



# *The Croaker*

**Newsletter of the Tablelands Frog Club**

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Photo by Michael Anthony.

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**February 2009**



# Tablelands Frog Club

## Executive Committee 2007-2008

<b>President:</b>	Michael Anthony (07) 4053 2759 capeherp@hotmail.com
<b>Vice-President:</b>	Keith Martin (07) 4055 3061 keithmartin30@hotmail.com
<b>Secretary:</b>	Marney Fichera marney_fichera@msn.com
<b>Treasurer:</b>	Eleanor Duignan (07) 4053 4857 eduinan@bigpond.net.au
<b>Committee:</b>	Neville Simpson Inga Lorenz Merv Maria Destro Shaun Cook (junior)
<b>Editorial:</b>	Darren Green 4057 5603 pinkenhah@internode.on.net
<b>Website:</b>	<a href="http://www.tablelandfrogclub.com">http://www.tablelandfrogclub.com</a>

# Tablelands Frog Club

Mail Bag 71  
YUNGABURRA QLD 4879



### DISCLAIMER:

Opinions expressed in this Newsletter are not necessarily that of Tablelands Frog Club.

### PUBLIC INFORMATION:

The Croaker is the Newsletter of the Tablelands Frog Club Incorporated. This Newsletter is produced by the voluntary efforts of members. We gratefully accept all contributions, however limited space may mean that contributions are not included immediately, and all are subject to editorial discretion. The TFC newsletter is published bimonthly (i.e. February, April, June, August, October, & December). Newsletter submissions are due on the 15th of the preceding month. Please direct all contributions to The Editor c/o Tablelands Frog Club, at the addresses listed above.

TFC meetings/nights and field trips/outings are held monthly. See schedule for dates, speakers and locations. Annual membership fees are:  
\$15.00 Adults  
\$15.00 Family  
\$ 5.00 Junior/Associate

The Croaker is now available as a PDF to members that have access to email. The PDF version of The Croaker is in full colour, and contains more information than mail-out photocopied versions. Email costs less to send out, and doesn't waste paper and other resources, making it good for the Tablelands Frog Club and the environment. To take advantage of this service, contact the Tablelands Frog Club with your email details. You will need Adobe Acrobat Reader to open PDF files. The latest version of Adobe Acrobat Reader is available as a free download from:



<http://www.adobe.com/downloads/>

<http://www.tablelandfrogclub.com>

## Editorial bullrush!

Hello everyone a welcome to the first newsletter for 2009. It looks as though Michael Anthony has lined up a number of excellent guest speakers. Apart from these nights being informative, meetings are a good way of meeting like-minded people. Please come along and support the club. Don't forget, supper is provided.

Our frog of the month is also accompanied by a snake of the month. If you have any interesting stories about these, please send them in so that I can include them in the next newsletter.

By the way, I take no responsibility for any jokes in The Croaker!

Regards to everyone.

**Darren Green**

## Meetings 2009

**Friday 20th February** - Cairns Michael Cermak - 7.00 pm at the Red Cross Hall, Trinity Beach Road, Trinity Beach. See advertisement on page 3.

**AGM 27th March** - Yungaburra Martin Cohen - Wildlife

**Friday 8th May** - 7.00 pm Cairns - members night - bring along photos, slides, cds, dvds, audio of frogs or other wildlife for an "id fest"

**Friday 9th October** - venue TBA Cairns - Laura Worth from the Environmental Protection Authority will outline the regulations concerning the collection & keeping of tadpoles & frogs in Queensland

**March 2010** - ANNUAL GENERAL MEETING - Yungaburra

## Field trips 2009

**Saturday 21st February** - Mareeba Wetlands (dry country frogs)

**Saturday 28th February** - Black Mountain (Black Mountain Frog)

**Saturday 21st March** - Tepon Wetlands, Wondecla (frog survey)

**Saturday 25th April** - Nandroya Falls (Stream-dwelling frogs & microhylids)

**Saturday 17th October** - Mt Baldy (Whirring Tree Frogs)

**NOTE:** Please contact Michael Anthony on 40532759 or 0427367888 for details of field trips.



# From the president's lily pad

Most of you would have heard by now the great news of the rediscovery of one of our "missing" frogs, the Armoured Mistfrog (*Litoria lorica*) on the Carbine Tableland. The Armoured Mistfrog or Little Waterfall Frog was only discovered in 1976 from specimens collected at Alexandra Creek near Thornton Peak. It is one of a number of highland rainforest stream-dwelling species that "disappeared" during the early 90's.

As the only known populations of this frog occurred at high altitude it was believed that this species was extinct. No specimens had been seen since 1991, until earlier this year when Professor Ross Alford and phd student Robert Puschendorf found a new population. This population was away from its previous known range, at lower altitude and outside of rainforest. This is February's Frog of the Month, although should be in contention for "frog of the century", at least in Australia!

The club continues to "tick over", albeit very slowly - it is very difficult to hold down a full time job and have the energy to organise club activities, as is the

case with all our committee – we are still looking for help with the committee, please bear in mind that our Annual General Meeting is looming (end of March) so have a think about getting involved.



Memberships are also due at the end of the calendar year, we aim to have all memberships paid by AGM time.

We have had some great guest speakers over the past year, many thanks to Martin Cohen, Kelvin Marshall and Jean Horton.

We have had a bumper wet season so far with our two traditionally wettest months February and March to come. Let's hope that the last few good wet seasons will result in there being more frogs around.

Hoppy Frogging!

**Michael Anthony**

<http://www.tablelandfrogclub.com>



## February Meeting

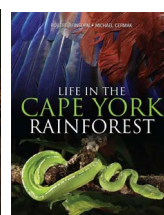
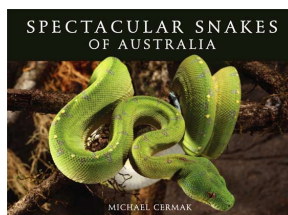


### Green Pythons in the wild and in captivity by Michael Cermak

Local naturalist and wildlife photographer, Michael Cermak, will present a slide-illustrated and informative talk on Green Pythons in the wild and in captivity. Michael will talk about the natural history, origins, convergent evolution with emerald boa, captive husbandry and breeding and what role it plays in the species' conservation.

Michael is the author of "Spectacular Snakes of Australia" and "Life in the Cape York Rainforest".

These books will be available on the night for purchase.



The presentation will begin at 7.00 pm on Friday the 20th of February at the Red Cross Hall, Trinity Beach Road, Trinity Beach, next to Coastwatchers Park. Members and Guests welcome, coffee, tea, cake and biscuits provided. We ask you for a gold coin donation to cover the cost of the venue.



