



ACTHA CONTACT DETAILS

PO Box 160
Jamison ACT 2614
Inquiries: Margaret on 6241 4065
E-mail: margaretning@iprimus.com.au
Website: www.actha.org.au

ACTHA INC. NEWS AUG - SEPT 2010

Newsletter of the
ACT Herpetological
Association Inc.

**2010 - 2011 ACTHA MEMBERSHIP IS NOW
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page of this issue for subscription payment options.

IN THIS ISSUE

Venomous snakes of Thailand and

The Red Cross Snake Farm & Institute in Bangkok:

Ric Longmore was our guest speaker at the June '10 Meeting where members gathered to learn all about vipers, cobras and antivenom production in Thailand, from page 2.

John Cann retires from reptile shows:

John Cann has been entertaining and educating generations of people through his reptile shows. This article takes a look at John's life and his last show, page 4.

Blue-tongue lizards are losing their home turf:

a newspaper article highlights lizard population movements, page 4.

The National Wildlife Rehabilitation Conference, SA, June 2010: your Editor, with a background in animal sciences and wildlife care, attends the NWRC on a yearly basis. Two reptile related presentations are summarised from this year's Conference, from page 5.

The Mary River Turtle - a species profile:

The Wildlife Land Trust's Australian office included a profile of this turtle in its latest newsletter, page 7.

Venom yields of Australian elapids: an interesting paper which gives the results of a study into the wet and dry venom yields for elapids. It includes descriptions of techniques for extracting venom, from page 8.

Burrowing into ACTHA's past, 1987: Eric Worrell passes away; issues surrounding the progeny of captive breeding; NSW allows the keeping of reptiles; and more..., page 12.

Pet reptiles: a newspaper article on the human health hazards of owning a pet reptile. The article contains some inaccuracies which our August guest speaker (*see right*) would like to elaborate on, page 14.

YOUR COMMITTEE

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* Denotes Life Members



This image of the endangered Pretty Tree Viper is just one of the many shown in Ric Longmore's talk to ACTHA Members in June '10.

DIARY DATE

The *bi-monthly* meetings of the Association are usually held on the **third Tuesday of the month at 7.30pm**, Southern Cross Club, Catchpole Street, Macquarie, Belconnen.

UPCOMING MEETING

Tuesday, 17 August 2010

**Guest Speaker: Peter Child,
Chief Education Officer, Reptiles Inc.**

**Pet reptiles need not be a health hazard
to keepers**

All pets require appropriate husbandry and correct hygienic handling practices. Peter will discuss some of the dos and don'ts for healthy and successful pet reptile keeping. As with his previous presentations, this should be an entertaining and information packed talk.

VENOMOUS SNAKES OF THAILAND AND THE RED CROSS SNAKE FARM & INSTITUTE IN BANGKOK

ACTHA's June 2010 talk was given by Ric Longmore.



Ric started his presentation with some general information on a reptile which is very close to his heart.

There are slightly more snakes in Thailand (182 species) than Australia (170 species) most of which are classed as colubrids. In addition, and relevant to the talk, there are 3 species of krait, 3 species of coral snake, 4 species of cobra, 12 vipers and 6 sea snakes.

The Siamese Russell's Viper, *Daboia russellii siamensis*, is responsible for the largest number of bites and deaths in Thailand. Most of the snake bites in Malaysia are from the Malaysian Pit Viper, *Calloselasma rhodostoma*.

Viperid glands are very large, producing a lot of venom which comes close to the quantity an Australian King Brown Snake would produce.

The Red Cross Snake Farm and Institute was opened in 1923 and its primary aim was to develop vaccines to help people being afflicted with tetanus, tuberculosis, hepatitis, cholera as well as other diseases. The facility had also developed cobra antivenom at this time but with Australia's help the technique was perfected. The facility is supported by the Queen of Thailand. Enclosures have been modernised utilising money from the Red Cross and the Thai Government.

The site on which the Institute sits is about 10 hectares and houses snake enclosures, the research staff, the snake venoms and the vaccines produced on site. The Institute is open to the public, with exhibitions and talks. A horse farm from where the antivenom is produced is located at Hua Hin, some distance from Bangkok. This is where draught horses are injected with increasing doses of snake venom to develop the antivenom.



The fang sheaths can be seen here in the open mouth of a cobra.

Ric first visited the Institute in 1984 and makes a point of seeing the friends he has made each year. One such friend, staff member Dr Taksa Vasaruchapong, a doctor in veterinary medicine and a snake handler, was recently made an Honorary member of ACTHA for his contribution to herpetology in Thailand and his interest in Australian venomous snakes.



Ric proceeded through his slides of a King Cobra, *Ophiophagus hannah* (below), which at 5.5m is the world's largest venomous snake. They predominantly feed on other snakes, however are fed on water snakes as adults and lizards as



young in captivity. Attempts to have the snakes eat mammals have failed to date. The snake is responsible for some human deaths but is not listed in the top 15 of dangerous snakes. However, it is able to inject a large amount of venom and is regarded as quite dangerous.

Cobras naturally rear up and this is not always a sign of an imminent bite: the stance is also one of a "fear-induced" posture. Snake handlers often

pat and kiss the top of a snake's head when in this characteristic pose. The snakes are used to captivity, in fact easily settling down to their new life. The fangs are not as big as vipers. A sheath covers most of the fang with only the tip showing.



Naja kaouthia, the Monocellate Cobra. The image at left shows the normal colour pattern of the snake that bit Taksa on the finger. Ric explained that although his friend Taksa received antivenom injections against the neurotoxins, it was the myotoxins that went on to start eating the flesh from his arm.

