ACTHA Inc. News

Your Committee for

2016 - 2017

Aug - Sept '17

ACT Herpetological

Newsletter of the

Association Inc.



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ACTHA 2017 - 2018 Membership Renewal Now Due

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Most importantly, please don't forget to note your name so I can identify it on the bank statement.

Queries:margaretning1@gmail.com.

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* Denotes Life Members

Diary date

The *bi-monthly* meetings of the Association are usually held on the third Tuesday of the month at 7.30pm. Our usual venue is:

Belconnen Soccer Club, Hawker (cnr Belconnen Way & Springvale Drive)

Upcoming meeting

Tuesday, 15 August 2017

Discover the hype: new geckos in the North, Rebecca Laver, ANU

Rebecca has recently completed her PhD through the University of Melbourne and Museum Victoria, studying diversity patterns of geckos from the Kimberley region of the Australian Monsoonal Tropics. She is currently working on various research projects with collaborators at the ANU, and is particularly interested in species formation, distributional patterns of diversity and why particular regions accumulate higher diversity than others.

At this month's ACTHA meeting, Rebecca will talk about recent surveys of the northern Australian Monsoonal Tropics which are revealing many new species and higher than expected levels of biodiversity, particularly herpetofauna. She will introduce you to some of our newly described geckos, a few exciting new diversity 'hotspots' within the Kimberley, and discuss the complexities of 'cryptic species' discovery.

New Waterwatch Coordinator for Yass Region



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Above: Taken from YaN (Yass Area Network & Landcare Groups e-news, July 2017

Freshwater Turtles of Australia

John Cann, Ross Sadlier Hardback, August 2017, CSIRO Publishing, 9781486308248, 464pp, 235x305mm

'Australia is home to a diverse freshwater turtle fauna including more than 25 species and an array of sidenecked turtle subspecies. The biology and ecology of Australian freshwater turtles is complex and a number of species are of particular conservation concern. Many affected species are found on Australia's east coast, where the river systems are most heavily modified due to the pressures of development.

Freshwater Turtles of Australia is a beautifully illustrated and comprehensive update of the 1998 edition. It reviews new information on the biology of Australian chelid turtles, presents recent perspectives and insights into their history and taxonomy, and provides an introduction to the freshwater turtles of New Guinea and Irian Jaya to Australia's north. This landmark work brings together years of research and experience and will serve as an important reference



for researchers, academics and herpetologists for many years to come.'

Ed. This book will be available on 1 August '17. I have found several websites advertising it from \$105 to \$150 (some with/without postage). I would suggest Googling online retailers.



Travels through Papua New Guinea to the land of the Rupahi clan, Wau Creek

and an introduction to Matt Young's *Carettochelys* PhD

This summary by Margaret Ning.

At our ACTHA meeting of 20 June 2017 **Matt Young** entertained us with a series of slides on the Pig-nosed Turtle (PNT) Carettochelys insculpta in Papua New Guinea (PNG) and northern Australia, and outlined his intended PhD project. Matt is from Arthur Georges' lab at the University of Canberra.

PNG is one of the world's 17 megadiverse countries, a High-Biodiversity Wilderness Area, and is the world's largest (890,000 km²) and highest (5,030 m) tropical island. A bit like Mexico (in our previous bi-monthly talk), its topography ranges from glaciers to tropical rainforest. New Guinea has a diverse range of ecosystems, such as alpine grassland, montane forest, savanna, lowland rainforest, wetlands and coastal mangroves resulting from the dramatic gradients of elevation, temperature and rainfall caused by tectonic uplift of the central mountain range. It has the third largest rainforest area in the world. Matt's opening slides set the scene beautifully - see the ecoregion map above (WWF).

It is estimated there are many hundreds of herpetofauna species in New Guinea that remain unknown to science, and have yet to be described. 82% of its herpetofauna species are endemic to the New Guinea area, with many others shared with Australia or Indonesia. Matt showed us the following table so we could compare species richness of New Guinea herpetofauna with Australian. In case you were wondering, New Guinea is only 0.6% of the earth's land area, compared with Australia being 5.15%.

New Guinea's background is that it was once joined to Australia by a land bridge that varied in size over the years, enabling the herpetofauna to move back and forth (Interactive map available at: http://sahultime.monash.edu.au/explore.html). Matt let us know when any of the species he showed us were currently found in both PNG and Australia.