# Wild News... IN THE SPOTLIGHT

## Reproductive Plasticity Revealed: Neotropical Treefrog Can Choose To Lay Eggs In Water Or On Land

ScienceDaily (May 23, 2008) — When frogs reproduce, like all vertebrates, they either lay their eggs in water or on land -- with one exception, according to new research by a team of Boston University scientists who discovered a treefrog (*Dendropsophus ebraccatus*) in Panama that reproduces both ways. The neotropical frog makes a behavioral decision to lay egg masses aquatically in a pond or terrestrially on the overhanging plants above a pond, where the newly-hatched tadpoles simply fall into the water.

The dual reproductive capabilities enable this species of tree frogs to choose the best environment for egg development avoiding either aquatic predators or the hot tropical sunlight that dries out the eggs. In two shady forest ponds the mating frogs laid terrestrial egg masses, as expected from previous research. In a third pond in an old gravel quarry without a forest canopy, the vast majority -- 76 percent -- of the eggs were laid in water, supported by aquatic vegetation. The remaining 24 percent were on leaves above the pond, although the mortality rate of these eggs was high due to the heat and lack of shade.

The study, "Reproductive Mode Plasticity: Aquatic and Terrestrial Oviposition in a Treefrog," by BU graduate student Justin C. Touchon and Assistant Professor of Biology Karen M. Warkentin appears in the Proceedings of the National Academy of Science (PNAS) online this week.

To test if genetic differences made frogs lay eggs in water or on land, or if instead their different environments affected egg-laying choices, Touchon and Warkentin built miniature ponds in an open field and in the forest. When they placed pairs of mating treefrogs in the shaded ponds, the frogs laid eggs on leaves above the water. In unshaded ponds, however, frogs put most of their eggs in the water.

Although this frog is the first vertebrate discovered to show reproductive flexibility, Touchon and Warkentin emphasize that it is probably not alone. The way an animal reproduces has been viewed as fixed, since most aquatic eggs die on land, and terrestrial eggs drown in water. This little yellow treefrog shows us such inflexibility is not universal.



Thus, the evolutionary change from aquatic to terrestrial eggs -- which has happened many times -- may not be a dichotomous switch but instead represent movement along a continuum.

Touchon and Warkentin suggest that this treefrog "could represent an intermediate stage in the evolution of terrestrial reproduction, combining a retained ancestral capacity for aquatic development with a derived ability for terrestrial oviposition and development." This discovery opens new avenues of research into the evolution of reproduction on land. The treefrog's ability to vary where it lays its eggs might also help it cope with changes in its environment, improving its chances of surviving habitat clearing or climate change.

SOURCE: Boston University (2008, May 23). Reproductive Plasticity Revealed: Neotropical Treefrog Can Choose To Lay Eggs In Water Or On Land. ScienceDaily. Retrieved May 26, 2008, from <http://www.sciencedaily.com/releases/2008/05/080520090608.htm>

PHOTO: A pair of treefrogs (*Ebraccatus*) laying eggs in the water. (Credit: Image courtesy of Boston University)

## Road Kill Losses Add Up, Taxing Amphibians And Other Animals

ScienceDaily (Apr. 21, 2008) — When frogs hit the road, many croak. Researchers found more than 65 animal species killed along a short stretch of roads in a Midwestern county. Nearly 95 percent of the total dead were frogs and other amphibians, suggesting that road-related death, or road-kill, possibly contributes to their worldwide decline, a trend that has concerned and puzzled scientists for decades.

The Purdue University study found that habitat along roadsides heavily influences road-kill. More than 75 percent of the carcasses originated alongside a one-mile stretch of road that traverses a wildlife-friendly wetland known as Celery Bog in West Lafayette, Ind.

"On hot summer nights when it rains, there are literally thousands of frogs out there," said Andrew DeWoody, a Purdue researcher who led the study in Tippecanoe County, home to the university.

During the 17-month study, researchers found 10,500 dead animals along 11 miles of roads. Of those, 7,600 were frogs of unidentifiable species and another 1,700 were bullfrogs, said DeWoody, an associate professor of forestry and natural resources.

"In addition to indirect costs of habitat fragmentation, roads have direct costs in terms of animals' lives," he said.

Several steps can be taken to help reduce road-kill, said Dave Glista, study co-author and a Purdue master's graduate who began the study as part of his since-completed thesis measuring roads' environmental impact. For one, development planning should take into account an area's wildlife value. Second, structures to mitigate, limit and prevent road-kill should be explored whenever possible, he said. Options include underpasses, viaducts and overpasses to allow wildlife safe passage, and special fences to keep animals off roads.

"We need to avoid, minimize and mitigate," said Glista, now a scientist with the Indiana Department of Transportation. "As a biologist, I do think we should avoid building roads

in wetlands and other wildlife-rich areas. Mitigation structures are worth the cost, as is any measure we can take to minimize our impact on the overall environment."

Scientists estimate that one-third of amphibian species are threatened, and hundreds of species have gone extinct in the past two decades alone. Road-kill adds to numerous factors already implicated in amphibian declines, DeWoody said. These include habitat loss and degradation, disease, pollution, competition from introduced exotic species, and threats posed by climate change.

Frogs, toads and salamanders are all amphibians, a class of four-legged animals known for their moist, scale-free skin. Most species begin life as gilled, water-dwelling creatures before undergoing a dramatic metamorphosis to become four-legged, air-breathing adults, walking or hopping about on land. They serve vital roles in many ecosystems, as consumers of various animals like insects and as a food source for carnivores. To maintain healthy ecosystems, it is vital to limit amphibian losses, DeWoody said.

The study, published online in the latest issue of the journal Herpetological Conservation and Biology, significantly underestimated the number of animals killed because many specimens were scavenged, degraded beyond recognition or moved, DeWoody said. About five times more animals died than could be recorded, he estimated.

The dead included 142 road-killed eastern tiger salamanders, a finding DeWoody said was troubling.

"The absolute number might not look that large, but most of these individuals were mature, up to 10 years old," DeWoody said. "Many of them were gravid, or females bearing eggs on an annual trip to breeding grounds where they often lay 50 to 1,000 eggs. This could make a potentially big difference for the population." Researchers also found 74 dead northern leopard frogs, a species of special conservation concern in Indiana.

To survive, most amphibians require habitats with running or standing fresh water, in which they lay eggs and begin life. This makes them vulnerable to water pollution and land-use changes like drainage or waterway disruption. Habitats like wetlands and rainforests are in decline worldwide, DeWoody said.

In addition to the toll on frogs and other amphibians, roadways put a wide variety of other animals at risk, he said. Road-killed animals identified in the study included:

- 79 opossums, the most common mammal;
- 36 chimney swifts, most common bird;
- 35 common garter snakes, most common reptile;
- 43 raccoons; and
- 4 white-tailed deer.