Naja siamensis, the Siamese Spitting Cobra, 1.5m in length, is a beautifully patterned animal, Ric enthused, adding that apart from a small opening at the end of their fang they have a little opening on the groove of the fang half way up to control the venom so that it comes out horizontally in a spitting action. According to literature they aim at the eyes of a predator.

The Equatorial Spitting Cobra, *Naja sumatrana*, is nocturnal, so handlers have changed the snake's normal day and night time patterns for viewing purposes. At over 2m in length they are considered fairly deadly.

The small White-lipped Green Tree Viper, *Trimeresurus albolabris*, grows to only 100cm in length but has fangs of about 1.5cm in length. The fangs can be moved forward, they are 'hinged'. An arboreal snake rarely seen on the ground, there are 4-5 species although taxonomically there is a problem with sub-speciation. It mainly feeds on birds.

The prettiest venomous snake in Thailand, according to Ric, is the endangered Pretty Tree Viper, *Trimeresurus kanburiensis* (below), which reaches only 70cm in length at maturity and has a striking purple and green colour. It is found only in the south-west of Thailand and whilst arboreal it does come to ground.



The Siamese Russell's Viper, *Daboia russellii siamensis*, is responsible for the largest number of bites and deaths in Thailand. It also occurs in southern China, Myanmar, Taiwan and Java. Great care must be taken in milking this snake because the fangs are so long they can be broken. A petri dish collects about 30ml of venom from 2cm long fangs which shoot forward like flick knives.

There is a website which lists the most dangerous snakes internationally, grouped together due to the number of bites. The data is correlated with the types of first aid that victims receive. In much of Asia snake bites generally occur in exceptionally poor areas with poor first aid and responses. The antivenom is also horrendously expensive. Much fund raising by charity events is undertaken for developments like snake farms. Many casualties do receive antivenom however a 15ml vial costs approximately \$US800. In some instances a few vials are needed.

The Institute has been successful in developing polyvalent antivenoms for both the dangerous elapids and viperids in Thailand. Neighbouring countries benefit from this development and the Commonwealth Serum Laboratories in Melbourne has been of great assistance to the Institute over many years.

Finally, the dramatic pictures of Taksa's arm (below) following the bite from a Monocellate Cobra whilst demonstrating at the Institute caused a stir in Ric's audience. Members were relieved to learn that Taksa made a good recovery. Ric keeps in touch with the Institute often.



JOHN CANN 'LA PEROUSE SNAKE MAN' RETIRES

Summarised by the Editor from a collection of articles which appeared in the May 2010 edition of The Australian Herpetological Society's Newsletter.

La Perouse is a snake pit that has hosted snake handling performances since 1897. Previous owners "a colourful but luckless lot" have included its founder, Professor Frederick Fox, who died after being bitten by a Krait in Calcutta. The next operator, Garnett See, was killed in 1913 by a brown snake at his first La Perouse show. Tom Wanless, a subsequent owner, died in 1921 after being struck by a green mamba during a demonstration in South Africa. Enter the Cann family.

John Cann's mother, Essie Bradley, was the first snake woman of Tasmania and his father, George Cann snr, was running a snake show in Hatt's Arcade in Newtown by age 13. After fighting in France during World War I George snr returned in 1919 to take over the La Perouse snake pit.

In 1938 Cann snr became the curator of reptiles at Taronga Zoo, but continued to run the show on weekends with help from his young sons George jnr and John. They took over the show after their father died of a stroke in 1965.

John and George ran the weekly shows for more than 40 years before George died, after which John continued alone.

Today, the shows have become a bit much, with the public risk insurance and the cost of feeding and housing the animals an added burden, not to mention the allergies John has developed from the seven venomous snake bites he has received over the years.

Sunday the 18th of April 2010 saw a large crowd gather for the last show (*see pic above*). Just after it started, Minister Peter Garrett and local Mayor Michael Daley MP jumped the fence, shook hands with John and presented him with a Certificate of Appreciation. It read, in part:

John Cann "The Snake Man" and the Cann family

For over 90 years of services and contribution to La Perouse and our local community.

We thank you for your many years of entertaining and educating generations and for helping to preserve local animals large and small.

John will hand the show over to the Hawkesbury Herpetological Society, together with the 25 venomous snakes, goannas, pythons, lizards and a small salt water crocodile he keeps at his Phillip Bay home. He intends to then "go camping, get out and about. There's still lots to see out there..." with his wife.



BLUE-TONGUE LIZARDS BANISHED FROM BACKYARDS TO SYDNEY'S OUTSKIRTS

Summarised by The Editor from an article written by Ben Cubby, Sydney Morning Herald, 13 July 2010

"Wildlife groups are reporting that blue-tongues and other natives, such as the tawny frogmouth, are being pushed to the edge of the city by more intense development and higher human population density."

The Gosford reptile Park is running an endangered species month with daily exhibitions featuring native animals that are under threat. Observers say blue-tongue lizard populations appear to be thinning out.



Eastern Blue-tongue Lizard, photo by Glenn Shea

James Dawson,
Biodiversity
Conservation
Section, NSW

DECC&W, advises "While there is increasing pressure on these animals and numbers are difficult to ascertain, there are things people can do to encourage wildlife in their backyards."

The Department recommends leaving at least part of a garden in a relatively natural state, with logs and rocks resting on the ground and bushy shrubs to provide cover for small animals.

Instead of snail baits, which are toxic to many other animals too, people can use slug traps or physical barriers made up of sawdust, grit or eggshells.



THE NATIONAL WILDLIFE REHABILITATION CONFERENCE, ADELAIDE, 22 - 24 JUNE 2010

By Mandy Conway, Editor

As in past years, I attended the NWRC which was this year hosted by South Australia. The annual 3-5 day Conferences, rotated through all the Australian States and Territories (bar Tasmania to date), are inspirational, informative and sometimes distressing.

