with others following in subsequent newsletters:

The African Association of Zoos and Aquaria ([PAAZAB](#)): Dave Morgan (see [September Newsletter](#)).

The Association of Latin American Zoological Parks and Aquariums ([ALPZA](#)): Diana Sarmiento Parra (see [September Newsletter](#)).

The Association of Mesoamerican and Caribbean Zoos and Aquariums ([AMACZOOA](#)): Yolanda Matamoros

The Association of Zoos and Aquariums ([AZA](#)): Shelly Grow (see [September Newsletter](#)).

Botanic Gardens Conservation International (BGCI): David Galbraith (see [September Newsletter](#)).

The Canadian Association of Zoos and Aquariums (CAZA): Greg Tarry

The Chinese Association of Zoological Gardens (CAZG): Zhang Enquan

The European Association of Zoos and Aquaria (EAZA): Gerardo Garcia

Euro-Asian Regional Association of Zoos and Aquariums (EARAZA): Oleg Shubraviy

International Aquarium Congress (IAC): Paul Van den Sande

International Council of Museums (ICOM): Andrew Gray

International Species Information System (ISIS): Nate Flesness

Japanese Association of Zoos and Aquariums (JAZA): Kaszushi Kuwabara

Private sector Australia: Gerry Marantelli (Amphibian Research Centre, [ARC](#))

Private sector Europe: Peter Janzen (Deutsche Gesellschaft für Herpetologie und Terrarienkunde, [DGHT](#))

Peter was born in 1963. He studied Biology at the University in Duesseldorf, Germany and earned a Ph.D. in Biochemistry before working for the pharmaceutical industry. Currently he teaches at a government school. Peter started his interests in nature at the age of three, keeping golden hamsters. He started keeping amphibians and reptiles at age seven. Peter worked for a private reptile zoo during the last years of his school days and became experienced with a number of interesting reptiles (*Brachylophus*, crocodiles, venomous snakes, different monitors) and some cats (ocelot, lynx, clouded leopard). Now Peter is organizing and coordinating breeding programs for amphibians in Austria, Germany and Switzerland. For example he bred F2 generation *Agalychnis moreletii* this year. He has been a member of the Deutsche Gesellschaft für Herpetologie und Terrarienkunde since 1985 and has written several articles about keeping and breeding frogs, and about journeys to different countries. His first trip was to Sri Lanka in 1979, and since that time has had a special interest in this country and its amphibians.



Private sector USA: Mike Ready (Tree Walkers International, [TWI](#)) (see [September Newsletter](#)).

The South Asian Zoo Association for Regional Cooperation ([SAZARC](#)): Sally Walker/Sanjay Molur

The South East Asian Zoo Association ([SEAZA](#)): Suzanne Gendron

The Society of Brazilian Zoos ([SZB](#)): Raquel von Hohendorff

The Zoo and Aquarium Association ([Australasia](#)): Susan Hunt

Susan Hunt was appointed Chief Executive Officer at Perth Zoo in March 2004. In recent years in addition to an upgrade of zoo facilities, the zoo has taken on a strong *in situ* conservation focus supporting projects in Sumatra and Java in Indonesia, in Laos, Cambodia, New Guinea and Zambia. Perth Zoo also works extensively on the recovery of threatened Western Australian species through its native species breeding program. Almost 2,000 Perth Zoo-bred animals have been released back into protected environments throughout Western Australia in conjunction with government wildlife agencies. This involves western swamp tortoise, numbats, dighters and chuditch.



Consistent with the push globally, over the past four years Perth Zoo has also become active in its work with threatened Western

Australian amphibian species *Geocrinia alba*, *G. vitellina* and *Spicospina flammocaerulea*. In 2005 Perth Zoo received a four-year grant from the Western Australian Office of Science Innovation to examine amphibian husbandry; captive breeding and growth and development studies; the induction of ovulation; and reproductive biology including non-invasive collection of sperm. In 2009 this has been followed up with a further \$100,000 grant to develop a breed for release program for *Geocrinia alba*. In recent conservation assessments in Western Australia *Geocrinia alba* has been listed as one of the top priority species for conservation action, a testimony to the ongoing work of Perth Zoo and partners on the recovery of this species.

As President of the Zoo and Aquarium Association (Australasia), Susan has supported the development of increased support for *in situ* conservation work, with the formation of the Association’s Field Conservation Committee in 2007. This group has worked on the development of assessment criteria for conservation projects. In 2009 the first grant program for amphibians was awarded through the Association and the Field Conservation Committee. Seven projects were funded from fundraising for the Year of the Frog (see [separate article](#)).

Universities: David M. Green ([McGill University](#))

We look forward to introducing our other Steering Committee members in the future, and we extend our deepest appreciation to them all for their time and guidance.

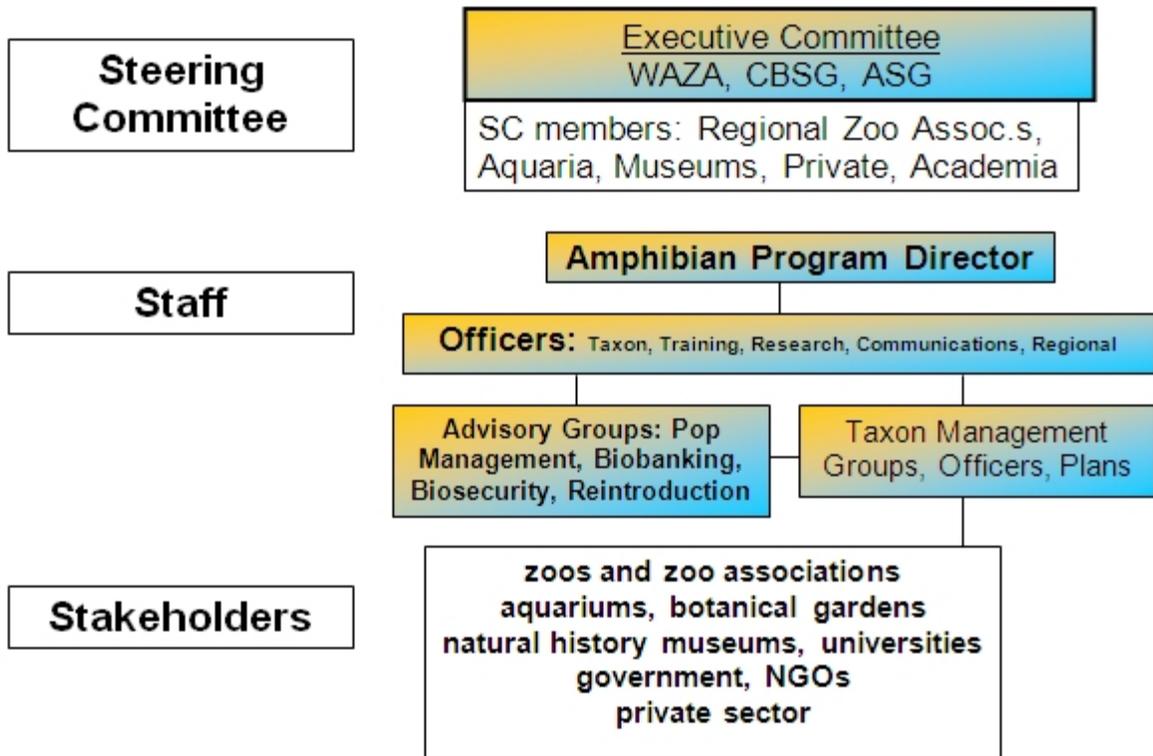


Fig.1: AArk’s organizational hierarchy.

