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ACTHA News

Apr—May 2007

Newsletter of the
ACT Herpetological
Association Inc.

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Your Committee

President:	Dennis Dyer
Vice President:	Ric Longmore
Secretary:	Joe McAuliffe
Treasurer:	Margaret Ning
Newsletter Editor:	Mandy Conway
Public Officer:	John Wombey
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Committee Members:	Chris Brown Christian Robertson

Diary date

The *bi-monthly* meetings of the Association are held on the *third Tuesday of the month* at 7.30pm, Western Districts Rugby Club, Catchpole Street, Macquarie.

Upcoming meetings

Tuesday 17 April 2007

We hope to have a presentation on the Broad-Shelled Turtle.

Failing this, members are invited to come along and have a chin-wag on all things reptile in an informal setting.

Please feel free to contact Margaret on 6241 4065 for further details.

Bearded Dragon breeding facility at the University of Canberra

Article by Mandy Conway

The bi-monthly meeting of ACTHA was held at the University of Canberra (UC), Bruce, on Tuesday, 20 February 2007 so members could see the bearded dragon colony which is utilised by several PhD students for their projects.

For many years UC researchers went on specimen collecting trips throughout Australia. The cost for acquiring gravid females in this way became prohibitive and so the breeding colony at the University was set up and has been operating for just over 2 years.

Jacqui Richardson, who cares for these reptiles, first took members to a glasshouse containing the adult breeding colony, near the Institute for Applied Technology Building, on the UC campus.

The glasshouse contained six large oval plastic tubs which housed breeding bearded dragons: each tub had a wild-caught male and 6 females who had an identifying letter or number painted on their back. Sand is used as substrate and cage furniture consisted of logs, clay roof tiles and pipes. Three water bowls were replenished daily, in summer up to 3 times daily.

Roof louvers are opened and an air-conditioner is used when the inside temperature reaches over 40C. The dragons appear comfortable with this as long as the humidity is kept low. In the colder months, heat lamps are switched on to maintain the temperature above 10C. UV tubes along the ceilings help provide a natural light source.

Feeding occurs on a regular basis with emphasis placed on variety. Cockroaches and some crickets are provided several times per week and vegie salads with lean mince mixed with Dragon Pellets at other times. The salads consist of chopped sweet potatoe, carrots, pumpkin and chinese vegies.

Vegies not used were potatoes (unliked), onions (toxic), lettuce (no nutritional value and can cause diahorrea) and surprisingly

spinach, which apparently inhibits calcium absorption. Interestingly, the dragons ate the red and yellow dry pellets but not the green ones.

The dragons are placed in an outside tub to sun themselves naturally once a week, although plans are currently underway to build an outdoor enclosure next to the existing glasshouse, which will provide a more natural environment and make UV readily available.

Females stop eating up to 7 days before an imminent lay and start digging at several sites within the enclosure. They are observed closely at this stage.

Six clutches of eggs are produced between September and February. Typically, a clutch of about 22 eggs is laid with a second clutch of about 26 eggs laid 2 weeks later. Females can retain sperm for production of the second clutch. An intense feeding regime is maintained.

Our tour then proceeded through to the incubation and rearing room within the UC.

Shelves holding various plastic tubs with dragons at various stages of development lined the walls.

Several large round plastic tubs were positioned on the floor in the centre of the room.

To start, eggs are removed within 24 hours and placed exactly how they were found in a compartment type container with dampened vermiculite (a small area of the shell is left exposed above the vermiculite). The lid has a small hole above each compartment. This container is then placed into a plastic bag with a hole at one end. Misting to maintain humidity occurs when necessary. For DNA study purposes it is important that details of the 'mother' of the eggs is recorded.

The incubation temperature is very important. Just a degree too low could extend the incubation period by 2 weeks.

Hatchlings are transferred to slightly larger containers and fed crickets daily. After about 3-4 weeks they will start to eat vegie mixes.

Evolution of Sex Determination in Reptiles (...especially dragons)

Alex Quinn, Institute for Applied Ecology, University of Canberra, in association with the Comparative Genomics Group, ANU.
This article by Mandy Conway

Alex Quinn gave a presentation of his current work on the evolution of sex determination in reptiles, focusing on bearded dragons, shortly after our tour of the bearded dragon breeding facility.

His work includes detailed monitoring of incubators containing eggs so that data can be carefully recorded to provide a TSD pattern.