Glista said he was surprised to find relatively few deer, but he speculated that more may have been hit and were either able to run away or were removed from the roadway. "We think of deer as being one of the animals more commonly killed on the road, but they actually make up a tiny percentage of the total," he said. "I think that helps put the impact in perspective."





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Most road-kill was found along Lindberg Road, which passes through Celery Bog Nature Area in West Lafayette, Ind. Along a one-kilometer (0.6-mile) section, an average of eight amphibians were killed each day, DeWoody said.

Funded by the Joint Transportation Research Program, a partnership of the Indiana Department of Transportation and Purdue, the study focused on road-killed vertebrates, or animals with backbones. Glista said it took some "backbone" to slowly drive a specially marked vehicle and stop for data samples along four sections of roads in Tippecanoe County twice weekly. During the 496 trips, he said he had close calls with motorists, but always remained careful.

"I didn't want to become one of my own data points," he said.

SOURCE: Purdue University (2008, April 21). Road Kill Losses Add Up, Taxing Amphibians And Other Animals. ScienceDaily. Retrieved April 22, 2008, from <http://www.sciencedaily.com/releases/2008/04/080416151943.htm>

PHOTO: Dead frogs and other road-kill line Lindberg Road in West Lafayette, Ind., that traverses a wetland known as Celery Bog in this 2005 photo. Research shows that frogs and other amphibians are particularly hard hit by road-related death; it may be a contributing factor to their worldwide decline, says Purdue researcher Andrew DeWoody. (Credit: Purdue University photo/Andrew DeWoody)



## Agriculture Linked To Frog Sexual Abnormalities

ScienceDaily (July 5, 2008) — A farm irrigation canal would seem a healthier place for toads than a ditch by a supermarket parking lot. But University of Florida scientists have found the opposite is true. In a study with wide implications for a longstanding debate over whether agricultural chemicals pose a threat to amphibians, UF zoologists have found that toads in suburban areas are less likely to suffer from reproductive system abnormalities than toads near farms -- where some had both testes and ovaries.

"As you increase agriculture," said Lou Guillette, a distinguished professor of zoology, "you have an increasing number of abnormalities." Guillette is one of several UF authors of a paper on the research appearing in the online version of the journal *Environmental Health Perspectives*. The lead author is Krista McCoy, who did the work as part of her UF School of Natural Resources and the Environment dissertation.

Several past studies have suggested a link between herbicides commonly used in farming and sexual abnormalities in tadpoles and frogs. Such deformities may be responsible for declines in frogs documented in areas affected by agricultural contaminants, such as Sierra Nevada, Calif., McCoy said.

Amphibians are declining worldwide and agricultural chemicals are considered to be one likely cause, she said. Others include pathogenic infections and habitat loss.

Past research has compared frogs collected from natural areas with those collected from agricultural areas. Other efforts have pointed to specific chemicals, including the herbicide Atrazine, as causing abnormalities. The UF study is the first peer-reviewed study to compare abnormalities in wild toads -- toads are a variety of frogs -- from heavily farmed areas with frogs from both partially farmed and completely suburban areas. In so doing, it highlights the difference between the impact of agriculture versus development.

"Our study is the first to explicitly ask, of these two areas of human disturbance, do we see a greater proportion of abnormal animals in one versus another?" Guillette said.

Because the results implicate agriculture, future research can narrow the focus to agricultural chemicals, McCoy said.

"Because we know what chemicals are used at these agricultural sites, we can begin to pin down the chemical cause of these abnormalities by conducting controlled experiments with each chemical alone and in combination," she said.

The researchers gathered giant toads, known scientifically as *Bufo marinus*, from five sites stretching from Lake Worth to Belle Glade and down to Homestead in South Florida. *Bufo marinus* is a very large, exotic, invasive, species known to be deadly to small animals. Guillette said the researchers studied the toad in part because they are easy to catch and their large size ensures enough blood for analysis. Also, he said, "they are common in other agricultural areas around the world," which means they are a good generalist species.

One of the sites consisted almost entirely of land devoted to sugar cane or vegetable farms. The amount of farmland declined in three other sites, with the last being entirely suburban. Researchers calculated the amount of farmland in each site using Google Earth images.

Each site was 2.1 square miles, with the toads collected at the center. That's because the toad's home range is known to be about 1.2 miles, and the researchers sought only those toads living entirely within each site. The researchers collected at least 20 toads from each site in 2005 and 2006.

Examination of the euthanized toads revealed a pattern: The more agricultural the land where they lived, the more sexual organ abnormalities or so-called "intersex" toads -- toads who have both female and male internal reproductive organs, not a normal condition for this and most species of amphibians.

While normal male toads' forelimbs are thicker and stronger than those of their female counterparts, more of the intersex frogs only found in agricultural areas had thin, weak forearms. Also, intersexes had fewer "nuptial pads," areas of scraggy skin on their feet used to grip females during copulation.

Where a sex was clear, the male toads appeared by far the most affected. Normal males are brown, while females are mottled with brown stripes. However, males from agricultural areas were mottled, looking like females.

Internally, the more agricultural the sites, the more feminized the males' reproductive organs. Many had both ovaries and testes. Not only that, both the impacted males and the intersex frogs had less of the male hormone testosterone than normal males, suggesting diminished reproductive capabilities, Guillette said.

Guillette and McCoy said the study's results may have important implications not only for other wild species, but also for people.

"What we are finding in *Bufo marinus* might also occur in other animals, including other amphibian species and humans," McCoy said. "In fact, reproductive abnormalities are increasing in humans and these increases could partially be due to exposure to pesticides."

SOURCE: University of Florida (2008, July 5). Agriculture Linked To Frog Sexual Abnormalities. ScienceDaily. Retrieved July 26, 2008, from <http://www.sciencedaily.com/releases/2008/07/080703160749.htm>

PHOTO: Giant toad (*Bufo marinus*) in Tampa Florida. Researchers found that toads in suburban areas are less likely to suffer from reproductive system abnormalities than toads near farms -- where some toads had both testes and ovaries. (Credit: Courtesy of Wikimedia Commons, photo taken by Bill Waller, GNU Free Documentation license)



## How The Snake Got Its Vertebrae

ScienceDaily (June 19, 2008) — Snakes, fish, chickens, and humans all begin life in much the same way. Early in their transformation from an amorphous blob of cells into a fully developed animal, growing cells pinch off into a string of identical segments destined to become individual vertebrae, which will later sprout blood vessels, peripheral nerves, and muscle. These repeated segments ensure that the rod-like spinal column can hunch, arch, and twist.