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Sri Lankan Amphibian Conservation Needs Assessment workshop

Richard Gibson, Taxon Officer, Amphibian Ark

AArk Taxon Officer Richard Gibson facilitated an Amphibian Conservation Needs Assessment workshop in Kandy, Sri Lanka on 2nd and 3rd November. The workshop was organised by regional Amphibian Specialist Group Co-chair Anslem de Silva and was well-attended with twenty-four participants from a variety of backgrounds, many of whom were generously supported by Rohan Pethiyagoda, the Sri Lanka government's Biodiversity Secretariat and grants from Durrell Wildlife Conservation Trust's International Training Centre.

Two days of intensive discussion and deliberation, expertly assisted by Durrell Wildlife's Gerardo Garcia and Jamie Copsey, resulted in a comprehensive assessment of the conservation needs for Sri Lanka's [107 named species of frogs and caecilians](#) and a draft Red List assessment for two newly-described species *Philautus singu* and *Philautus tanu* – both provisionally assessed as Endangered on the basis of limited distribution and extent of occurrence. Perhaps the most exciting revelation of the workshop was that at least one species thought to be extinct, *Adenomus kandianus*, is now thought to have been rediscovered – great news for Sri Lanka and the world amphibian conservationists alike.



Ten species of frog were considered to be so close to extinction that *ex situ* ['Rescue'](#) programs are justified while more encouragingly, a further twenty-two threatened species could probably be saved *in situ* with dedicated [conservation action](#). Thirty-three species were identified which would benefit from [ex situ Research](#) initiatives, reflecting both the relatively recent discovery of much of Sri Lanka's amphibian diversity and the paucity of ecology and life-history studies. Approximately a quarter of the known species were recognised as having [educational potential](#) either nationally or locally and through a variety of means including public exhibition. With a brand new government zoo under development, guidance on educational and research program species couldn't come at a more appropriate and convenient time.

Critically Endangered *Nannophrys marmorata* – habitat modifications responsible for the demise of this species in its type locality are now being reversed by course graduates! Photo: Richard Gibson.

The workshop was followed by an [Amphibian Conservation Husbandry course](#).

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Amphibian husbandry training in Brazil

Ron Gagliardo, Training Officer, Amphibian Ark

With nearly 800 species currently recognized (and many endemic), Brazil holds the title of the most amphibian species in a single country. Considering the many threats amphibians face and that roughly thirty percent are threatened with extinction, it makes the continued studies in amphibian-rich countries such as Brazil very important. Habitat loss continues to be the primary threat in Brazil, but the toll taken currently or in the past by other threats such as disease and pollution have not been well documented.

With the realization that there is so much at stake in Brazil in terms of amphibian biodiversity, interest has increased in learning more about the status of amphibians and what actions could or should be taken. In 2008, AArk Program Director [Kevin Zippel](#) made two visits, first to encourage the *ex situ* community to embrace their role in the addressing the amphibian extinction crisis and then to encourage the *in situ* experts to work with their *ex situ* colleagues and include *ex situ* efforts in their national recovery plan. An [Amphibian Conservation Needs Assessment workshop](#) conducted by AArk Taxon Officers [Kevin Johnson](#) and [Richard Gibson](#) in August 2009, brought together many range country experts to produce a database of Brazilian species and the type of conservation action (if any) they require. Some of these species are very close to extinction. This has sparked interest in the use of *ex situ* breeding techniques to serve as a stopgap for these species on the brink and also for broader research applications. In Brazil, few managed captive programs for amphibians exist, however there is clearly a growing interest in this topic. With this, the Brazilian Zoological Society (SZB) and Zoo Bauru initiated a workshop dedicated to the biology and *ex situ* conservation of amphibians.

The six-day course was held in Bauru, Brazil (São Paulo state) from September 13-19 and facilitated by [Ron Gagliardo](#) and Kevin Zippel from the Amphibian Ark and Andy Odum from Toledo Zoo, and also co-administrator of the [AZA Amphibian Biology, Conservation and Management Course](#). Over thirty students from a variety of backgrounds (zoos, universities, NGOs and government) participated in the course, which began with several presentations by Brazilian researchers, giving the forty participants a very good foundation of knowledge of the current fieldwork being done in Brazil. This helped set the stage for covering the basics of planning for *ex situ* programs, which is equally important to husbandry techniques in charting the success of a program. All of the basic and specific husbandry information was presented from water quality and lighting to veterinary care and nutrition. Hands-on demonstrations and group projects helped to create communication between scientists working sometimes very far apart in this large country. We managed one night in the field to see amphibians in nature where nearly a dozen different species were encountered. The course wrapped up with a comprehensive look at *ex situ* facilities around the world giving participants a look at other programs and how they could apply some of these principles to their own.



Above and below: Students during practical workshops at the first Brazilian AArk Amphibian Husbandry Workshop. Photos: Ron Gagliardo.



We were very impressed with the excitement, motivation and knowledge base of the participants in Bauru. There were many people in the room who had very interesting and important experiences with threatened amphibians in various parts of Brazil. Their personal accounts were truly motivating for everyone. Our hope is that this will foster increased communication and working relationships within country aimed at moving forward with in and ex situ amphibian conservation in Brazil.

A team “on the ground” including Catia Dejuste de Paula (Brazilian Zoological Society), Ralph Vanstreels, (University of São Paulo), Juliana Lehn Linardi (University Estadual Paulista) and Luis Pires (Director, Zoo Bauru) executed all of the logistics of travel, presentations and translations perfectly! We owe a big thanks to all for their hospitality including the city of Bauru and its Mayor who addressed the group and attended several presentations indicating his strong interest in conservation. Also we give special thanks to Sorocaba Zoo for their sponsorship and to [WAZA](#) for the grant that funded the course.

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Amphibian Ark Husbandry Essentials workshop, Panama

Ron Gagliardo, Training Officer, Amphibian Ark

Amphibian Ark staff and colleagues conducted a three-day intensive husbandry training course in Panama October 23-25. Led by training officer Ron Gagliardo, this course aimed to put experience and knowledge into the hands of ten students, some of whom will soon be directly involved in caring for amphibian assurance populations at the Panama Amphibian Rescue and Conservation Project Facility being put together at the Summit Zoo near Panama City.