To understand the evolution of sex determination we need to compare the chromosomes of different species and he has found that this is not very clear in dragons.

In Temperature-dependent Sex Determination (TSD), egg incubation temperature determines sex. This applies to all crocodylians, most turtles (all sea turtles), Tuatara and some lizards.

Genotypic Sex Determination (GSD), where genes determine sex, occurs in all snakes, some turtles and many lizards.

Some reptile species seem to be partly TSD and partly GSD. For example, *Bassiana duperreyi* (Three-Lined Skink) has XY chromosomes like mammals and mostly males are produced at low temperatures. *Pogona vitticeps* (Central Bearded Dragon) has ZW chromosomes like birds and all females are produced at high temperatures.

TSD lizards have a narrow range of preferred temperature, whereas GSD lizards have a broader range.

What is driving sex determination work in reptiles? Rapid climate change poses problems for TSD animals. Hotter temperatures are not good for TSD animals as the temperature fluctuations are too great, causing population crashes (also seen with frogs). Understanding past changes may help determine the future of populations.

Dragon lizards (Agamidae)

GSD species

*Amphibolurus norrisi**
*Ctenophorus fordi**
*Ctenophorus pictus**
*Amphibolurus nobbi**
Diporiphora albilabris
Diporiphora bilineata
Hypsilurus spinipes
*Pogona barbata**
*Pogona vitticeps**
Tympanocryptis diemensis
Tympanocryptis tetraporophora

Mechanism unknown

*Ctenophorus nuchalis**
*Lophognathus longirostris**

...and all the other species....

TSD species

*Amphibolurus muricatus**
Chlamydosaurus kingii
Ctenophorus decresii
Ctenophorus ornatus
Lophognathus burnsi
Lophognathus gilberti
Lophognathus temporalis
*Physignathus lesueurii**

* Dragons at the Uni of Canberra

Molecular research will hopefully answer the question: what DNA changes have occurred in evolutionary transitions between TSD and GSD?

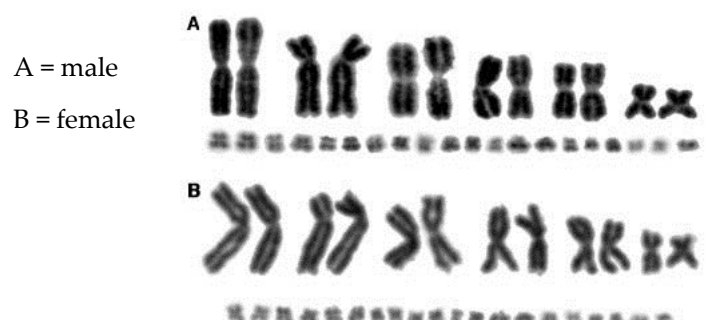
Ecological research will investigate what adaptive pressures are driving transitions between GSD and TSD.



To understand the evolution of sex determination in dragons we need to compare:

1. Chromosomes of different species
2. Genes of different species (DNA)

eg chromosomes of Norris's dragon



Mr Toad comes to Darwin

Article by Margaret Ning

On Tuesday, 6th March 2007, Professor Rick Shine from the University of Sydney's School of Biological Sciences, gave a lecture in the Academy of Science Public Lecture Series 2006-07, titled *Mr. Toad comes to Darwin: an evolutionary perspective on the cane toad invasion*.

According to Professor Shine, conservation problems have traditionally been seen as ecological issues, unfolding too rapidly for evolutionary processes to play any significant role. However, adaptation can happen very quickly under some circumstances, and the current invasion of cane toads through tropical Australia has already produced some clear evolutionary effects. His talk aimed to review recent evidence of rapid changes in the toads themselves (as they adapt to Australian conditions, and to the invasion process) and concurrent rapid responses by the native fauna (as they evolve to survive in the presence of these toxic invaders). It was an evolutionary perspective on conservation biology.

Professor Shine began with a *Wind with the Willows* allegory, with Mr Toad wanting to go places as quickly as possible.

Background included:

- how the cane toad was introduced to Australia in 1935 as an attempted bio control
- that Australia is virtually the only country that has frogs but no toads
- that the cane toad has reduced mosquito numbers at Fogg Dam over the last 25 years
- that cane toads lay more than 30,000 eggs in a single clutch and that they are toxic in all life stages

The current approach is to spend many tens of millions of dollars researching how to kill, but not understand the cane toad. Professor Shine wants to understand their biology and their impact. Extensive research has been conducted which has involved the fitting of radio

transmitters - death adders were also radio tracked – all in all, a big program with sponsors including the Australian Government's Australian Research Council.