Inspirational in the sense that each year you meet up with like-minded people who care for injured native fauna in their areas of expertise (more reptile people this year!) and with whom you form a great long distance friendship. Many are not only rescuers and rehabilitators, but are actively involved in studying and recording population distributions, disease outbreaks and breakthroughs in injury treatment and management, often encompassing husbandry matters.

Informative in that developments in habitat management and captive breeding of endangered fauna etc are presented and discussed by attendees, often until all hours of the night in a hotel foyer which, having now attended six conferences, gets better every year - discussions and information sharing that is!

Distressing The two conferences held after Steve Irwin died were particularly sad. Yes, I thought he was a tad over the top and never really watched his TV performances, but when the plane we were on from Darwin to Canberra broadcast his death we could only think of the things he had achieved. Achievements which we had been shown at several Conferences. The scale of habitat conservation and funding for particular species protection that Steve Irwin had initiated...

I was inspired to volunteer at the Australia Zoo Wildlife Hospital for 1 week shortly afterwards and its an experience I will never forget, especially the commitment by the people who work and volunteer in all areas of Australia Zoo.

This year, Aaron Machado from the Australian Marine Wildlife Research & Rescue Organisation gave a presentation on his organisation's efforts to help marine wildlife in the wake of the Gulf of Mexico oil spill. Photographic examples of the sheer number of wildlife affected was distressing. One photo of eight pelicans stuck together, covered in oil, who were left to suffocate to death because people were only allowed to record stranded animal

numbers but not to rescue anything on the beach was a directive beyond belief! Any animal who was still alive after 48 hours would be euthanased - depending on staffing. I had to turn away from the images of mass sea turtle mortality. All Conference attendees were visibly upset at the helplessness of volunteers in the region who were powerless to relieve suffering due to 'red tape'.

On to the reptile related presentations...

Each year there are more presentations involving reptiles and amphibians and I've summarised two given this year. (NB in the 'Wildlife as pets in Qld' article I've focussed on reptiles and amphibians. Ed.)

The Pygmy Blue-tongue Lizard

Mr Terry Morley, a keen herpetologist. Following is an excerpt from the Conference Proceedings.

Until 1992, the Adelaide or Pygmy Blue-tongue Lizard (*Tiliqua adelaidensis*) was only known from a handful of specimens, the last of which were collected in the late



1950's. Between then and their rediscovery in late 1992 there had been many unsuccessful attempts to find the species, by professional and amateur herpetologists alike. Accordingly, the species was thought to be extinct.

A chance discovery of a dead specimen in a road-killed Brown Snake (*Pseudonaja textilis*) in 1992 gave scientists an opportunity to find out more about this species' biology. The South Australian Government developed a draft recovery plan, providing funding for a full scale research program involving many institutions and individuals. Three PhD thesis' are currently underway, which to date have resulted in finding the lizard at 28 sites, some in historical original locations.

Adelaide Zoo received the first live animals in 1992 and was charged with determining captive requirements in case future captive breeding, re-introduction or translocation programs would be needed. Five lizards were caught in pit-fall traps and one was found in a Wolf Spider hole. The Trap-door Spider's burrow is also suspected of housing this species.

The spider's holes were replicated and the lizards gladly made these their new homes. The Pygmy Blue-tongue's diet was thought to be similar to other

species: limited observations in the field show a diet of predominantly grasshoppers and vegetation.

Researchers have since been given permits to collect an additional 10 animals. They are concentrating on gravid females, which are released after giving birth along with some of the young.

Data to date reveals 1-4 young are produced (with an average of 2), the young average 1.5g at birth, measure 45mm and stay with their mother for some time.

Captive breeding attempts have remained unsuccessful to date but the Zoo is hibernating adults outside this year and will be placing pairs in new enclosures in Spring.

Wildlife as pets in Queensland

Janet Gamble, State Wildlife Coordinator, and Leonie Rickard, Senior Wildlife Officer, RSPCA Qld.

RSPCA Qld provides for common pocket pets like rats, mice, guinea pigs and also native and exotic wildlife species such as birds, reptiles, fish, crabs, amphibians and invertebrates. These animals are presented as strays, private surrenders, seized or rescued wildlife. Shelters in Qld are seeing a few trends: birds provide the bulk of small animal intake with annual reptile intakes increasing.

Housing density increases in response to rising human population growth, especially on the East Coast, means the popularity of smaller pets is on the rise. "It is generally considered... by the broader community, that these species are less needy and easier to care for than dogs or cats."

"In Qld, the Department of Environment and Resource Management (DERM) administer the Nature Conservation Act 1992 which regulates keeping native wildlife as pets. The regulations were relaxed in 2006 allowing trade in native reptiles much easier. Pet shops and reptile keepers can trade on the condition that both parties hold a permit. Generally, you can only keep native reptiles if you have a license. Anyone over 13 may apply for a Recreational wildlife license to purchase and keep native and lawfully obtained birds, reptiles and amphibians."

Native animals require equally high standards of care as any domestic pet, however in many cases it is much more difficult to adequately provide for them. They often require specialised husbandry and facilities to mimic their natural environment and meet their physiological and ecological

requirements. All pets should have routine veterinary consultations that incorporate a vet medical program, however pocket pets, historically, often do not see a veterinarian during their lifetime.

There are also some zoonotic and species specific diseases worth noting. Cryptosporidiosis via faecal - oral from reptiles is one. Others include:

Chytrid fungus, *Batrachochytrium dendrobatidis*:

The Australian Government has two Threat Abatement Plans in attempts to manage wildlife disease at a national level using a comprehensive, integrated approach. One for "Infection of amphibians resulting in Chytridiomycosis", a highly virulent fungal pathogen of amphibians which is capable at the minimum of causing sporadic deaths in some populations and 100% mortality in others.