The agenda covered specific husbandry techniques, captive reproduction and climate control but also had special focus on veterinary care, health and nutrition and food colonies. The course was set up in El Valle in close proximity to the El Valle Amphibian Conservation Center (EVACC) and their team of Edgardo Griffith and Heidi Ross, directors. Hands-on work has been undertaken at this facility which currently houses dozens of species (and hundreds of individuals) of threatened amphibians of Panama.

In addition to Ron Gagliardo, the instructor team consisted of Allan Pessier (San Diego Zoo), Robert Hill (Atlanta Botanical Garden), Brad Wilson (Veterinary Clinic West, Atlanta), and Joe Mendelson (Zoo Atlanta). This diverse group were able not only to cover many topics in their own areas of expertise but to interact with students, providing valuable advice and information.

We gratefully acknowledge the funding assistance from the Smithsonian Institute, Amphibian Ark and instructors who covered some of their own expenses to be able to participate.



Above: The amphibian husbandry workshop in Brazil included practical sessions on drilling glass aquariums.
Below: Some of the breeding facilities at the El Valle Amphibian Conservation Center.
Photos: Ron Gagliardo.

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Sri Lankan capacity-building extravaganza

Richard Gibson, Taxon Officer, Amphibian Ark

Following hot-on-the heels of the [Sri Lankan Amphibian Conservation Needs Assessment workshop](#), Jamie Copsey and Gerardo Garcia from Durrell Wildlife led a week-long Amphibian Conservation Husbandry course in Kandy, Sri Lanka in November. Chester Zoo contributed Richard Gibson's time to this course also, making a trio of dedicated tutors to deliver a comprehensive and complex series of lectures, discussions sessions, and practical workshops. Further lectures by Sri Lankan contributors gave the course a tailor-made, Sri Lankan focus and a mid-course field trip to the extraordinary Knuckles mountains provided the twenty-plus, trainees and trainers with both a well-earned break from the intensity of the classroom and an opportunity to see some wild reptiles and frogs – including the Critically Endangered *Nannophrys marmorata*.

Results from the preceding [Conservation Needs Assessment workshop](#) were discussed in the husbandry workshop also and a selection of species recommended for *ex situ* educational or *ex situ* research work were used as focus species for applying what was being taught in each module of the course. Detailed enclosure designs and husbandry methodology were therefore drafted during the course and can provide a 'kick-start' to programs for the species in the future.

All course participants were awarded a certificate at the end of the course and provided with a DVD containing more than 450 megabytes of course lectures, presentations, references and other materials relevant to the conservation of amphibians, both *in situ* and *ex situ*. A small grant fund was also established by Durrell and Chester Zoo to which course graduates can apply for seed-funding to initiate new, or further existing, amphibian conservation projects – a means to keep up momentum and allow new knowledge, ideas, enthusiasm and partnerships to be acted on swiftly.



Above: Sri Lankan Amphibian Conservation Husbandry students make frog enclosures, rain-chambers and filters from everyday objects.

Below: Participants at the week-long Amphibian Conservation Husbandry course in Sri Lanka in November.

Photos: Richard Gibson.



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Amphibian Conservation Research Guide

Robert Browne, Research Officer, Amphibian Ark

“Zoos, aquariums and their partners are developing as one of the most substantial sources of scientific knowledge and activity, for the ultimate benefit of the survival of biodiversity ...” Reid et al 2008.

To focus amphibian research on the needs of conservation breeding programs we have developed an Amphibian Conservation Research Guide. The Guide is supported by documents that expand particular topics, and that provide examples of projects.

The [AArk Science and Research portal](#) provides a range of documents as a guide for amphibian research. The portal also offers an insight into the research needs of amphibian conservation breeding programs. The primary document is the [Amphibian Conservation Research Guide](#) which includes:

- Husbandry Projects for Zoos
- Conservation Breeding
- Re-introduction
- *In situ* Programs
- Facilities and Collaborations
- Visitor Studies.

Supporting the Guide are supplementary documents in the categories of:

- [Amphibian Zoo Studies](#)
- [Amphibian Husbandry](#)
- [Amphibian Reproduction Technology](#)
- [Amphibian Larval Rearing](#)
- [Methods](#).

The amphibian conservation crisis requires the establishment of conservation breeding programs to prevent extinctions. Conservation breeding programs focus on the maintenance of a species and its genetic variation through a captive breeding population. However, the scientific knowledge to support amphibian conservation breeding programs is somewhat limited and nutrition, behaviour, cycles of temperature and lighting, and their effect on reproduction and amphibian health are sometimes poorly-known.

The core of conservation breeding programs also includes field work to study the biology of species and their needs for habitat protection or restoration to improve their prospects for survival or later re-introduction. It is also important to develop a regional and global perspective of amphibian conservation needs including threats to both habitat and species.

The world's zoos historically offer the best current potential for support of amphibian conservation breeding programs. This potential has been demonstrated by the rapidly expanding number of programs involving zoos globally. In addition, research collaborations between zoos and other institutions are increasing in scope and range. Consequently, the Guide has exemplified research potentials that include the possibility of direct zoo participation in collaborations of research at zoos.

The Guide encourages those in different scientific fields to contribute to research that supports conservation breeding programs, and to develop research that engages the widest range of participants. The Guide extends through breeding programs including field assessment and amelioration of threats, the selection and sampling of founders, husbandry and the reproduction cycle, and reintroduction.

Research is specifically emphasized in the Guide that:



Amphibian research at Antwerp Zoo supported Kevin van Kampen's ambition to do Masters research that directly benefits conservation breeding programs. Kevin's thesis investigated the effects of genetics and egg quality of tadpole size variation. Photo: Robert Browne.

- directly contributes to both *ex situ* and *in situ* components of amphibian conservation
- extends research programs widely throughout scientific fields
- involves the global community
- targets conservation breeding programs
- encourages collaborations
- directly benefits participating institutions and more broadly humanity
- supports young conservation scientists, and
- develops benign research techniques.

Zoos, private amphibian keepers, commercial breeders, researchers, aquaculture facilities and aquariums, science researchers and educators have led the way to manage and consistently reproduce an increasing number of amphibian species. For private breeders these achievements have come from the challenge of being pioneers in the husbandry and reproduction of novel species. For commercial enterprisers the goal was the provision of large numbers of amphibians for display, consumption or research. This knowledge must now be harnessed, and expanded through research, to support conservation breeding programs for a very diverse range of amphibian species. Many studies of amphibians can be directly applied to reptiles, and their conclusions also benefit other groups including birds and fish.