What is the cane toads' impact on Australian fauna?

- keelbacks have Asian lineage, so they are ok
- pythons just don't recognise them as a prey item
- elapids such as king browns and death adders and 90 per cent of goannas are the biggest decliners
- the green tree frog is fine, but species such as *Litoria dahlia* is not so good
- there has been no news of any decline in bird numbers, due possibly to the genetic interchange with Asian populations
- barramundis spit out cane toad taddies – apparently they taste bad
- the common planigale, which is related to quolls, was videotaped (during research) eating the toads from the nose first (??). The second time around they wouldn't eat toads and even avoided frogs. Only two of the planigales died of the original 20 animals in the experiment.

Conclusion

Cane toads will only affect a small proportion of frog eaters, as most Aussie predators will adapt. Even for the predators that are affected, many will recover after an initial period of decline. Many predators are now able to live with cane toads.

How rapidly will cane toads spread through Australia?

Evolutionary thinking is that the fast moving toads will travel even more quickly. Long-legged cane toads were the first to reach Fogg Dam – they can progress at the rate of almost one kilometre a day!

Behaviour: they started out spreading slowly, but are now speeding up – initially they were measured at travelling at 10 kms per annum

while some have been clocked now at 60 kms per annum.

How far in Australia can/will they go?

Will it be confined to the equivalent of their original climatic conditions, or will they expand beyond the climate they're in? Now in Queensland they are spreading to areas they wouldn't have entered years ago. Professor Shine suggests their current range will be hugely expanded, and that eradication is impossible, as they can adapt to almost anything. Professor Shine believes we can only focus on reducing their impact.

Professor Shine questioned why there may be many or a few toads in a particular place. He suggests that numbers may be high initially for ten years, and then they decline.

Do toads have parasites?

Apparently yes – from Australian frogs! They transfer parasites from an old area to a new frontier. Lung worms were mentioned – apparently they are catching up after a 20 year lag. This would be a cheap effective way to get at them.

Other control measures?

- the toads' breeding site of choice is pools with no vegetation on the edges
- cracking the toad code – frighten the cane toad or hurt it. Cane toads have alarm system pheromones, without affecting native frogs. They are scared by macerating toadlets – stroke them or spray a chemical that drives metamorphs out of the water, becoming crispies! (This is a mechanism people can use.)
- climate change will probably enlarge the predicted area they spread to. Also they hitch rides - we move so much stuff around this country!

Basically the cane toad story is a very bad scenario, but essentially Professor Shine summed it all up as "it's all good news" for the future in many ways!

Domestic animals – do they adjust?

Apparently terriers in Katherine disappeared, but other dogs adapted.

A question by Arthur Georges

How do cane toads cope with Australia's dry season? The answer– they remain active during the dry season and lose condition, and they do not recover until the end of the wet season.

Imparting ACTHA's message – another successful display

Article by *Margaret Ning*

On 1 April 2007 a small group of ACTHA members made their way to Hawker Primary School to man a small display of ten lizards, three snakes and (for something completely different!!) a stick insect. Our display was just one small part of the school's annual fund raiser and was another opportunity for us to reach out to the community with our message.

The stick insect had very generously been donated by Peter Child as a silent auction prize, but until being claimed at the end of the day it provided added interest to our other exhibits. They included a tub of two local lizard species (two blue tongues and two shinglebacks), and enclosures containing two coastal carpet pythons, a woma python, two central bearded dragon, and three eastern bearded dragon hatchlings.

It was a perfect autumn day, and our conditions were near perfect too. We had a comfortably set up room to ourselves which made it easy to manage our visitors, and a sausage sizzle for lunch time sustenance. Christian even brought some 'energy giving' relief in the form of chocolate bars.

Apart from a couple of the moments described below, the visitors kept ACTHA members busy with their queries and were invariably delighted by whatever exhibits they saw or touched. While most comments were very positive, some show that we still have a distance to go in educating some of the people out there!

Quotes from the day...

Child commenting on one of the pythons: "Their jaws stretch".

Second child: "Yeah just like wild pigs."

Child feeling the two shed python skins which were on display: "It feels just like bubble wrap."

Child, after viewing tub of blue tongues and shinglebacks: "We had two blue tongues and two babies in our backyard. We also have two dogs, one cat and some chickens."