Inclusion Body Disease (IBD): An important disease in Australian snakes because of its 100% fatality rate. This is mainly a disease of boas and pythons. The incubation period is unknown but has been seen to exceed 12 months. Its current status in wild Australian snakes is unknown. Prevention and control recommends quarantine periods as long as 13 months.

Ophidian Paramyxovirus (OPMV): Transmission is by aerosol and through faeces. The snake mite, *Ophionyssus natricis*, has also been implicated as a possible vector. Families affected are elapids, boids and colubrids. Current advice says that snakes should be quarantined for a minimum of 90 days with good mite control practise in place.

A 2006 veterinarian magazine said '...the reptiles are coming...', advising vets to be prepared. Qld is seeing a rise in reptile intakes, the on-line Pet Directory lists 40 Australian and 10 Qld reptile veterinarians, will this be enough?

Problems arising from release of unwanted wildlife pets has been documented in Australia with Red-eared Slider Turtles: yet another issue.

Reptiles – The subject of more recent interest and hobby in Queensland.

DERM has a local facility that has been taking the "illegal" native fauna presented to RSPCA Qld. The facility is starting to have difficulties in rehoming the reptiles due to saturation of permit holders and staff are not confident to perform a competent formal adoption process. That is, they are unable to say no without appearing biased or prejudiced (pers com).

Councils responsible for animal registration have advised that the failure to locate an owner is 95% more likely for animals other than dogs. Many tags and bands are untraceable because there is no national trend to utilise the service. Pocket pet owners and service providers, including pet shops and vets, are either naive to the availability of a micro-chipping service or not willing to spend the money, currently approx \$20.

RSPCA Qld is working with DERM towards being able to re-home reptiles in the future. RSPCA Qld is also currently working towards the promotion and development of national recording of microchips for native fauna, both free-living wildlife that has been in care for some reason (universities, rehabilitation, surveys) and pets (birds and reptiles). Negotiations with Homesafe are almost finalised with registration at an additional charge (~\$15.00) for wildlife as pets undergoing adoption.

Leonie finished by saying "If wildlife were to be kept as pets then the licence process should include thorough training in the needs of the species to be kept."

References relating to reptiles:

IBD fact sheet

[http://www.wildlifehealth.org.au/AWHN_Admin/ManageWebsite%5CFactSheets%5CUploadedFiles/122/Inclusion%20Body%20Disease%20in%20Australian%20Snakes%2025%20Jul%202009%20\(1.0\).pdf](http://www.wildlifehealth.org.au/AWHN_Admin/ManageWebsite%5CFactSheets%5CUploadedFiles/122/Inclusion%20Body%20Disease%20in%20Australian%20Snakes%2025%20Jul%202009%20(1.0).pdf)

OPMV fact sheet

[http://www.wildlifehealth.org.au/AWHN_Admin/ManageWebsite%5CFactSheets%5CUploadedFiles/122/Ophidian%20Paramyxovirus%20in%20Australian%20Snakes%205%20Sept%202009%20\(1.1\).pdf](http://www.wildlifehealth.org.au/AWHN_Admin/ManageWebsite%5CFactSheets%5CUploadedFiles/122/Ophidian%20Paramyxovirus%20in%20Australian%20Snakes%205%20Sept%202009%20(1.1).pdf)

Threat Abatement Plan; Infection of amphibians with chytrid fungus resulting in chytridiomycosis:

<http://www.jcu.edu.au/school/phtm/PHTM/frogs/papers/chytrid-report.pdf>

DERM – Native Animal Pets, Birds, Reptiles

http://www.derm.qld.gov.au/wildlifeecosystems/wildlife/living_with_wildlife/native_animal_pets.html



WILDLIFE LAND TRUST SPECIES PROFILE: MARY RIVER TURTLE

Reproduced from "Wildlifelands" issue 6 2010 which is produced by the Wildlife Land Trust 'www.wildlifelandtrust.org'

The Mary River Turtle is classified as an endangered species not only under both the Queensland *Nature Conservation Act 1992* (NCA) and Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act), but additionally the World Conservation Union Red List of Threatened Species, which ranks them in the world's top 25 most endangered turtle species. We are extremely proud that the Commonwealth listing is a result of our nomination finalised all the way back in 1994 to have the Mary River Turtle classified as endangered under the EPBC Act's predecessor, the *Endangered Species Protection Act 1992*.

As its name suggests, this turtle occurs in the Mary River in south-east Queensland, with habitat extending approximately from Gympie to the tidal reaches slightly upstream from Maryborough. Additional habitat is located in the Tinana Creek upstream of Tallegalla Weir, and it is likely that there are populations in the majority of waterholes of the Mary River downstream from Kenilworth. The turtle is most likely found in areas of clear, slow moving water, but also in areas where the riparian communities are heavily grazed and disturbed.

Population levels of the Mary River Turtle suffered major setbacks in the 1960s and '70s when they were collected and sold as 'penny turtles'. This collection greatly depleted a generation of the species and left a reduced and aging population, with some reports suggesting that as many as 15,000 individuals were sent to shops every year during a 10 year period, before the collection and trade of reptiles was prohibited by the *Fauna Conservation Act* in 1974. Another major threat was narrowly averted only last year, with the Queensland Government's proposed Traveston Crossing Dam being rejected by Federal Environment Minister Peter Garrett (through power provided by the EPBC Act), who said, "the project would have serious and irreversible effects on national listed species such as the Australian Lungfish, the Mary River Turtle and the Mary River Cod - both of those endangered."

At present, it is possible that four Wildlife Land Trust properties (Coolaroo, Greens Dale, Mount Monty and Oakview) have Mary River Turtles either on their land or very nearby, once again representing the critical role private land conservation can play in protecting threatened wildlife and their corresponding habitats.'