In November 2016, Matt travelled to PNG with Arthur Georges (*University of Canberra*), Deborah Bower (*James Cook University*) and Simon Clulow¹ (*University of Newcastle*) with a view to: conduct herpetofauna surveys on PNT

Vertebrate spp.	New Guinea	Australia	World	% World (NG)	% World (AUS)
Anurans (frog or toad)	381	242	7,301	5.2	3.3
Reptiles	384	1041	10,450	3.7	10.0
Total	765	1,283	17,751	4.3	7.2

Above: Species data from: Amphibian Species of the World 6.0. American Museum of Natural History, & Uetz, P. and Hošek, J. 2017 The Reptile Database

¹ Note that Simon Clulow is associated with the discovery of Mahony's Toadlet, that was the subject of an article in the last ACTHA newsletter.

nesting biology and harvest; embark on frog discovery and collection; and advise on effective community-led conservation action in



the Kikori River catchment.

Matt's PNG

adventures occurred in the Kikori region in the Gulf of Papua. It is a difficult place to get to, an adventure in itself, requiring travel by plane, helicopter, 4WD, and a day's boat

ride up the Kikori River and tributaries. The 1608 ha Wau Creek protected area is part of the larger Rupahi Clans territory. They have set aside this land as a conservation area for the PNT. Once there, the researchers and Rupahi clan members explored the waterways and jungle. The research team collected data on the PNT nests including distance from waterline, the number of eggs, predation from monitor lizards and, further afield, data on human predation, i.e. poaching. In the clear upstream creeks the researchers and clan members dived for PNTs, which at that time of year congregate in pools next to nesting beaches. It was easy to determine where PNT nests were from their distinctive tracks in the sand. Less easy to negotiate was the forest, especially with the painful Calamus species of palm tree that Matt had encounters with, but it was all pretty amazing regardless of the spikes and bites!



The frog research team led by Deb and Simon spent each night combing the forest. They trialed a method for catching arboreal frogs from the canopy using PVC tubes, which some of the Rupahi clan men attached to branches. However the frogs didn't like the artificial habitat. The frogs come out at night, with some being arboreal and others down in the leaf litter. Matt told us how some of the frogs he encountered changed colour between night and day, probably trying to blend into their surroundings.

Matt's pics were colourful, and he worked through them, letting us know items of interest about each species. His slides included around 30 frog species, two dragon species, three gecko species, one crocodile species, four snake species, 13 lizard species and 2 turtle species, all of which are found within the 1608 ha conservation area. With the frogs, there were often a couple of slides of each species which often illustrated how radically different individuals could look.

Right: <u>New</u> <u>Guinea Tree Frog</u> <u>or Green-eyed</u> <u>Tree Frog (Litoria</u> genimaculata) - is one of the tree frogs with different colour at night time.



<u>White-lipped Tree Frog</u> (*Litoria infrafrenata*) - arboreal and also found in Australia

Choerophryne crucifer – only scientifically described this year in May 2017!

Callulops sp - a genus of 15 species restricted to New Guinea and the Maluku Islands (~4 sp). It uses tree hollows to amplify its call.

Oreophryne aurora - another species with a colour change between day and night. Its eggs are laid terrestrially and hatch into small frogs.

Details on many of the frogs in Matt's presentation are to be published by Deb and Simon. There were some weird looking 'fatty' frogs in the mix.

<u>Rocket Frog</u> (Litoria spp) - can leap up to 1m in a single bound.

<u>Arfak Mountains frog</u> (*Rana arfaki*) - bigger than the palm of a hand - one of the biggest out there.



Left: <u>Horned Land</u> <u>Frog (Sphenophryne</u> *cornuta*) - the male of the species guards the eggs and carries the froglets around on his back, and one hops off every now and then, and that is how they disperse.

Wokan <u>Cannibal Frog or Sandpaper Frog</u> (*Lechriodus melanopyga*) - Widely distributed across New Guinea, up to 1,100m above sea level. Terrestrial, breeds in ephemeral habitats, swamps/puddles and the larger tadpoles cannibalise the smaller ones.

Dragons



<u>Crown Forest Dragon</u> (*Hypsilurus dilophis*) easier to find at night, and at eye level on tree trunks, and is up to 45cm. Widely distributed across NG, and is omnivorous and egg laying.

<u>Water Dragon</u> (*Hypsilurus magnus*) widely distributed across NG, up to 80cm, active during the daytime and is arboreal. It hangs out over water and dives in when threatened.

Geckoes

Right: Southern Bent-toed Gecko

Cyrtodactylus novaeguineae) - nocturnal and arboreal, 20cm, insectivorous, lays 2 eggs, and was responsible for biting Matt a few times.

<u>Serrated Bent-toed Gecko</u> (*Cyrtodactylus serratus*) - basically the same characteristics as the previous gecko, but has a good-natured temperament and didn't try to bite at all.