The segmentation process also helps establish some key differences in the body plans of different organisms: while humans have 33 vertebrae, frogs have 10 or fewer, and snakes can have more than 300. Now, a team led by Howard Hughes Medical Institute researchers has uncovered the mechanism that guides vertebral development in the early embryo and makes sure each species ends up with the right number of vertebrae. The team, led by Olivier Pourquié, an HHMI investigator at the Stowers Institute for Medical Research, reported its results on June 18, 2008, in an advanced online publication in the journal *Nature*. "There is huge variability in the number of vertebrae among different animals, and virtually nothing [was] known about what controls this diversity," said Pourquié. "What we do in the paper is provide an explanation." During development, vertebrate embryos grow from head to tail. As the body elongates, vertebral precursors known as somites, or segments, emerge from





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a group of immature cells called the presomitic mesoderm (PSM). These segments develop at regular intervals, much as a plant's stem forms branches at regular intervals as it grows.

"The way the body of a human or mouse or any vertebrate forms is from a growth zone - like the tip of a shoot - which is called the tail bud. First you produce the head, then the neck, then the thorax, and so on, until the tail," said Pourquié. The long chain of vertebrae that defines a snake's body takes shape in about 23 days.

The regular emergence of segments from the PSM is driven by a cell signaling system known as a "clock and wavefront." The clock is a simple set of signaling molecules that accumulate and disappear in rhythmic oscillations. Each time the clock molecules peak, a new vertebral segment is created. Left to their own devices, the oscillating proteins would stay in one place, and create vertebrae one on top of another. But in developing embryos, the clock is whisked along the extending tail by another set of signaling molecules called the wavefront. It's a bit like an ambulance roaring down the street with its siren blaring; when the ambulance stops, the siren just blares in place. But when the ambulance is moving, every time the siren peaks, it's in a new place a little farther down the road. In the same way, every time the clock ticks, the wavefront has carried it a little further down the developing body to a new group of cells.

As a mouse or snake embryo begins to develop, the tailbud moves faster than the wavefront, leading to an increase of the PSM size. But then, probably due to a slowed down growth in the tail bud, the PSM starts to shrink. "The PSM shrinks until there is virtually no material left to make segments, and the process terminates," said Pourquié. In mice, this happens after 65 segments have been produced. In snakes, over 300 segments are created before the PSM is exhausted. Pourquié's group discovered this segmentation clock several years ago, and he and others have been working to identify and explain how the components of the clock and wavefront work together. But until now, no one understood how different species produced different numbers of vertebrae. The snake, with its unusually high number of vertebrae, served as a good organism for Pourquié's team to study.

"The most intuitive way to think about it would be to say that the oscillator is going to move for a longer time period" to create so many more segments, said Pourquié. "You'd imagine that in chickens, where there are around 50

segments, the oscillator would move for a defined time period. In snakes, the oscillator would move for six times as long."

Pourquié's group started out thinking that that was how snakes created all their myriad segments, but once they tracked the clock in a developing embryo, they rejected the idea. "What we see is that that is absolutely not the case," he said. While it's true that snake embryos take several times as long as chicken embryos to develop, in fact this is because the development proceeds several times more slowly than it does in chickens. In relative terms, the time that a chicken and a snake have to produce somites is not very different.

Pourquié and his group discovered that the way a developing snake gets around this is to speed up their clock relative to their development rate. They compared a developing snake embryo to those of chickens and found that, after taking into account the different paces of development, the snake's clock ticks much faster relative to the movement of the wavefront, creating segments more often. They also compared the snake embryo to a lizard, because, said Pourquié, "lizards are like snakes in that they develop very slowly, but they produce many fewer somites than snakes." The team found that, while the corn snake made a somite every 100 minutes or so, the lizard took four hours between somite formation.

Pourquié's work on vertebrae development has already begun to have an impact on medicine. "We're trying to investigate diseases that result from defects in the segmentation clock," he said. Using their knowledge of how vertebrae develop, Pourquié's group compiled a list of genes they suspected might be involved in human diseases that result when this process goes awry. Using this technique, they identified a recessive mutation responsible for Jarcho Levin syndrome, a congenital defect that results in malformation of the spine and ribcage. "Now we've developed a genetic test to identify the mutation, and so it's possible to do some genetic counseling," said Pourquié.

SOURCE: Howard Hughes Medical Institute (2008, June 19). How The Snake Got Its Vertebrae. ScienceDaily. Retrieved July 14, 2008, from <http://www.sciencedaily.com/releases/2008/06/080618152400.htm>

PHOTO: Detail of a developing snake embryo. How do embryos end up with the right number of vertebrae? (Credit: HHMI)

## Malagasy Chameleon Spends Most Of Its Short Life In An Egg

ScienceDaily (June 30, 2008) — There is a newly discovered life history among the 28,300 species of known tetrapods, or four-legged animals with backbones. A chameleon from arid southwestern Madagascar spends up to three-quarters of its life in an egg. Even more unusual, life after hatching is a mere 4 to 5 months. No other known four-legged animal has such a rapid growth rate and such a short life span. "It really is a huge surprise," says Christopher Raxworthy, Associate Curator in the Department of Herpetology at the American Museum of Natural History. "Adding to that, until now, the short life span of chameleons in captivity has always been considered as a failure to thrive. We need to rethink this."

Most mammals, reptiles, birds, and amphibians

(all tetrapods) typically live 2 to 10 years, an average bracketed at the upper end by some long-lived animals (for example, turtles and humans that can live for a century) and at the lower end by a handful of animals that only live for about a year. The males in nine species of marsupials die off after a year, for example, as do most adults in about twelve species of lizards. But the chameleon described here, *Furcifer labordi*, not only has a brief, yearly life cycle, but the bulk of that time is spent incubating inside an egg. Once outside of the egg, all individuals in the population die within 4 to 5 months.

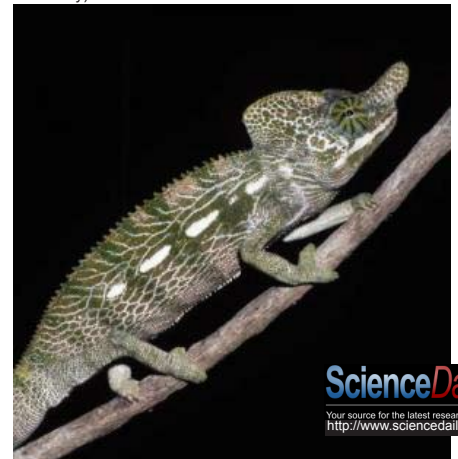
Kristopher Karsten, a graduate student from the Department of Zoology at Oklahoma State University, discovered the unusual life cycle almost by accident. "I showed up late in the season and found something weird," recalls Karsten. "There were no juveniles. But by February, I found carcasses all over with no signs of mutilation or predation. The population plummeted—we've never seen this with other lizards."