Contributions will be welcome to our range of supplementary material. Please contact robert@amphibianark.org

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The FrogMatters internet blog – Posts from the Amphibian Ark

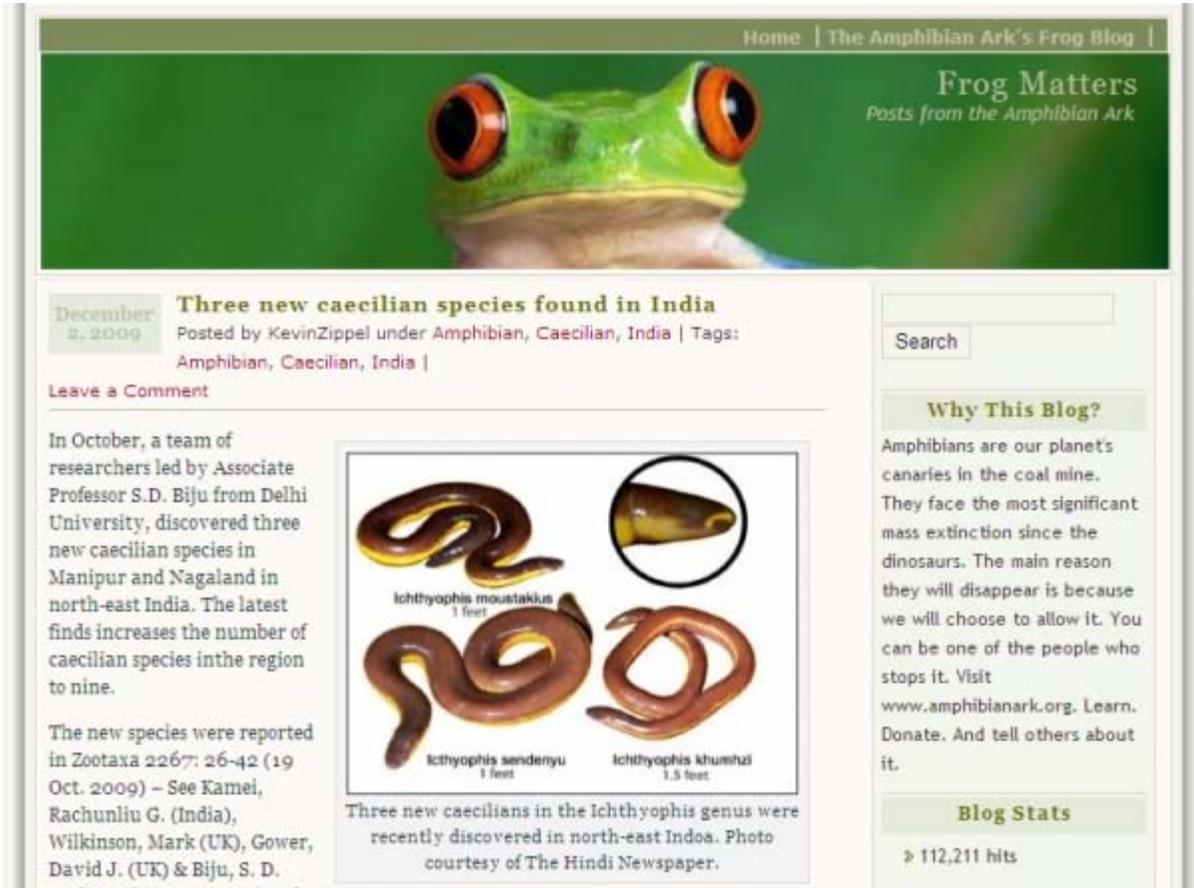
Kevin Johnson, Taxon Officer, Amphibian Ark

The [FrogMatters blog](#) was developed by Jeff Davis (aka pleasecroak) from St Louis in September 2007, and in mid-2009, it was handed over to AArk staff to continue its success. Jeff created the blog to help raise awareness of the global amphibian extinction crisis, and to encourage everyone to do what they can to help prevent it.

The blog currently has almost 370 posts, on a wide variety of topics such as the Year of the Frog campaign, recently-discovered species of amphibians, developments in studies into chytrid fungus and steps towards saving amphibians. Like most blogs, we encourage readers to leave comments in this interactive format, to foster further thought and discussion into the plight of amphibians.

New topics are posted by Amphibian Ark staff on the FrogMatters blog a couple of times each week, and we would like to invite all of you to visit the blog, and to contribute to any of the topics that you would like to comment on.

AArk's FrogMatters blog can be found at <http://frogmatters.wordpress.com>



The screenshot shows a blog post from 'The Amphibian Ark's Frog Blog'. The header features a green frog with large orange eyes. The post title is 'Three new caecilian species found in India', dated December 2, 2009, and posted by Kevin Zippel. The main text describes the discovery of three new caecilian species in north-east India. An image shows three caecilians: *Ichthyophis moustakus* (1 foot), *Ichthyophis sendenyu* (1 foot), and *Ichthyophis khumhzi* (1.5 feet). A circular inset shows a close-up of a caecilian's head. The post includes a 'Leave a Comment' section, a 'Why This Blog?' sidebar with a search box, and a 'Blog Stats' section showing 112,211 hits.

Home | The Amphibian Ark's Frog Blog |

Frog Matters

Posts from the Amphibian Ark

December 2, 2009

Three new caecilian species found in India

Posted by KevinZippel under Amphibian, Caecilian, India | Tags: Amphibian, Caecilian, India |

Leave a Comment

In October, a team of researchers led by Associate Professor S.D. Biju from Delhi University, discovered three new caecilian species in Manipur and Nagaland in north-east India. The latest finds increases the number of caecilian species in the region to nine.

The new species were reported in *Zootaxa* 2267: 26-42 (19 Oct. 2009) – See Kamei, Rachunliu G. (India), Wilkinson, Mark (UK), Gower, David J. (UK) & Biju, S. D.



Three new caecilians in the *Ichthyophis* genus were recently discovered in north-east India. Photo courtesy of The Hindi Newspaper.

Search

Why This Blog?

Amphibians are our planet's canaries in the coal mine. They face the most significant mass extinction since the dinosaurs. The main reason they will disappear is because we will choose to allow it. You can be one of the people who stops it. Visit www.amphibianark.org. Learn. Donate. And tell others about it.

Blog Stats

» 112,211 hits

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GoodSearch.com is a new Yahoo-powered search engine that donates half its advertising revenue, about a penny per search, to the charities its users designate. Use it just as you would any search engine, get quality search results from Yahoo, and watch the donations to the Amphibian Ark add up!



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Please make every gift count this holiday season. More than 1,300 top stores including Amazon, Toys R Us, Best Buy, Apple, Gap and more will donate a percentage of virtually every sale to the Amphibian Ark. Just go to GoodShop.com, designate us as the cause you support and then click over to your favorite store. You pay nothing extra - and you can even save money as GoodShop lists thousands of money-saving coupons and free shipping offers.



Or, add our toolbar to your browser at <http://www.goodsearch.com/toolbar/amphibian-ark> - and your purchases will count even if you forget to go to GoodShop first! There's no easier way to support us this holiday season! Please spread the word.