Crocodile

Pukpuk, <u>Freshwater Crocodile</u> (*Crocodylus novaeguineae*) - a >2m specimen was captured (and eaten), in which they found PNT flippers (PNT corpse in shallows nearby). During the night when the PNTs are making their way to nesting beaches they traverse shallow areas between pools, the crocs must lurk and predate on them there where they're easier to catch.

Pythons

<u>Green Tree Python</u> (*Morelia viridis*) widely distributed in New Guinea and northern Australia. Nocturnal and arboreal, grows up to 2m, ambushes small mammals, and is oviparous



(egg laying). The juveniles are yellow/red, changing to green at around one year. It is harmless and a beautiful young yellow one was the highlight of the trip.

<u>Amethystine Python</u> (*Morelia amethistina*) - has iridescent scales, is widely distributed in New Guinea and northern Australia. It is nocturnal and arboreal, eats mammals (rodents to wallabies), and is New Guinea's largest snake (grows up to 8.5m).

<u>Brown Cat Snake</u> (*Boiga irregularis*) - widely distributed in New Guinea, is nocturnal and arboreal, lays eggs and grows up to 2m. It is an aggressive snake that eats small rodents, frogs, birds, lizards and bats, and is mildly venomous, mostly due to its small fangs.

<u>Slatey-grey Snake</u> (*Stegonotus parvus*) nocturnal and specimens were found on the forest floor, to 80 cm, lays eggs, and eats small lizards and frogs. It is mildly venomous, and is the most aggressive snake Matt came across



while in PNG. They devised the most ingenious captive method for this species.

"Skinks. There was a bit of the 'little brown skink' syndrome about some of the skinks, but others were breathtakingly colourful." Margaret said.

<u>Mueller's Forest Skink</u> (*Sphenomorphus muelleri*) - nocturnal and fossorial (burrowing), to 40 cm, and eats earthworms and other invertebrates. It is a large colourful skink that ran away rather than be photographed.

Indonesian blue-tongued skink (*Tiliqua gigas*) - is a close relative of our Eastern Blue-tongued Skink.



Left: <u>Pacific Blue Tailed</u> <u>Skink</u> (*Emoia caeruleocauda*) - widespread in the Pacific Islands, diurnal, to 10cm with an absolutely breathtakingly beautiful blue prehensile tail.

Shrub Whiptail Skink (Emoia longicauda) extremely widespread species (New Guinea,

Solomon Islands, Torres Strait, and eastern Cape York Peninsula, Australia). Diurnal and arboreal, to 10 cm, and there were lots on the walls of the Wau Creek research hut.

Turtles

<u>Southern New Guinea Snapping Turtle</u> (*Elseya rhodini*) - an omnivore. The juveniles are bright red, but fading with age, carapace (the hard upper shell) to 25 cm, and is currently listed as vulnerable.



Above: <u>Pig-nosed Turtle</u> (*Carettochelys insculpta*) - has a distribution of southern New Guinea and northern Australia and is currently listed as vulnerable. Is an omnivore (mangrove fruit, crustaceans, carrion), grows to 55cm carapace length.

Matt's PhD study species - Pig-nosed turtle (*Carettochelys insculpta*)

Wildlife trafficking is an increasing threat to PNTs, with thousands passing through the black markets of South East Asia each year. The species is also a food item for Indigenous peoples in PNG's subsistence communities and Australia. A lack of recent tribal warfare in PNG has led to an increase in permanent settlements near rivers where the turtles nest, and people can now get to places that they couldn't before. Settlements permanently near water and modern technology such as boats and nets, etc., have led to a lot of unsustainable harvesting of the species. In studies done on the Kikori River and Vriendschap River of New Guinea, more than 95% of nests were harvested (up to 100% in some locations), nesting females are also corralled and end up in market places, which in the Kikori catchment has all led to an estimated >57% decline since the 1980s.

The aim of Matt's project is to establish phylogenetic and phylogeographic information for pig-nosed turtles in a wildlife forensics context, combining this information into a Geographic Origin Assignment test. Applied to illegally trafficked individuals seized by customs officials, the test will identify source populations, allowing repatriation of turtles to the rivers they are from, prosecution of wildlife smugglers and identify poaching hotspots. Matt will also be determining if the scale that the Piku Project (PNT conservation project in the Kikori River catchment) currently functions is effective by determining rates of dispersal between the Kikori and other river catchments within the Gulf of Papua. If the turtles are moving between catchments the conservation program will have to be more widespread to be effective, otherwise unsustainable hunting and poaching in adjacent catchments may still cause a decline in the Kikori population of PNT.