The Wildlife Land Trust was established in Australia by Humane Society International in 2007, with a primary focus of encouraging private landholders with an interest in habitat protection to join with like-minded people in a national and global effort for wildlife conservation.



VENOM YIELDS FOR AUSTRALIAN ELAPIDS

Source: *Ecotoxicology* (2006) 15:531-538

DOI 10.1007/s10646-006-0089-x

Springer Science+Business Media.

ABSTRACT

Wet and dry venom yields for Australian elapids and a number of non-Australian species were examined in this study. Snakes from the *Pseudonaja* genus yielded higher than previously published amounts and suggest reconsideration be given to increasing the volume of antivenom in antivenom vials.

INTRODUCTION

The amount of venom produced by a snake when it bites is described as the yield. The whole snake venom is comprised of salts, water, enzymes, proteins and various other macromolecular and smaller organic and inorganic compounds. The traditional way venom yield is measured and compared is in its dried powder form where the free water is removed by some method of drying leaving the remaining solids. The remaining solids or dry yield is normally just called the yield as opposed to the wet yield which is the total weight of the venom (water plus all the solids). The percentage solids are the fraction of the solid weight divided by the total weight (solids and liquid) of the venom expressed as a percentage [(solid weight/total weight) · 100 = % solids].

There have been many ways in which snakes have been artificially milked for their venom and many ways of drying venom. Some early milking techniques included forcing the snake to bite on a watch glass whereupon the venom spread out over the glass. Another method was to force the snake to drape its fangs over the side of a beaker and allow the venom to run down the inside of the beaker (a method more suited to longer-fanged vipers). A later improvement saw a rubber latex diaphragm stretched over a glass beaker and the snake was forced to bite through it which stimulated it to express venom but it had the disadvantage of either forcing snakes milked subsequently to bite over the same area of rubber thus increasing the chance of transferring infection.

Methods used to milk low yielding snakes like the *Pseudonaja* genus have in the past resorted to forcing the snake to bite on to rubber latex stretched over a beaker as with most other snakes resulting in some venom being wasted when it came in contact with the latex. For high yielding

snakes, the proportional amount lost by this method is less significant. The method used by Venom Supplies Pty Ltd at their Tanunda (SA) laboratory to milk low yielding snakes exposes the venom to a smaller surface area thus reducing contact losses and the pressure of the capillary tube against the *vagina dentis* (fleshy sheath surrounding the fang), stimulates the snake to express venom into the tube. The plastic used to make the capillary tubes also has less binding affinity for the venom than latex rubber allowing greater recovery of venom into the vial.

Early venom drying was carried out simply by allowing the water in the venom to evaporate in air. Later improvements to drying the venom involved placing the venom into a closed container where desiccants such as silica gel or calcium chloride accelerated the drying by removing moisture from the air in the container. Freeze drying is a more recent refinement where the venom is quickly frozen after milking and then subjected to a vacuum supplied by a vacuum pump which forces any water vapour coming off the frozen venom through a moisture trap condensing it on a cold surface. The process of sublimation of the frozen water in venom to a vapour when the pressure is reduced to almost zero, bypasses the liquid stage and so hastens drying thus preserving the more delicate macromolecules in the venom.

Scientific studies on snake venoms are quite extensive. Using key words "snake" and "venom" on the National Library of Medicine's internet database PubMed, some 13,236 papers were found. Clearly this does not reflect all scientific works. Scientists spend considerable sums of money carrying out this research and depend faithfully on the venoms they obtain, in many cases from commercial venom suppliers. It could be useful to reflect on the way these venoms are produced as it may influence the outcome of research results.

When working with venoms, whether it is in development of antivenoms, evaluating the lethal capacity of snake species or working with venoms in pure research applications, knowledge of the basic venom yield of the species in question is valuable. Often this basic knowledge is unknown. Moreover, in some cases, it is also useful to know the maximum and minimum yields, the weight of wet and dry venom delivered by the snake and the percentage of solids in the venom. The work described here aims at providing this basic information for most of the dangerously venomous

Australian snakes and for a comparison with some other non-Australian species. The data has been collected over 6 years at the venom production laboratories at Venom Supplies Pty Ltd. Some of the species assessed are shown below.

Australian snakes

<i>Notechis ater seroventyi</i>	Chappel Island Tiger Snake
<i>Notechis ater niger</i>	Peninsula Tiger Snake
<i>Notechis scutatus</i>	Common Tiger Snake (outside pits)
<i>Pseudechis porphyriacus</i>	Red-bellied Black Snake
<i>Pseudechis australis</i>	King Brown or Mulga Snake
<i>Oxyuranus microlepidotus</i>	Inland Taipan
<i>Oxyuranus scutellatus</i>	Coastal Taipan
<i>Hoplocephalus stephensi</i>	Stephens Banded Snake
<i>Acanthophis antarcticus</i>	Common Death Adder
<i>Austrelaps superbus</i>	Lowland Copperhead
<i>Tropidechis carinatus</i>	Rough-scaled Snake
<i>Pseudonaja guttata</i>	Speckled Brown Snake
<i>Pseudonaja textiles</i>	Common Brown Snake
<i>Pseudonaja nuchalis</i>	Western Brown Snake
<i>Pseudonaja affinis</i>	Dugite
<i>Pseudonaja infracaula</i>	Peninsula Brown Snake

Other

<i>Bitis gabonica rhinoceros</i>	Gaboon Viper (Africa)
<i>Bitis arietans</i>	Puff Adder (Africa)
<i>Bitis nasicornis</i>	Rhinoceros Viper (Africa)
<i>Vipera latasti</i>	Lataste's Viper (Spain)
<i>Crotalus vegrandis</i>	Uracoan Rattlesnake (Venezuela)
<i>Agkistrodon bilineatus</i>	Mexican Moccasin (Mexico)
<i>Naja kaouthia</i>	Monocled Cobra (Thailand)
<i>Naja siamensis</i>	Indo-chinese Spitting Cobra (Thailand)
<i>Naja mossambica</i>	Mosambique Spitting Cobra (Africa)
<i>Naja melanoleuca</i>	Forest Cobra (Africa)

All of the snakes examined are considered dangerous to humans, i.e. either it is a species which has caused fatalities or has high potential to cause them in bites not treated with an appropriate antivenom.