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Chytrid fungus: new developments in our understanding

Kevin Zippel, Program Director, Amphibian Ark

In the [last AArk Newsletter](#), we learned that amphibian chytrid fungus had finally been documented in Asia, the last amphibian-inhabited continent where it was not previously known. That does not mean it was not there previously, just that no one had looked for it adequately! Sites known to be chytrid-positive now include three archipelagos ([Japan](#), [Indonesia](#), and [the Philippines](#)) and also the mainland ([South Korea](#)). Fortunately, but curiously, the presence of the disease in Asia has not been associated with significant mortalities, as have been seen on every other amphibian-inhabited continent.

One team of researchers studying the situation in Japan has made some interesting discoveries. Surveying thousands of native and exotic amphibians, both in captivity and the field, the team documented twenty-six genetic variations of the fungus, including three unique to the giant salamander, *Andrias japonicus*! Not only weren't wild native amphibians dying of infection, the incidence of infection was remarkably low. Furthermore they also found a museum specimen of the giant salamander from 1902 with the fungus in its skin (recall that the previous oldest record was 1938 in a South African clawed frog, giving rise to the hypothesis that the disease emerged from Africa with clawed frogs used around the world for pregnancy tests). As a result of these observations, the team put forward a new hypothesis that Bd originated in Asia. Clearly, we still have much to learn about this disease, particularly its origin. However, it is also clear that it continues to be a threat requiring urgent action in many other parts of the world. More info: Goka, K., Yokoyama, J., Une, Y., Kurokis, K., Suzuki, K., Nakahara, M., Kobayashi, A., Inaba, S., Mizutani, T. and Hyatt, A.D. 2009. [Amphibian chytridiomycosis in Japan: distribution, haplotypes and possible route of entry into Japan](#). Molecular Ecology online.

In Central America, another team of researchers examined patterns of extirpations and extinctions caused by amphibian chytrid and found that the disease was non-randomly and disproportionately eliminating rare, specialized, and endemic species. The end result of the legacy of outbreaks of chytridiomycosis is that the remaining amphibian communities are highly similar or 'homogenized' having lost diversity in terms of both species richness and variety in natural history.

More info: Smith, K.G., Lips, K.R. and Chase, J.M. 2009. [Selecting for extinction: nonrandom disease associated extinction homogenizes amphibian biotas](#). Ecology Letters 12:1069-1078.

In Australia, another team has shown that amphibian chytrid can continue to be a significant source of mortality even decades after introduction and initial epidemics. Studying the Near Threatened Pearson's green tree frog, *Litoria pearsoniana*, the researchers showed that after thirty years of coexistence, the disease is still causing a ~38% reduction in monthly survival.

More info: Murray, K.A., Skerratt, L.F. Speare, R. and McCallum, H. 2009. [Impact and dynamics of disease in species threatened by the amphibian chytrid fungus, *Batrachochytrium dendrobatidis*](#). Conservation Biology:23:1242-52.

Australian researchers have also given us a mechanism by which amphibian chytrid kills its hosts. The disease is associated with a decrease in electrolyte transport across the skin and into the blood, leading to cardiac arrest.

More info: Voyles, J., Young, S., Berger, L., Campbell, C., Voyles, W., Dinudom, A., Cook, D., Webb, R., Alford, R.A., Skerratt, L.F., and Speare, R.. 2009. [Pathogenesis of chytridiomycosis, a cause of catastrophic amphibian declines](#). Science 326:582-585.

Another study looked at the role of international trade in spreading amphibian chytrid, revealing that of twenty-eight million frogs imported into three US ports over six years, 62% of animals sampled carried the fungus. Defenders of Wildlife has petitioned the US government to enact new regulations to limit the potential for trade to spread amphibian chytrid.

More info: Schloegel, L.M., Picco, A.M., Kilpatrick, A.M., Davies, A.J., Hyatt, A.D. and Daszak, P. 2009. [Magnitude of the US trade in amphibians and presence of *Batrachochytrium dendrobatidis* and ranavirus infection in imported North American bullfrogs \(*Rana catesbeiana*\)](#). Biological Conservation.

Also recently published were two excellent overviews of amphibian chytrid:

Fisher, M.C., Garner, T.W.J., and Walker, S.F. 2009. [Global emergence of *Batrachochytrium dendrobatidis* and amphibian chytridiomycosis in space, time, and host](#). Annual Review of Microbiology 63:291-310.

Kilpatrick, A.M., Briggs, C.J., and Daszak, P. 2009. [The ecology and impact of chytridiomycosis: an emerging disease of amphibians](#). Trends in Ecology & Evolution online.

Amphibians in the news

The following links are reproduced from recent copies of the [Amphibian Ark's Monthly Activity Reports](#), and provide some interesting reading about recent events in the amphibian world.

- [Kihansi spray toad becomes second amphibian species to be classified Extinct in the Wild.](#)
- Canaries or coal miners? While one paper declares that, relative to a number of invertebrates and fish, [amphibians are “canaries” \(exceptionally sensitive indicators of environmental health\) perhaps only for the contaminant group phenols](#), another describes how amphibians are [far more sensitive than mammals to a number of contaminants](#). Because of their generally conspicuous presence in the environment and chemical sensitivity relative to other tetrapods, the role of amphibians as sentinels to potential human threats should not be discounted.
- [Some strains of amphibian chytrid seem to be non-epidemic, endemic in Japan, suggesting a new possible origin for the disease.](#)
- [Amphibian chytrid “kills by changing the animals' electrolyte balance, resulting in cardiac arrest” 2 3.](#)
- [Non-Bd chytrid "dominates soils communities in otherwise relatively lifeless habitats atop mountains in the Rockies and in Nepal".](#)
- [Amphibian chytrid documented in mainland Asia.](#)
- [Amphibian chytrid causing "a vast homogenization" of Central American ecosystems.](#)
- [Defenders of Wildlife petitions US government to “immediately regulate live amphibian imports”.](#)
- [EPA fails to inform public about weed-killer in drinking water.](#)

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Darwin's frog conservation efforts in Chile

Ron Gagliardo, Training Officer, Amphibian Ark

In late September, I made a short visit to Chile to observe the projects focused on protecting Darwin's frog *Rhinoderma darwinii*. Historically, the only colony of this species successfully maintained for multiple generations in captivity was in the lab of Dr. Klaus Busse at the Alexander Koenig Museum in Bonn, Germany. Starting in 2001, there has been renewed interest in this species resulting in increased fieldwork and *ex situ* activities in Chile. Two *ex situ* breeding programs are in process there, one at the National Zoo in Santiago and one at the Universidad de Concepción in southern Chile, within the natural range of the species. While the IUCN red list describes *Rhinoderma darwinii* as Vulnerable, the second species, *R. rufum*, has not been seen in nature in decades and is considered Critically Endangered. If it were to be found, certainly it would be included in these *ex situ* programs.