Now, after five seasons of data and sightings of nearly 400 individuals, the life cycle of *F. labordi* can be described. Hatching begins with the rains in November, and, once emerged, the chameleons develop rapidly, growing up to 2.6 mm (0.1 inches) a day—up to two orders of magnitude greater than other known lizard growth rate. In less than 60 days, for example, there can be a 300%-400% increase in body size for males to reach adulthood. After reaching maturity, the population reproduces, and females burrow through about 138 mm (5.4 inches) of sand to lay their eggs. Once covered, the eggs wait out the dry season for the next 8 to 9 months, and all adults die.

"It is amazing to think that for most of the year, this chameleon species is represented only by developing eggs buried in the ground," says Raxworthy. "This species really illustrates just how much there is still to discover about the natural history of Madagascar." Karsten agrees, adding: "We've identified a species that does something really different from the others, but what is driving this system? One bad year could wipe out these chameleons."

SOURCE: American Museum of Natural History (2008, June 30). Malagasy Chameleon Spends Most Of Its Short Life In An Egg. ScienceDaily. Retrieved July 1, 2008, from <http://www.sciencedaily.com/releases/2008/06/080630173924.htm>

PHOTO: Adult male *Labord's* chameleon (*Furcifer labordi*) from Ranobe, Southwestern Madagascar. (Credit: Christopher J. Raxworthy)



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# Wild News... IN THE SPOTLIGHT

## New Family Of Gecko Discovered

ScienceDaily (May 23, 2008) — Researchers at the University of Minnesota's Bell Museum of Natural History and Pennsylvania's Villanova University have discovered a new family of gecko, the charismatic large-eyed lizard popularized by car insurance commercials. Scientists have long been interested in geckos and their evolution because they are key biodiversity indicators and are found on nearly every continent. Researchers are also interested in the gecko because of the animal's sticky toe pads, which allow them to scale rough and smooth surfaces -- a characteristic that may have human application in medicine, emergency rescue service and military industries. Graduate students Tony Gamble from the University of Minnesota and Aaron Bauer from Villanova sequenced DNA from 44 species of gecko and used this genetic data to reconstruct the animals' family tree. The resulting new classification is different from previous classifications, which are based solely on foot structure. "A classification based solely on foot structure will track selective pressure on the feet and not represent actual evolutionary history," said Gamble, who believes his discovery will add to a more accurate gecko family tree that, in turn, will allow scientists to better understand how sticky toe pads have evolved. The researchers have named the new family "Phyllodactylidae," referring to the leaf-shaped toes of many of the species in this group (phyllo meaning "leaf;" dactyl meaning "toe"). The new family consists of 103 species found in semiarid and tropical regions of North Africa, the Middle East, North and South America and the Caribbean. The family includes eight previously known genera: *Asaccus*, *Haemodracon*, *Homonota*, *Phyllodactylus*, *Phyllopezus*, *Ptyodactylus*, *Tarentola* and *Thecadactylus*.

SOURCE: University of Minnesota (2008, May 23). New Family Of Gecko Discovered. ScienceDaily. Retrieved May 26, 2008, from <http://www.sciencedaily.com/releases/2008/05/080522145204.htm>

PHOTO: The new family of gecko consists of 103 species found in semiarid and tropical regions of North Africa, the Middle East, North and South America and the Caribbean. Shown above: a tropical gecko and member of the genus *Tarentola* -- one of eight genera that make up the new family.



ScienceDaily  
Your source for the latest research news  
<http://www.sciencedaily.com>

## Snake Venom Tells Tales About Geography

ScienceDaily (July 15, 2008) — Just as people give away their origins by that southern drawl or New England twang, poisonous snakes produce venom that differs distinctly from one geographic area to another, the first study of the "snake venomics" of one of the most common pit vipers in Latin America has found. In the new study, Juan J. Calvete and colleagues point out that researchers have known for decades that venom collected from snakes of the same species from different geographic locations can differ in terms of their biological effects and symptoms on snakebite victims. However, scientists know little about the chemical differences behind these geographically different venoms. To find out, the scientists collected venom samples from adult and newborn specimens of the lancehead pitviper from two geographically isolated populations from the Caribbean and Pacific regions of Costa Rica. After a detailed laboratory analysis of the proteins found in the venom -- so-called "snake venomics" -- the researchers found major differences in the venoms collected from the two regions. They also found distinct differences in proteins collected from newborns and adult snakes. The study "highlights the necessity of using pooled venoms as a statistically representative venom for antivenom production" for human snakebite victims, the report states.

SOURCE: American Chemical Society (2008, July 15). Snake Venom Tells Tales About Geography. ScienceDaily. Retrieved July 26, 2008, from <http://www.sciencedaily.com/releases/2008/07/080714092718.htm>

PHOTO: Scientists are reporting that venom of snakes, such as the Bothrops asper from Costa Rica, could differ based on geographical regions, an important finding in the production of antivenom. (Credit: Courtesy of Mahmood Sasa)



## Snake Venoms Share Similar Ingredients

ScienceDaily (Dec. 25, 2007) — Venoms from different snake families may have many deadly ingredients in common, more than was previously thought. A new study has unexpectedly discovered three-finger toxins in a subspecies of the Massasauga Rattlesnake, as well as evidence for a novel toxin genes resulting from gene fusion. Susanta Pahari from National University of Singapore, Singapore (currently working at Sri Bhagawan Mahaveer Jain College, Bangalore, India) used venom glands from a rare rattlesnake that lives in arid and desert grasslands. Known as Desert Massasauga (*Sistrurus catenatus edwardsii*), this pitviper is a subspecies of the North American Massasauga Rattlesnake

(*Sistrurus catenatus*). Together with Stephen Mackessy from the University of Northern Colorado, USA and R. Manjunatha Kini from National University of Singapore, Singapore, Pahari constructed a cDNA library of the snake's venom gland and created 576 tagged sequences. A cocktail of recognized venom toxin sequences was detected in the library, but the venom also contained three-finger toxin-like transcripts, a family of poisons thought only to occur in another family of snakes (Elapidae). The team also spotted a novel toxin-like transcript generated by the fusion of two individual toxin genes, a mechanism not previously observed in toxin evolution. Toxin diversity is usually the result of gene duplication and subsequently neofunctionalization is achieved through several point mutations (called accelerated evolution) on the surface of the protein. Pahari says "In addition to gene duplication, exon shuffling or transcriptional splicing may also contribute to generating the diversity of toxins and toxin isoforms observed among snake venoms."

Previously, researchers identified venom compounds using protein chemistry or individual gene cloning methods. However, less abundant toxins were often missed. The library method has now revealed new toxin genes and even new families of toxins. Taking low abundance toxins into consideration shows advanced snakes' venoms actually have a greater similarity than previously recognized. Snake venoms are complex mixtures of pharmacologically active proteins and peptides. Treating snake venom victims can be complicated because of the variation between venoms even within snake families. Kini says "Such a diversity of toxins provides a gold mine of bioactive polypeptides, which could aid the development of novel therapeutic agents."