The inclusion of the non-Australian species is mainly for comparative purposes however the data will inevitably be useful for researchers.

MATERIALS AND METHODS

Snakes were kept at Venom Supplies Pty Ltd laboratories in Tanunda South Australia. The snakes were kept at temperatures ranging from a winter low of 18°C and summer maximum of 31°C. They were fed on either rats (*Rattus norvegicus*) or mice (*Mus domesticus*).

The snakes were milked either fortnightly or after longer intervals using one of the following three methods. Adult snakes were used at all times.

METHOD 1 – FOR LOW YIELDING SNAKES

A 100 l plastic pipette tip which had approximately 4 mm of the tip trimmed off was placed independently over each fang of the snake thus forcing the *vagina dentis* upwards and out of the way of the pipette tip. At the same time pressure was exerted on the venom gland with the hand restraining the snakes head (Fig. 1). Venom was expelled into the pipette tip and was retained in the tip due to surface tension. The venom was expelled into a vial from the pipette tip with air using a rubber puffer bulb.



Fig. 1: *Pseudonaja textilis* being milked using Method 1

METHOD 2 – FOR VIPERID SNAKES AND AUSTRALIAN *OXYURANUS SCUTELLATUS*

The snake was forced to bite through a parafilm membrane which was stretched over a 70ml vial (Fig. 2). The venom was collected in the vial below the membrane.



Fig. 2: *Oxyuranus scutellatus* being milked using Method 2

METHOD 3 – FOR OTHER ELAPIDS WITH MODERATE TO SHORT FANGS

A method described as the “Mirtschin technique” is described as forcing the snake to bite through a parafilm membrane which was stretched over a 70ml vial (Fig. 2). The venom was collected in the vial. Following this initial procedure, the snakes were again milked in a secondary milking as described in Method 1 (Fig. 1). Venom collected in this latter step was then expelled into the 70ml vial. In instances where 70ml vials were used, to reduce the need to handle dried venom, once all snakes in a batch were milked, the venom was aliquotted from the 70ml vial to smaller 5ml vials.

During venom collection, the venom vials were weighed between each snake to allow determination of the wet yield produced by each snake. Once the venom was collected for any batch and aliquotted when 70ml vials were used, it was then snap frozen inside the vials in powdered dry ice and then stored for Lyophilization at a later date. Lyophilization was carried out using either a cold finger method whereby the temperature differential was provided by a mixture of alcohol and dry ice or a similar method provided by a Heto Drywinner freeze drier machine. Both methods produced similar results for any venom. When the venom was dry it was then re-weighed and the % solids calculated. Using the calculated % solids and the wet weight of the venom for each snake the dry venom yield could be calculated for each snake. The use of the average % solids to calculate the dry venom yield is the only practical way of avoiding the necessity of using a separate vial for each snake milked.

FINDINGS

Results were given in the paper in the form of tables (example at right). A summary of the results and discussion is included below.

Generally, the average Australian elapid snake venom yields are low compared with cobra or viperid species included in this study.

The relationship between venom yields obtained from milking and those delivered by wild snakes when either hunting or using a defensive bite have been studied.

Generally, yields from snakes milked were usually higher than yields from wild snakes hunting or those obtained from snakes using a defensive bite. Milking yields could represent a venom yield potential high and these amounts of venom may possibly be approached from snakes in some instances of frenzied attack or multiple bites. Snake venom yield is highly variable and injected amount varies with prey size and type and with snake age.

The average yields for the *Pseudonaja* species were considerably higher than previously reported. The average yields for *Pseudonaja textilis* Queensland were much higher than *P. textilis* South Australia. This could be due to the fact that in the wild a greater number of rats prey items are available to Queensland snakes than smaller mammalian prey items in the South Australia *P. textilis* used in this study. Greater amounts of venom are required to quickly immobilize larger prey animals and rats retaliate fiercely when bitten or trapped by snakes. *P. textilis* also uses prey restraint to hold its prey whilst delivering the venom and offers a brief opportunity for the rat to bite and injure the snake. More rapid immobilization by the venom through increased yield, would minimize injury to the snake.

Given the reported problems of CSL Ltd Brown Snake antivenom in neutralizing the procoagulant toxin fraction of *Pseudonaja* venoms which induces blood coagulation and small molecular weight toxins, the implications of these results suggest that if there is no change to the efficacy of the antivenom serum, further consideration be given to both the quantity of antivenom in the vial and the initial dose. The amount of antivenom present in vials of Australian antivenoms (CSL Ltd) is