The National Zoo facility in Santiago, supported in part by the Atlanta Botanical Garden (ABG), is coming along really well. The building itself looks fantastic and will surely be a treat for visitors peering into the lab. ABG staff visited in late August, installing tanks and plumbing. National Zoo veterinarian Marcela Tirado who interned in July 2008 at ABG and also attended the AZA Amphibian Biology, Conservation and Management training course in Toledo, OH in April 2009 heads the project up. She is working diligently with Zoo Director Mauricio Fabry to get things polished off in the facility, secure adequate food colonies, etc. It will serve as an excellent facility for showcasing this important conservation effort and the commitments of the players to keep it going. I believe their plan is to have Darwin's frogs in this facility this winter. A website at www.savedarwinsfrogs.org details their efforts on this project.

The Concepción facility is under the direction of Professor Juan Carlos Ortiz and graduate student Carlos Barrientos. The Leipzig Zoo supports this program and since April 2009 has maintained eleven live specimens in a modified shipping container. They are also planning for an attempt to raise *Rhinoderma* in secure outdoor enclosures. Marcela Tirado and I visited for the day and met up with Klaus Busse who was in town for lectures at the university. Klaus kindly offered his experience to Marcela and Carlos Barrientos. I witnessed a very solid connection



Above: The exterior of the *Rhinoderma* facility in progress at the National Zoo in Santiago, highlighting the access for the public to view the program.

Below: Marcela Tirado with staff at Universidad de Concepción (Carlos Barrientos, Professor Juan Carlos Ortiz, and Dr. Klaus Busse).

Bottom: Two Darwin's frogs in Chile.
Photos: Ron Gagliardo



made between National Zoo and Concepción staff regarding husbandry issues, food colonies, and overall collaboration on their programs. I predict that they will reproduce them very soon, as we observed calling and amplexus the entire time of our visit. Hopefully Carlos will be able to also attend the AZA course in Toledo, OH in April 2010. More information on this project is available on line at http://www.zoo-leipzig.de/index.php?strg=19_41_74&baseID=74.



Back in Santiago, I met up with field researchers including Andres Charrier (Catholic University in Santiago) and Claudio Soto (University Andres Bello) who indicated that they were getting ready for "the season" which begins in December. ABG and the Zoological Society of London support the fieldwork of Charrier and Soto respectively. Johara Bourke, a graduate student from Bonn, Germany is also doing fieldwork but she was not in Chile at the time of my visit. Hopefully, all will continue to communicate amongst each other to lessen the risk of duplicate work and spreading out the range of exploration in the field. There seems to be some concern about where *Bd* occurs in Chile and the location (if any) of the elusive *R. rufum*.

About twenty students and faculty showed up for an evening lecture on amphibian conservation I presented at the University Andres Bello arranged by Claudio Soto. There was clearly some excitement in the air in terms of amphibian conservation in Chile. While *Rhinoderma* is certainly a very interesting and charismatic amphibian, Chile is home to over fifty other amphibian taxa, some of which are equally in need of protection. Hopefully, these programs will expand in the future to include other critically endangered species.

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New breed and rear for release program commenced for *Geocrinia alba*

Helen Robertson, Director Animal Health and Research, Perth Zoo

Thanks to the combined generosity of the [Zoo and Aquarium Association \(Australasia\) Frog Conservation Grant](#) (AU\$11,000), Perth Zoo's Wildlife Conservation Action grant (AU\$11,000) and an AU\$100,000 grant from Natural Resource Management, the Western Australian Frog Recovery Team has commenced new direct action to rescue this Critically Endangered species from the brink of extinction. *Geocrinia alba* is a direct developing frog, and as such does not have a free swimming tadpole stage. The tadpoles develop within a small jelly nest laid in a shallow burrow beneath leaf litter, which is built by the male.

Perth Zoo and Western Australia's Department of Environment and Conservation staff have already collected the first egg nests for this season to commence the project. For the first year it is unlikely that we will be breeding adults in captivity as our metamorphs reared from wild collected egg nests last year are not yet sexually mature and judging from their growth rate will be unlikely to be sexually mature for at least another twelve months.

The main aim of the project is to raise sufficient numbers of eggs to metamorph stage to overcome the loss of eggs in the field via predation. The reared metamorphs will be translocated into the field in late December - January (or whenever they are ready).

We aim to release a minimum of thirty metamorphs each release so assuming an average of 8–10 eggs per nest, and an egg to metamorph survival rate of 60%, we need to collect between 6–11 egg masses. During our first field trip this season we collected four egg nests so we still have a good many to go. The challenge with this species is that due to the very low numbers in the wild, finding egg nests is very difficult. Many creek lines only have one or two calling males remaining.

The release site lies within the southern portion of Witchcliffe Forest Block, which is located in the south-west of Western Australia, quite close to the planned collection creek lines. With a bit of luck and a lot of hard work we hope to collect a few more egg nests and give them an 80% chance of surviving to metamorphosis rather than the ~10% chance they have in the field.



Above: Perth Zoo frog keeper, Tammy Goad, at the entry of one of the frog breeding sites.
Below: Helen Robertson removing a *Geocrinia alba* egg nest.
Photos: Perth Zoo.



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2009 northern corroboree frog breeding results

Carly Humphrys, Wildlife Officer, Tidbinbilla Nature Reserve

After the 2008 breeding of 190 northern corroboree frog eggs, this year the staff collected just over 1,000 eggs from the captive breeding colony. Last year's breeding season produced 111 frogs from the 190 eggs. This year, already half of the tadpoles have metamorphosed and the survivorship rate of around 90% has already been an exciting improvement over last year.

These results are a positive step forward for the captive breeding of this species. Currently the breeding and the raising process of the northern corroboree frogs in captivity has shown a far greater survivorship rate than would occur in the wild. The frogs housed at Tidbinbilla are able to grow in a relatively stable environment with minimal disturbances, compared to the frogs in the wild where they face the introduced chytrid fungus.

The three shipping containers at Tidbinbilla housing the frogs are extremely full; trying to find space after the success of two years of breeding within the containers is a challenge. The captive population has now increased, with many new hungry frogs to feed as the newly metamorphosed frogs grow. The adult frogs have just been through their wintering period, when the temperature was lowered to simulate the natural environment, and are now experiencing warmer conditions to prepare them for the 2010 breeding season. We are hoping the next few breeding seasons produce similar successful results to this breeding season just passed.

Discussions are currently underway with Taronga Zoo, which currently maintains a captive colony of southern corroboree frogs, about the possibility of transferring some northern corroboree frogs from Tidbinbilla to the zoo. Spreading the population of northern corroboree frogs amongst more than one institution minimises risks by not having 'all the eggs in one basket'. Liaising with other institutions which maintain frogs is extremely important for the future survivorship and breeding of the species. The ultimate goal of the northern corroboree frog captive breeding program is to release frogs back into the wild to boost existing wild populations. By releasing frogs back into the wild, the aim is to re-establish viable populations.