SOURCE: BioMed Central (2007, December 25). Snake Venoms Share Similar Ingredients. ScienceDaily. Retrieved July 26, 2008, from <http://www.sciencedaily.com/releases/2007/12/071219202946.htm>

## Rare frog caught on film

A rare type of frog has been filmed for the first time by scientists. The purple frog was only discovered in 2003 in the Western Ghats, in India. The chubby amphibian spends most of its time buried underground, surfacing only to breed during the monsoon.

Video courtesy of S. D. Biju and the Zoological Society of London (ZSL)

AVAILABLE: <http://news.bbc.co.uk/2/hi/science/nature/7814913.stm>

The draft Wild River declaration of the Wenlock has been released for public comment. TWS has an online cyberaction to support the declaration and to voice opposition to mining near the river & its tribs. (eg Cape ALumina and Rio Tinto bauxite mining).

The Wenlock River cyberaction is now online at [www.wilderness.org.au/wenlock](http://www.wilderness.org.au/wenlock)  
More info on the Wenlock: [http://wildrivers.org.au/rivers/cape/wenlock\\_river](http://wildrivers.org.au/rivers/cape/wenlock_river)

# Armoured Mist Frog

## (*Litoria lorica*)



Armoured Mistfrog *Litoria lorica* also known as Little Waterfall Frog, Armoured Frog  
The scientific name *lorica* is latin for breast plate, alluding to the spines on the chest of this species (also present in *L. nannotis*). This also gives rise to the common name "armoured" mistfrog.

This stream-dwelling hylid frog was first described in 1979 by Margaret Davies and Keith McDonald from a specimen collected in 1976 at Alexandra Creek near Thornton Peak. The holotype is housed at the Queensland Museum.

Little was ever known about this frog, due to the remoteness of and limited access to its only known locations in high altitude rainforests. It was also known from 3 other localities – the nearby Hilda Creek, Roaring Meg to the north and Bluff Creek near Mossman Gorge.

When many other species of stream dwelling frog began to die out, fears were held for the populations of *Litoria lorica* and despite numerous attempts to locate specimens at all known localities, it appeared that this species had died out along with other high altitude species. The last sighting of *Litoria lorica* was in 1991 and with no further specimens located it was thought to be possibly extinct by 2002.

However a further population has miraculously been found recently on the edge of the Carbine Tableland, well away from its previous locality and away from rainforest!

[http://www.jcu.edu.au/top/JCUPRD\\_037882.html](http://www.jcu.edu.au/top/JCUPRD_037882.html)

*Litoria lorica* is very similar to the Waterfall Frog *Litoria nannotis*, with which it also shares its habitat.

It is slightly smaller, growing to approximately

37mm (females) and 33mm (males). *L. nannotis* grow to over 50mm in length. The pattern is similar to *L. nannotis* – *L. lorica* are slightly less robust and have a truncated (shorter, flattened) snout.

The common name Little Waterfall frog seems to be preferable for this species after observation of the species in the wild, due to the similarities between the two species and the fact they share a habitat. Both males of the species have the "armour" or breast spines and the new location does not appear to be laden with mist, although there is "mist" close to the cascades in fast flowing streams.

The location of the new population is a large rocky stream with large boulders, cascades and both shallow and deeper sections of fast-flowing stream. Waterfall Frogs *L. nannotis* are very common throughout the habitat, even found well away from water. Notable is the absence of Green-eyed Tree frogs *Litoria genimaculata*. The only other frog species observed were Stony-creek Frogs *Litoria jungguy* and Common Mistfrogs *L. rheocola*, both in small numbers.

The *L. lorica* were not observed on the flat part of the creek, but as the gradient increased they began to be more commonly observed. All the specimens observed were very close to water, sometimes together with *L. nannotis*; *L. nannotis* were found close to water as well as away from it but the *L. lorica* were not found away from the waters edge, either where the was water flowing over the rocks or in the splash zone. It is believed that the frogs hide by day in cracks and crevices near cascades amongst boulders There is no call recorded.

Eggs are large and unpigmented; a clutch of 163 eggs is recorded. Tadpoles are unknown but presumably similar to the tadpoles of other stream-dwelling frogs (particularly *L. nannotis*) in having a flattened body and large suctorial mouthparts allowing them to attach to rocks in fast flowing water.

It is presumed that these frogs declined due to the effects of the chytrid fungus, considering their disappearance coincided with that of the other species, although no direct observations of deaths were reported.

As with the other stream dwelling frogs and especially with this species, their original habitat

was protected and difficult to access.

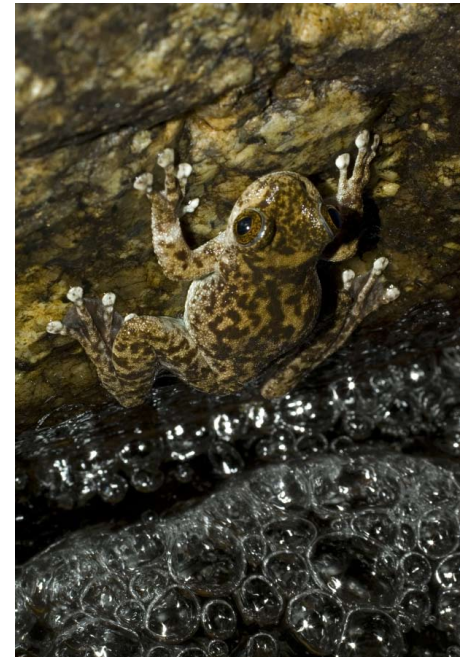
The newly discovered population also carries the fungus but appears healthy – is there some reason why this population is resistant to the effects? Is it the open nature of the habitat (several high altitude populations of *Litoria nannotis* favour sites outside of the rainforest or at least in large open streams within the rainforest)? Have a few resistant individuals of the species survived the effects of the fungus and have now bred up their numbers to a healthy, resistant population?

It has also been suggested that the variant of chytrid at this site may have been less severe.

Questions also present themselves about whether other populations exist in suitable habitat or pockets of resistant individuals still exist within their previous known localities within rainforest.

However there is great concern that this is possibly the only population left of these frogs so it is of primary importance that the habitat is protected.

AUTHOR: Michael Anthony.



## From Frogs Australia...

Family: Hylidae

**Common names:** Little Waterfall Frog; Armoured Frog; Armoured Mistfrog

**Description:** This frog is grey or grey-brown on its back. The belly is white and granular. The skin on the back is finely tubercular (lumpy) with larger tubercles over the eyes and tympanum (tight membrane covering the entrance to the ear). The throat is smooth and white with dark brown flecks. The males have nuptial pads and black spines on their chest during the breeding season. The toe and finger pads are large, and the toes are fully webbed.