	<i>Naja kaouthia</i> (Thailand)	<i>Naja siamensis</i> (Thailand)	<i>Naja mossambica</i> (Africa)	<i>Naja melanoleuca</i> (Africa)
No. snakes	14	11	10	2
No. milkings	140	82	80	59
Min (wet) gm	0.176	0.193	0.175	0.623
Min (dry) gm	0.058	0.072	0.057	0.181
Max (wet) gm	1.897	1.690	1.806	2.766
Max (dry) gm	0.742	0.738	0.656	1.102
Av. (wet) gm	0.741	0.817	0.966	1.616
Av. (dry) gm	0.266	0.341	0.335	0.571
STD (wet)	0.316	0.352	0.410	0.514
STD (dry)	0.123	0.157	0.149	0.216
Var. (wet) gm	0.100	0.124	0.168	0.264
Var. (dry) gm	0.015	0.025	0.022	0.047
Av. % solids	35.63%	41.34%	34.60%	34.66%
Milking method	3	3	3	3

related to the average amount of venom produced when the snakes are milked. The antivenom amount is calculated from tests measuring the amount of antivenom necessary to prevent death in small animals. In unpublished work, we have shown that these tests merely evaluate the neurotoxic effect and allow little time to measure other enzymatic effects, such as the procoagulant toxins which may take longer to manifest themselves. The venom neurotoxic effect is very fast in small animals, especially due to the postsynaptic neurotoxins. Two specimens of *P. textilis* from Queensland had maximum dry yields of 155 and 112mg and averaged 64 and 44.5mg respectively. They are abnormally high yields for this species and the *Pseudonaja* genus in general and demonstrate the potential of this species. A single antivenom vial of Brown snake antivenom is capable of neutralizing 10mg of Brown Snake venom based on the efficacy tests performed by CSL Ltd. The average venom yields resulting from milking, for most of the *Pseudonaja* species, are well over this amount. Using anaesthetised dogs, it was shown that to neutralise the effects of severe coagulopathy and cardiac depression, 25 times the recommended dose was required for *P. textilis* and 10 times the recommended dose was required for *P. affinis*. This discrepancy between the recommended dose, and the dose required, suggests that the antivenom-antibodies (immunoglobins) present in the antivenom are inefficient in neutralizing the venom procoagulant toxin. The reason for this could be quantitative (insufficient immunoglobins) or qualitative (the antivenom antibodies are of low affinity). Recent research work on this indicates that the problem is probably qualitative in nature, but clearly higher than expected venom yields will simply exacerbate this problem.

The average and maximum yields from the *Notechis* genus are also worth noting. Kangaroo Island Tiger Snakes, *Notechis ater niger*, averaged 110mg and one specimen achieved a maximum yield of 636mg. In earlier work we recorded a maximum yield in of 695mg in a male *Notechis scutatus* and in this work 336mg. These maximum yields are much higher than previously recorded average yield for *N. scutatus* of 35mg and indeed our average yield of 28–42mg depending on the geography of the snake's origin. The greater yields for *N. ater niger* over *N. scutatus* could reflect a variations in the toxic components of the venom.



The authors have found that the quantity of procoagulant toxin in the *N. ater niger* venom is only 60% of *N. scutatus*. This may have a bearing in immobilizing prey. It has previously been shown that cardiovascular depression can be caused by the procoagulant toxin in *N. scutatus* venom and the toxin could be important in immobilizing prey. Having less of this toxin in the venom could require a greater venom yield to subdue some prey items.

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BURROWING INTO ACTHA'S PAST: 1987

By Mandy Conway, Editor

The ACTHA Newsletters of 1987 started to appear more regularly and included details of some Meeting speakers and their topics. Newsletters of note have been summarised below. I have purposefully left content which today could be considered controversial because I wanted to accurately reflect the views of the time.

Anyone wishing to see any edition in full can contact The Editor.

The **March 1987** edition introduced Sue Tudor from Braidwood, and previously the SA Herpetology Group, as our new Secretary and Newsletter Editor. It called for a discussion on membership fees to cover envelopes and stamps for the Newsletter, setting up a herp library, installing a Treasurer and indeed a Committee.

April 1987:

- **membership fee** introduced; \$5 for adults and \$2 for children;
- the creation of an attendance book to be passed around at Meetings;
- a **pamphlet** produced by the then Dept. of Territories and Local Government on *'The protection and keeping of animals in the ACT and Jervis Bay Territory'* was included. It listed exempt species and licence, import and export requirements;
- an article detailing successful attempts to breed a male diamond python with a female carpet python;
- **Honey Pyner, a Bungendore Vet**, contributed an article about a 9 month old **Children's Python** she had treated. It was undersized for its age (12 inches long, 10 grams), had poor shedding, a poor appetite with recurrent parasite problems despite regular worming, low-grade dehydration and the sudden appearance of a large bulge one third of the way down the body. A 0.75cm flat stone was surgically removed but unfortunately the snake died shortly after surgery. The anaesthetic, an inflamed stomach and poor general condition were blamed. Honey recommended that small stones not be used in substrate and animals should be seen by a vet quickly if unwell to avoid gastritis or peritonitis.

May 1987 saw Sue Tudor elected as Secretary/Editor and Paul Hardiman as Treasurer, with 20 members attending April's Meeting to hear Arthur Georges give a talk on *'The Warradjan – Australia's most unusual turtle'*. The Membership fee was revised to **\$10 per adult** and \$5 for students and concessions.

A newspaper article covered the birth of nine **rare yellow Anacondas (*Unetchis noteaus*) at Joe Bredl's Reptile Farm in Renmark, SA**. "Two feet long at birth, they are born live after a four month gestation period and are aggressive from day dot. They start life eating small mice and move onto wild pigs and deer in their native country."

Another newspaper article *'Snakes aggressive only if provoked'*, advised readers to avoid local venomous snakes on the move.

The **June 1987** newsletter contained the following contributions:

'Breeding of Blue-tongue Lizards' by junior member Paul Scanlan.

*'Notes on captive breeding of the taipan *Oxyuranus scutellatus*'*, Neville Burns, RKA Journal.

'Reptile breeding: a justifiable goal?' article reprinted from the RKA Journal.