Above: Captive-bred northern corroboree frog metamorphs at Tidbinbilla Nature Reserve.

Below: Over 1,000 northern corroboree frog eggs were collected at Tidbinbilla Nature Reserve, and some of these have now started to metamorphose. Photos: Carly Humphrys.



Regional updates on biobanking activities

San Diego Zoo's Institute for Conservation Research, California, USA - Andrea Johnson, Marllys L. Houck and Oliver A. Ryder, Sand Diego Zoo

Since the beginning of 2009, the Genetics Division at San Diego Zoo's Institute for Conservation Research have attempted to establish cell cultures from twenty-five individual amphibians. For most animals, several different tissues and/or conditions were tried, for a total of seventy-five cell culture flasks. Of these, nineteen attempts resulted in some cell growth. Eighteen of the cultures that were initially successful later died, mostly due to contamination (fungus, bacteria, or yeast), although several simply stopped growing before reaching a point where they could be considered viable cell lines. Thus, one viable fibroblast cell line, grown from the eye of an African bullfrog (*Pyxicephalus adspersus*), has been frozen since the beginning of the year.

A variety of tissues have been used in these cell culture attempts, including skin, limbs, eye, tongue, kidney, tail (from tadpoles), muscle, ovary, and eggs. The best results so far have come from tongue and eye samples. Due to a high rate of contamination of tissue, we have also been experimenting with several methods of cleaning the samples, such as kanamycin, penicillin-streptomycin, fungizone, flaming, ethanol, bleach, and dragging the samples through antibiotic-impregnated agar. Yeast contamination is proving to be more difficult to prevent than fungus and bacteria.

We also routinely freeze pieces of tissue from amphibians in addition to attempting cell culture. In the future, when we have succeeded in refining a protocol for amphibian tissue culture, these samples may be thawed and potentially used to establish cell lines which would be impossible with today's techniques. Since January, 2009 we have frozen seven tissue samples representing species new to the Frozen Zoo: dyeing poison frog (*Dendrobates tinctorius*), Panamanian golden frog (*Atelopus zeteki*), Madagascar tomato frog (*Dyscophus antongilii*), California chorus frog (*Pseudacris cadaverina*), and Mexican giant tree frog (*Pachymedusa dacnicolor*).

The majority of animals from which we have received tissue samples were part of the San Diego Zoo's collection. Eleven individuals were sampled and sent to us by outside institutions, including Fort Worth Zoo, National Zoo in Washington, D.C., and Houston Zoo.

As part of developing successful amphibian cell culture techniques, we purchased four cell lines from ATCC: The Global Bioresource Center: African clawed frog (*Xenopus laevis*), American bullfrog (*Rana catesbiana*), giant marine toad (*Bufo marinus*), and northern leopard frog (*R. pipiens*). From this we hope to learn more about how amphibian cells respond to being cultured and frozen.

Laboratory of Cryopreservation of Genetic Resource, Institute of Cell Biophysics (Russian Academy of Sciences), Moscow, Russia - Edith N. Gakhova and Victor K. Uteshev, Russian Academy of Sciences

During the early 1980s, efforts to cryopreserve and bank animal and plant germplasm were initiated at the Institute of Cell Biophysics (Russian Academy of Sciences) and continue to the present day. The creation of a cryocollection for amphibian conservation is a significant part of the Laboratory of Cryopreservation of Genetic Resource's efforts at the Institute of Cell Biophysics (Russian Academy of Sciences). Within the last twenty years we have cryopreserved spermatozoa and embryo cells of various amphibian species from the field and Moscow Zoo.

As a rule we salvage spermatozoa from the macerated testis of deceased amphibians for cryopreservation. A simplified Ringer's solution containing 15% DMSO, 10% sucrose and 1% of bovine serum albumin has been effective for the cryopreservation of amphibian spermatozoa. The fertilizing capacity of the thawed spermatozoa is routinely 30-40% and a considerable proportion of hatched amphibian tadpoles (*Rana temporaria* and *Bufo bufo*), with normal metamorphosis and development, have been produced using the thawed spermatozoa.

Embryo cells are obtained for cryopreservation by dissociating intact blastula stage embryos using a calcium-free variant of Niu-Twigg medium. This medium, when supplemented with 10% DMSO, 10% sucrose and 1-0.5% bovine serum albumin, has been the most effective for cryopreserving embryo cells to date.

Currently, we have spermatozoa and embryo cells from six amphibian species stored within the Institute of Cell Biophysics (Russian Academy of Sciences) cryobank, including: common frog (*Rana temporaria*), pool frog (*R. lessonae*), moor frog (*R. arvalis*), smooth-clawed frog (*Xenopus laevis*), Kenya smooth-clawed frog (*X. borealis*) and common toad (*Bufo bufo*).

Also, we have started to collect spermic urine from live male anurans after hormone administration. This method provides additional possibilities for obtaining spermatozoa from amphibians, including rare and endangered species, for cryobanks.

Presently, we are carrying out research on the cryopreservation of embryo cells and the early embryos of frogs and toads. We are also developing a program for cryobanking material from tailed (caudate) and tailless (anura) amphibian species in collaboration with zoologists from Moscow Zoo and with colleagues from scientific institutions and private collections.

For more information on amphibian biobanking, please visit [Amphibian Ark's biobanking portal](#) or email cryobanking@amphibianark.org.

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AMACZOOA report

Yolanda Matamoros, President of the Mesoamerican Association of Zoos

A new frog species was found by Gerardo Chavez (cachi@biologia.ucr.ac.cr), Adrián García, Alejandro Leal and Alejandra Mora from the Biology School, Universidad de Costa Rica. It is a species of the genera *Diasporus*, that lives at El Silencio Valley, Talamanca mountains, Costa Rica. The results of the research can be found in the international journal [Zootaxa volume 2088](#).



The updated lists of the amphibians of Costa Rica and Honduras can be found at the Biology Museum of the Universidad de Costa Rica's web site. <http://museo.biologia.ucr.ac.cr/Listas/LZAMision.htm>

A workshop to analyze what happens to wildlife extracted from its natural habitat was held from August 17-21, at SENASA-MAG Auditorium, with fifty-nine people representing different institutions participating. This workshop was one of the actions proposed in the Costa Rica Amphibian Conservation Strategy. The workshop was organized by SENASA-MAG, Environment Ministry (MINAET), Universidad de Costa Rica, and FUNDAZOO and had the support of CBSG Mesoamerica. The report from the workshop is currently being edited.

Andrea Brenes, FUNDAZOO's nutritionist, has been working on a research project at the Saint Louis Zoo from September to November. Her project is *The effect of carotenoids in the levels of vitamin A in the Madagascar tomato frog (Dyscophus antogillii)*.