Margaret, attempting to make a point: "You're very lucky that the blue tongues survive."

Child's response: "Well, the baby ones didn't – it was pretty sad."

Margaret's response: "And you don't see a problem with that?"

Another excited child, following her tub encounter: "We found a blue tongue in our back yard with its insides hanging out because our dog attacked it. Mum couldn't bear to kill it, so she buried it." (Alive!!!!!!!)

Salmonella Kingabwa infections and lizard contact, United States

Author: Anthony Yartel

Centre for Disease Control and Prevention, Atlanta, Georgia, USA; April 2007

A 2005 outbreak of *S. Kingabwa* infections amongst 6 people who had been associated with 2 lizard species, the water dragon and the bearded dragon, has recently been investigated by the Centre for Disease Control and Prevention (US).

Nontyphoidal *Salmonella* infections cause an estimated 1.4 million illnesses and 400 deaths in the United States annually. Among the >2,500 *Salmonella* serotypes, *Salmonella enterica* serotype Kingabwa rarely causes human illness. This serotype was first reported in a patient in the Belgian Congo in 1953. From 1995 through 2004, only 30 human illnesses caused by *S. Kingabwa* were reported to the National *Salmonella* Surveillance System. No common source for *S. Kingabwa* human illnesses has been previously identified.

The 6 patients in the 2005 outbreak did not know each other and resided in 5 states: Maine (2 patients), Arizona, California, Idaho, and Ohio. Illness onset dates were in June, July, August, October (2 patients), and November 2005. Of the 6 patients, 4 were <1 year old (range <1–53 years), 4 were male, 2 were hospitalized, and none died.

Three of the patients with *S. Kingabwa* infections were exposed to the water dragon *Physignathus cocincinus* and one other was exposed to a bearded dragon (*Pogona* sp.). Interviews with patients or their parents or guardians conducted during routine public health surveillance collected information on specific food items, water sources, restaurant venues, travel history, and animal contact. No common food or environmental source was identified. Of these 4 patients, 3 had >1 lizard in their own household as pets; the other patient was exposed to a lizard when visiting a family member. The 2 patients who did not recall lizard exposure might represent patients with background cases unrelated to lizards. Single cultures of the 2 lizards available for testing in February 2006 did not yield *S. Kingabwa*, which

could mean that they did not carry this rare *Salmonella* serotype. However, this does not exclude lizards as the source of these illnesses because lizards intermittently shed salmonellae.

The lizards had been purchased from local pet shops and a travelling reptile show. Shipments of reptiles were mixed together at points of sale, and numerous distributors and importers were used, so determining the origin of individual reptiles was not feasible. However, water dragons and bearded dragons are imported into the United States from Asia and Australia and are rarely bred domestically.

Two thirds of the patients in this outbreak had documented exposure to 1 of 2 lizard species, and half of the patients had pet lizards in their homes. In 2001, the estimated number of households with lizards was 545,000, which represents 0.5% of all American households. Using a standard binomial model, the probability of finding at least 3 of 6 persons chosen at random to be lizard owners is 0.000002. To our knowledge, this is the first investigation to identify a strong association between the rare serotype *S. Kingabwa* and lizards and the first instance of which we are aware that a serotype has been associated with a particular species of lizard dispersed in homes across the United States.

The association between reptile exposure and human salmonellosis is well-established. CDC has published recommendations for reducing the risk for infection from reptiles (www.cdc.gov/healthypets/animals/reptiles.htm); these include thoroughly washing hands with soap and water after handling reptiles or their cages and keeping reptiles out of food preparation areas. The young age of most patients in this outbreak supports the recommendation that reptiles should not be allowed in households with children <5 years of age.

Some Web sites worth looking at:

<http://frogs.org.au/>

www.aussiereptilekeeper.com

www.mark.org.au

www.canberraexotics.com.au

http://www3.environment.nsw.gov.au/pdfs/hygiene_protocol_snakes.pdf

NEW: <http://www.cdc.gov/healthypets/animals/reptiles.htm>

Has your email address changed lately?

If so, please notify us when it happens, as we rely on email to send reminders to members about our monthly meetings, the topic, etc. So if you haven't received a couple of emails from Margaret or Joe in the last fortnight about this month's meeting, it is because we no longer have an up-to-date email address for you, and we have the frustration of returned messages. Could you please just drop Joe or I an email with your new address so we can get back on track. If you are not sure, still email us - we don't mind.

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