Extract: '120 reptile keepers are licenced in NSW by NPWS due to hobbyists automatically granted licences from early 1974. Many of these people have established excellent breeding records, though the newest NPWS policy disallows the distribution of arising progeny to new, unlicenced hobbyists. Licenced reptile keepers are granted permission to collect new specimens under only the rarest of incidences. Keepers would like to be able to transfer progeny of captive breedings. Common sense dictates that reptile collecting will always occur, regardless of its legality - it always has. We cannot very well breed reptiles for distribution without first obtaining breeding stock in some legal and practical manner.'

The **August 1987** newsletter reported the very sad news that Eric Worrell had died at his home in Gosford, aged 62, from a massive heart attack. Eric Worrell founded the Australian Reptile Park at Ocean Beach, Gosford, in 1946. He helped develop antivenom serums for Australia's dangerous spiders and snakes. He spent many years milking the poisonous species to send venom to the Commonwealth Serum Laboratories in Melbourne.

An interesting paper from the **NSW National Parks and Wildlife Service** was included in the **May 1987** Newsletter entitled '**All reptiles in NSW are protected --- but!**'

'Reptiles and most other native animals are protected by law in NSW. This means that reptiles cannot be killed or harmed or disturbed in any way unless they are a direct threat to life or property. It also means that reptiles cannot be sold, or kept in cages without the permission of the NPWS. However, there are some reptiles that do not suffer unduly when kept as pets and properly cared for. These are:

Cunningham Skink	<i>Egernia cunninghami</i>	Common Blue-tongue Lizard	<i>Tiliqua scincoides</i>
Shingle-back Lizard	<i>Trachydosaurus rugosus</i>	Eastern Water Dragon	<i>Physignathus lesueurii</i>
Eastern Water Skink	<i>Sphenomorphus quoyii</i>	Swamp Snake (<u>Venomous</u>)	<i>Hemiaspis signata</i>
Long-neck Tortoise	<i>Chelodina longicollis</i>	Short-neck Tortoise	<i>Emydura macquarrii</i>

'NPWS has therefore relaxed the regulations to allow two individual reptiles selected from the above list to be kept as pets. However, they must not be collected from parks and reserves. Each of these reptiles has its own preference for food and living conditions and you should be aware of these before deciding to keep one. Information on reptiles is contained in the books listed below (Goode, Swanson, Worrell, Cogger...) or write to the Australian Herpetological Society or the NPWS.'

There was advice regarding health checks, 'particularly as illness is not always easy to spot in reptiles'. NPWS also 'does not encourage the caging of native animals and wherever practical, reptiles should have the run of a yard, verandah or large enclosure.' Basic advice on enclosures was provided, along with 'the animal should not be handled too often.'

'**Any offspring?** Your reptile may give birth to young. Remember that you may legally keep only two reptiles at a time. The young are to be released after seven days into their natural environment within 40km of the area where the parents were found.* Also remember that an animal kept in captivity for most of its life loses the ability to live under natural conditions.'

* ?!

(cont'd from page 12)

Eric Worrell was made an MBE for his services to herpetology and in 1980 received the National Bank Humanitarian Award for his work on the funnel-web spider.

October 1987 and '*Is the earless dragon extinct in the ACT?*'

The article by then member Dean Ward, Zoology Dept., ANU, is summarised below.

'The Lined Earless Dragon *Tympanocryptis lineata* (Peters 1863) has not been recorded from the ACT by the CSIRO Australian Wildlife Collection in the past twenty years. It is a widespread species inhabiting diverse environments; desert, grasslands, low shrubland and even open woodland. Canberra is on the eastern most point of its distribution and represents a marginal habitat at best. With increased urbanisation, *T. lineata* has appeared to have retreated westward.'

Dean suggested at the time that ACTHA mount a survey to see if *T. lineata* had in fact become extinct in the ACT, and cited four reasons.

'Firstly, before any management plans can be drawn up, its status must be established. Our effort is worthwhile simply on the premise that we may be aiding the survival of this lizard.

Secondly, the Association is lucky to have in its membership many experienced scientists able to teach other members methodologies used in field experiments.

Thirdly, it is quite likely we could get some coverage in the local media. The repercussions of this could be increased membership - a goal worth striving for if we want a dynamic Association. This project could lend legitimacy to our group in the eyes of native fauna authorities and many otherwise closed doors may be opened.'



PARENTS WARNED ON PET REPTILES AFTER BABY BECOMES ILL

Below is a summary of an article which appeared on the front page of The Canberra Times on Mon 5 July 2010, by Peter Jean, Health Reporter.

The case of a four-month old baby girl who contracted salmonella from indirect contact with a pet Eastern Bearded Dragon has highlighted the health risks reptilian pets can pose to young children. Humans usually contract salmonella from contaminated food but the girl was exclusively breastfed and the mother was the only person to physically hold the animal.

An article published in the *Medical Journal of Australia* reveals that the girl was taken to an ACT hospital emergency department last year suffering from fever, vomiting, bloody diarrhoea. The girl was hospitalised for four days but no other family members fell ill. A team of seven doctors and scientists were involved in the case.

Laboratory testing found that the girl was the first person on ACT records to be infected with a form of salmonella known as Rubislaw, which has previously been detected in water supplies and animals in northern Australia and captive reptiles in NSW and South Australia. Between nine and 19 human Rubislaw cases were reported annually between 2000 and 2009.

The article said salmonella carried by reptiles could be transmitted through handling the animal or through contact with an object contaminated by the reptile or its faeces. Samples collected from the terrarium and the household vacuum cleaner filter all contained salmonella Rubislaw.

Hand washing may not eliminate the risk of infection as the entire surface of a reptile may be contaminated. The authors of the article recommend that owners and prospective owners of reptiles be better informed of the risks to human health, particularly the threat to children.

The family decided to have the lizard put down because of the health risk it posed.



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