UNIVERSIDAD DE COSTA RICA | **Saint Louis Zoo**
NOVUS | **Williams & Morrow**
Pigments, Phytoc
Pigment & Phytoc

Effect of Dietary Carotenoids on Fat-Soluble Vitamin Status and Pigmentation in False Tomato Frogs (*Dyscophus guineti*)

Andrea Brenes, Lic. Zoo and Wildlife Nutrition & Management Program, Animal Science College, University of Costa Rica, Jeff Erding MS, Saint Louis Zoo, St. Louis, MO 63110, Ellen S. Davenport, PhD, Newsw International, Inc., St. Charles, MO 63024

Introduction
The coloration of the skin in the vertebrates is a result of the presence of pigments. These pigments are responsible for the coloration of the skin and are responsible for the coloration of the skin. The coloration of the skin is a result of the presence of pigments. These pigments are responsible for the coloration of the skin and are responsible for the coloration of the skin.

Objectives
1) Evaluate the effect of dietary carotenoids on the fat-soluble vitamin status and pigmentation in false tomato frogs.
2) Evaluate the effect of dietary carotenoids on the fat-soluble vitamin status and pigmentation in false tomato frogs.

Materials & Methods
False tomato frogs were fed a diet containing 0, 10, 20, 40, 80, and 160 mg/kg of dietary carotenoids. The effect of dietary carotenoids on the fat-soluble vitamin status and pigmentation was evaluated. The effect of dietary carotenoids on the fat-soluble vitamin status and pigmentation was evaluated.

Preliminary Data
Dietary carotenoids increased the fat-soluble vitamin status and pigmentation in false tomato frogs. The effect of dietary carotenoids on the fat-soluble vitamin status and pigmentation was evaluated. The effect of dietary carotenoids on the fat-soluble vitamin status and pigmentation was evaluated.

Color analysis and pigmentation

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An update from the Association of Zoos & Aquariums

Shelly Grow, Conservation Biologist, AZA

Conservation Endowment Fund recipients

Applications for the 2010 Conservation Endowment Fund will be available on the AZA web site in January 2010 at <http://www.aza.org/cef>



Amphibian theme at AZA's mid-year meeting 2010

AZA's 2010 mid-year meeting will have an amphibian theme with keynote speakers to include Dr. James Collins, co-chair of the IUCN Amphibian Specialist Group, professor at Arizona State University, and author of the recently published book, *Global Amphibian Extinctions: The Mysterious Environmental Die-off*. Other amphibian-related events will include additional presentations, panel discussions, and FrogWatch USA Chapter Coordinator Training. For more information, visit: <http://www.aza.org/midyearmeeting/>

Register now for AZA's Amphibian Biology, Conservation, and Management Course

Registration for AZA's April 17-23, 2010 Amphibian Biology, Conservation, and Management course, to be held at the Toledo Zoo in Toledo, Ohio, is now open. Learn more and register at: <http://www.aza.org/ProfTraining/detail.aspx?id=496>

From Capitol Hill

Over the past year, AZA has been working the U.S. House Interior Appropriation Subcommittee on language regarding amphibian conservation. The following language was recently approved by the Congress and signed into law:

"The Committee is aware of the impacts of the Chytrid disease on amphibian species worldwide. Amphibian species are disappearing at over 200 times their historic rate, and if left unchecked, up to 30 percent of these species could be extinct within two to three decades. The Committee urges the Service to work with the international conservation community to establish conservation and captive breeding programs as well as to support the development and testing of novel methods to combat the amphibian chytrid to conserve the most imperilled of these species."

Read more about the AZA community's amphibian conservation efforts in our quarterly newsletter at: <http://www.aza.org/amphibian-news/>

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Amphibian awareness education programs during India's Wildlife Week 2009

R. Marimuthu, Education Officer, Zoo Outreach Organisation/CBSG, South Asia

Zoo Outreach Organization/CBSG South Asia and the South Asian Educator Network, International Zoo Education South Asia has provided educational material on selected species and issues including amphibians, during Wildlife Week. We stepped up our campaign in 2007 when CBSG and WAZA joined to create AArk, and have sent many thousands of publications throughout South Asia since 2007, and during the 2008 Year of the Frog promotion.

For 2009 Wildlife Week we brought out new packets and amphibian calendars and an Amphibian-Art AArk colouring book which were supplied to eleven zoos, five Forest Department personnel, eight education institutions, one museum and fifteen non-governmental organizations which conducted amphibian awareness programs and sent us reports. An estimated 5,000 students learned about the amphibian crisis.

Sponsors for this material were [CBSG](#) and [Busch Gardens Conservation Fund](#).

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Above: A doctor at Calicut the Medical College, Kerala conducted a lively amphibian education program for children with leukemia.

Photo: Dr.Geeta Govindaraj.

Below: Indian school children were provided with amphibian masks, colouring books and other material during Wildlife Week.

Photo: D.H. Tanuja.



Year of the Frog funding supports projects in Zoo and Aquarium Association (Australasia) institutions

Chris Banks, Coordinator, Conservation Partnerships, Zoos Victoria

Seven frog conservation projects were selected to receive funding from the money raised during the regional Year of the Frog campaign, but the The Zoo and Aquarium Association (Australasia)'s Field Conservation Committee wishes to acknowledge and thank all of the project applicants for the commitment to frog conservation in Australia and New Zealand. A total of AU\$83,792 was available for allocation.



The seven successful projects are:

- “Developing captive husbandry skills for threatened Tinkerfrogs (*Taudactylus* spp.) in Queensland”: Currumbin Sanctuary & Griffith University. AU\$14,000 awarded.
- “Research-informed improvement and expansion of *ex situ* facilities for New Zealand frogs to progress the Native Frog Recovery Plan”: Hamilton & Auckland Zoos and University of Otago. AU\$14,000 awarded.
- “Monitoring in the field of the first captive-reared *Geocrinia alba* and *G. vitellina* release”: Perth Zoo. AU\$11,000 awarded.
- “An Endangered Amphibian Complex at Melbourne Zoo”: Melbourne Zoo. AU\$15,730 awarded.
- “The Wellington Zoo Native Frog Research & Rescue Unit”: Wellington Zoo Trust. AU\$5,570 awarded.
- “The impact of life stage on the reintroduction success of the Australian booroolong frog”: Taronga Conservation Society of Australia, NSW Department of Environment & Climate Change, and James Cook University. AU\$11,500 awarded.
- “Evaluating competing hypotheses in amphibian declines”: Healesville Sanctuary. AU\$12,000 awarded.

The Field Conservation Committee members are:

Chris Banks: Chair and Zoos Victoria.
Dr Rebecca Spindler: Taronga Conservation Society of Australia.
Clare Campbell: Perth Zoological Gardens.
Dr Katja Geschke: Wellington Zoo Trust.
Susan Hunt: Perth Zoological Gardens.
Peter Fraser: Auckland Zoo.
Dr Wendy Foster: Zoos South Australia.

Our thanks once again to all the project applicants.

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