**Size:** 35 mm

**Habitat:** This frog lives in upland rainforests near fast flowing rocky streams.

**Call:** Not described.

**Eggs:** Are large and without pigment.

**Tadpoles:** Are unknown but probably resemble tadpoles of this group by having a flattened body and large mouth - that allows them to attach to rocks in fast flowing streams.

**Similar species:** This frog can be distinguished from *Litoria nyakalensis*, *Litoria rheocola* and *Litoria nannotis* by its size, the black spines on the males' chests and its colour.





# Mulga Snake

## (*Pseudechis australis*)

The Mulga Snake, also commonly known as the King Brown Snake, was first described in 1842 by J. E. Gray of the British Museum, from a specimen collected from Port Essington N.T. The holotype is housed in the British Museum of Natural History. Its original name was *Naja australis* – *Naja* being the cobra genus.

### Other Common Names

Darwin Brown Snake, Copper Snake, Orange-bellied Snake, White-nosed Snake

### Distribution

The Mulga Snake is found throughout much of Australia, only being absent from southern and south-eastern Australia. Not found in tropical rainforest but recorded from tropical monsoon forest.

This was once a common species in tropical northern Australia but its numbers have declined considerably due to the spread of the Cane Toad.

This species was once common in the Cooktown area, but was rarely seen by the early 1980's. Appears to be making a "comeback" in north Queensland, sightings appear to be more numerous in recent years.

Once common in the top end of the NT, where there was a "giant" race, with specimens reaching 3.5 metres - it is not known whether this race will survive the "wave of death" from the cane toad invasion.

### Recognition

The Mulga Snake is a large robust species with a broad, "chunky" head. It is usually a shade of brown, from pale to dark, without other markings. It is a lighter shade on the belly, usually cream to salmon, but often with orange blotches.

The scales are dark-edged, creating a reticulated (netted) effect.

Average length is about 1.5 m. Maximum lengths in the literature of 2.82 m, 2.75 m.

Worrell records specimen of "over 9 feet" from Charters Towers Qld.

A pair of very large specimens resided at Yarrowonga in Darwin (the NT conservation commission's predecessor to Berry Springs Zoo) in the 1980's. The largest specimen, which I personally viewed, was reportedly 12 feet in length.

### General Biology

Habitat is recorded as: savannah woodland, open forest, paperbark woodland, wide variety of grassland, savannahs and lightly timbered habitats throughout its range; open grassland, semi-forest areas around creeks and lagoons.

It is often associated with watercourses, especially when found in very dry areas. Apparently absent from very dry desert areas.

This species may also be found in close proximity to rock outcrops.

Mulga snakes utilise many types of cover, sheltering amongst rocks, rock crevices and under large rocks; disused burrows, deep soil cracks, fallen timber.

Mulga Snakes are known to be both diurnal and nocturnal. They appear to be almost exclusively nocturnal in north Queensland, with one specimen sighted on a very cool night in June 2007.

However diurnal observations are rare for most tropical elapid snakes due to their shyness and speed coupled with high daytime temperatures.

Mulga snakes feed on small ground dwelling mammals and birds, lizards, reptile eggs, and frogs. Cannibalism is well known in captivity and they will prey on other snakes, including their own species, in the wild.

There is a record of Mulga Snakes feeding on road-kill.

### Reproduction

Male combat occurs in this species.

Records indicate spring mating (September/October) with eggs laid from November to

January, however most of these records are from the southern part of Australia. It is not known whether the timing is different in the tropics, however gravid females have been found in April and August as well as January in the tropics indicating that they may breed all year round.

4 to 19 eggs are laid (average 9).

Hatchlings measure from 198 to 298 mm.

### Venom

This species has a maximum venom yield of 1350 milligrams recorded, by far the most of any Australian snake.

It is not an extremely potent venom, but the large amounts it can inject make it very dangerous.

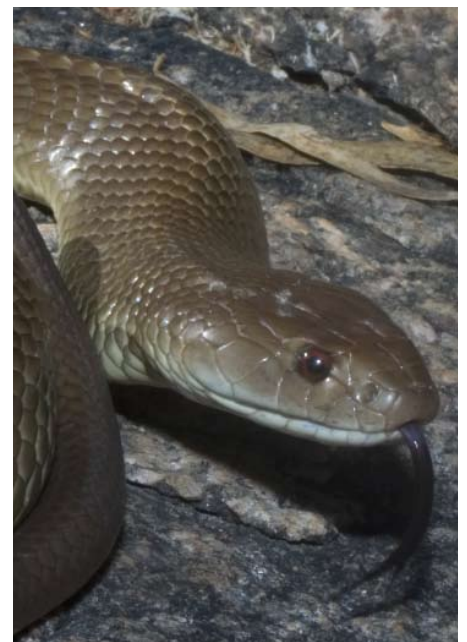
The venom is also quite different in composition, and effects, to other Australian elapids.

Most Australian dangerous species possess a highly neurotoxic venom, that is it affects the nervous system, however Mulga Snake toxins attack the blood and muscles, in severe cases skeletal and heart muscle. The local effects of the venom (at the bite site) are often far more severe, sometimes resulting in considerable breakdown of tissue.

"Black Snake" antivenom is used for this species. Mulga Snakes are in the black snake genus, one of the reasons why the common name Mulga Snake is preferred to King Brown – brown snake antivenom is ineffective against the bite of this species.

Despite their reputation these snakes are usually of placid disposition, it is only when they feel threatened that they become aggressive.

AUTHOR: Michael Anthony.



# Memberships

Alan Gillanders  
Mandy Lindsay  
Dominic Chaplin  
James & Margaret Sweetzer  
Neville Simpson  
Murray Wellington  
Marney Fichera  
Bevan Pritchard  
Judy Catchpole  
Merv Robson  
John Booy  
Inga Lorenz  
Claudine Grandjean  
Grant Turner  
Val Bonner-Burrowes  
Beryl Davidson  
Wai Awarau  
Robyn King  
Ian Wilesmith  
Sian Moore & Scott Radcliffe  
Michael & Sharon Williams  
Chris Tsilemanis  
Keith Martin  
Darren & Jo Green  
Michael Anthony  
Maria Destro

Yungaburra  
Atherton  
Bungalow  
Malanda  
Yungaburra  
Speewah  
Mooroobool  
Atherton  
Chambers Flat  
Malanda  
Gordonvale  
Malanda  
Yungaburra  
Innisfail  
Oxley  
Malanda  
Atherton  
Broadbeach  
Redbank Plains  
Yungaburra  
Newport, Vic  
Yungaburra  
Clifton Beach  
Trinity Beach  
Whitfield  
Whitfield

Shaun Cook  
Eleanor Duignan  
Andrea James  
Val Speedie  
Rosy Maccarone  
Liz, Lionel & Sandy Carroll  
Sally Moroney & Adrian Walker  
Garrie Douglas  
Lee Curtis  
Wendy & Phillip Grimm  
Michael Willcox  
Phillip Bennett  
Cathy Retter  
Gaby Schierenbeck  
Michael Cermak  
Alastair & Amanda Freeman  
Martin Cohen  
Charles Annicelli  
Dan Vermilya  
Ray & June Crook  
Jim Buckley  
Stacey Henry  
Philip Bennet  
Wendy & Phillip Grimm  
Judith Farrelly

Whitfield  
Whitfield  
Redlynch  
Innot Hot Springs  
Kuranda  
Yungaburra  
Mission Beach  
Yungaburra  
Yungaburra  
St Ives NSW  
Whitfield  
Atherton  
Kuranda  
  
Earlville  
Yungaburra  
Yorkeys Knob  
Connecticut, USA  
Connecticut, USA  
North Cairns  
Bentley Park  
Kurrimine Beach  
Atherton  
St Ives NSW  
Cairns

## October Meeting Report

Jean Horton from Atherton EPA gave us the good oil on permits and explained the difference between least concern, restricted, and rare and threatened. A Recreational Permit was going to set you back \$55 for 5 years while a Restricted Permit was around \$175 for 5 years. You need to be 13 years of age to hold a permit and 13-18 requires a parent/guardian on the licence.

Captured on your property, you can hold 2 adults of up to 10 species. The sky is the limit for taddies but once they morph they must be released asap.

Should the club continue to exhibit frogs at shows and schools we need an Educational Permit which costs nothing, obtainable from Michelle Nissen at EPA Cairns.

AUTHOR: Bevan Pritchard

## Eco Access Information

**Application Form Recreational wildlife licence (birds, reptiles, amphibians)**

<http://www.epa.qld.gov.au/publications?id=1021>

**Captive Reptile & Amphibian Husbandry Code of Practice**

<http://www.epa.qld.gov.au/publications?id=61>

**General requirements - Keeping and using protected, international or prohibited animals in Queensland**

<http://www.epa.qld.gov.au/publications?id=1386>

**Nature Conservation Act 1992**

<http://www.legislation.qld.gov.au/LEGISLTN/CURRENT/N/NatureConA92.pdf>

**Nature Conservation (Wildlife) Regulation 1992**

<http://www.legislation.qld.gov.au/LEGISLTN/CURRENT/N/NatureConWiR06.pdf>

A frog species not seen for the past 17 years has been found in a remote location in Far North Queensland. James Cook University's Professor Ross Alford said it was feared that the Armoured Mist Frog (*Litoria lorica*) had been lost in the devastating outbreaks of amphibian chytrid fungus that started in the Wet Tropics 20 years ago.

"But JCU PhD student Robert Puschendorf working with myself and the JCU Amphibian Disease Ecology Group has found a healthy population of the Armoured Mist Frog well outside the areas it used to inhabit," Professor Alford said.

"The population at a remote location on the Carbine Tableland is healthy and is coexisting with a healthy population of the Waterfall Frog, *Litoria nannotis*, another species that declined due to the fungus.

"All frogs of both species are in good health, although most individuals are infected with the amphibian chytrid fungus."

He said the identification of this species was confirmed by Dr. Conrad Hoskin of the Australian National University.

Professor Alford's group plans to learn how these populations are able to coexist with the disease, and use this information to develop better strategies for the future conservation and management of vulnerable frogs.

Amphibian chytrid fungus is believed to have caused the extinctions of all known high elevation populations of seven frog species in the Wet Tropics between the late 1980s and early 1990s.

"Some of those species have since recolonised some sites," Professor Alford said, "and our team has been working to discover how they are now able to coexist with this devastating pathogen."

He said the research would not have been possible without funding from the Federal Department of Environment, Heritage, Water, and the Arts, Australian Geographic, and the Skyrail Foundation, and collaboration with the Queensland Parks and Wildlife Service.

Photographs of the rediscovered Armoured Mist Frog are available from the researchers.

Issued September 11, 2008

Contact: Robert Puschendorf ( Robert.puschendorf@jcu.edu.au ) or Professor Ross Alford (07 4781 4732 or 0427 122937, Ross.Alford@jcu.edu.au)

PHOTO: Robert Puschendorf



**Q. Why did the frog walk across the road?**

A. He didn't... he jumped.

**Q. Why did the frog cross the street?**

A. Because the chicken crossed the road.

**Q. Why did the frog cross the road?**

A. To see what the chicken was doing.

**Q. Why did the frog cross the road?**

A. Some mean little kid super-glued it to the chicken.

**Q. Why did the frog stop in the middle of the road?**

A. To get hit by a steamroller

**Q. Why did the frog stay in the middle of the road?**

A. He ran after a fly and was hit by a car.

**Q. Why did the frog cross the road?**

A. If a chicken can do it so could he!





# Tablelands Frog Club

Mail Bag 71

YUNGABURRA QLD 4879

<http://www.tablelandfrogclub.com>

## Application for Membership

### Membership type

- \$15.00 Adult membership     
  \$15.00 Family membership     
  \$5.00 Junior/Associate

Surname(s): \_\_\_\_\_ Given name(s): \_\_\_\_\_

Address: \_\_\_\_\_

\_\_\_\_\_ P/Code \_\_\_\_\_

Postal: \_\_\_\_\_

\_\_\_\_\_ P/Code \_\_\_\_\_

Phone (h) \_\_\_\_\_ (w) \_\_\_\_\_ (m) \_\_\_\_\_

E-mail Address (for newsletters and updates) \_\_\_\_\_

Occupation: \_\_\_\_\_

The Tablelands Frog Club Incorporated is incorporated under the Associations Incorporation Act.

### TFC OFFICE USE ONLY

Membership paid: \$ \_\_\_\_\_ Paid by:  Cash,  Money Order,  Cheque

Receipt number: # \_\_\_\_\_ Date issued: \_\_\_\_/\_\_\_\_/\_\_\_\_

Membership number: # \_\_\_\_\_ Date entered: \_\_\_\_/\_\_\_\_/\_\_\_\_



### Tablelands Frog Club

Mail Bag 71

YUNGABURRA QLD 4879

### MEMBERSHIP TAX RECEIPT

Membership paid: \$ \_\_\_\_\_ Paid by:  Cash,  Money Order,  Cheque

Receipt number: # \_\_\_\_\_ Date issued: \_\_\_\_/\_\_\_\_/\_\_\_\_

Membership number: # \_\_\_\_\_ Signed: \_\_\_\_\_

Please Post Membership Application to: Mail Bag 71, Yungaburra QLD 4872



# *The Croaker*

**Newsletter of Tablelands Frog Club  
February 2009**

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