Matt will also focus on the evolutionary history of PNTs across Australia and New Guinea, resolve any taxonomic uncertainties, provide information for conservation management and investigate if PNT exhibit natal philopatry (where females return to the beaches they were born to lay their eggs).



From Pg 5, above: Pukpuk, <u>Freshwater</u> <u>Crocodile</u> (*Crocodylus novaeguineae*) - a >2m specimen was captured (and eaten), in which they found PNT flippers (PNT corpse in shallows nearby).

Questions and Answers

Q: Are there any attempts to breed them?A: Essentially no conservation breeding program, but there may be a couple of people with captive populations that breed them.

Q: How are they trapped?

A: You cannot use traps due to crocs also becoming tangled, and you cannot dive/snorkel in areas with saltwater crocs. You can identify nests and eggs, hatch them out and take a sample. Q: How many trips do you plan to make?

A: It may be difficult to get into West Papua. Matt will contact World Wide Fund for Nature (WWF) to see if they can help to collect some samples. Matt plans to spend one season at his Australian sites. It takes ages to travel in PNG as travel arrangements may easily go askew.

Q: Trade through Indonesia - is it possible to get samples?

A: If there are good samples they will be used.

Q: Are you after other Australian sites?

A: There may be unknown Australian PNTs mixing with PNG populations. Matt might go and check out Torres Strait and Cape York, as he believes there may be undiscovered sites there. (Matt said the PNTs are a soft-shelled turtle that like the water conditions from limestone territory, because these conditions prevent fungal and bacterial diseases.)

Q: Greg F. said that he had seen PNTs in Jabiluka Billabong.

A: Matt said he only has one sample from the South Alligator River catchment, so that might be a place he could get more samples from.

Q: Do you plan future trips on your own?

A: Matt said in Australia he'll stick to one site per catchment, while in New Guinea he'll try and get coastal and upstream populations sampled.



The **Australian & International Scene**, which starts over the page, is compiled from information provided by long-time ACTHA members Tony, Dierk, Margaret and Janet. *Many thanks for their continual contributions without which we would not have this segment!* Have you got an interesting story or photo? Then feel free to send it to this Ed. mandycnwy@gmail.com

The Australian & International Scene

This is how a frog's tongue works

By Australian Geographic staff, 1 February 2017

Frogs are renowned for catching prey at high speeds – faster than a human can blink, hitting their unsuspecting meals with a force several times greater than gravity.

But while previous studies have suggested the frog tongue holds on to its prey by working like sticky tape, such adhesives struggle to work on textured surfaces like that of insects. Instead, new research published this week in the *Journal of the Royal Society Interface* has found frogs use a unique kind of 'reversible' saliva combined with an ultra-soft tongue to hold onto prey.

The researchers, from the Georgia Institute of Technology (Georgia Tech) in the USA, filmed frogs eating crickets in super-slow motion to better understand the physics of the tongue. They also collected saliva samples and measured the softness of the tongue tissue.



Above: A northern leopard frog catches a cricket. Image: Candler Hobbs.

They found that frogs' saliva turns from watery to thick and sticky during prey capture, then thin and watery again as the prey is released inside the frog's mouth – allowing it to flow on impact, and grip during retraction. The researchers also determined that the tissue of a frog's tongue is incredibly soft – as soft as brain tissue; 10 times softer than a human's tongue, enabling it to stretch and store energy like a spring.

"The tongue acts like a bungee cord once it latches onto its prey," explained Alexis Noel, a Georgia Tech mechanical engineering PhD student who led the study.

"When the tongue first hits the insect, the saliva is almost like water and fills all the bug's crevices. Then, when the tongue snaps back, the saliva changes and becomes more viscous – thicker than honey, actually – gripping the insect for the ride back. The saliva turns watery again when the insect is sheared off inside the mouth," said Alexis. The combination of saliva and tissue softness is so effective, it provides the tongue with 50 times greater work of adhesion than synthetic polymer materials. The findings could help engineers design new reversible adhesives at high speeds, using the same principles.

"Most adhesives that have been created are stiff, especially tape," said David Hu, a professor at Georgia Tech and Alexis's supervisor. "Frog tongues can attach and reattach with soft, special properties that are stickier than typical materials. Perhaps this technology could be used for new band-aids. Or it could be used to create new materials in soft manufacturing."

Pet Black-headed Python bites, 'handcuffs' Sunshine Coast owner

By Chloe Brice, ABC News, 15 January 2016

A Sunshine Coast woman was bitten and "handcuffed" by her pet python at 3am, prompting an unusual over-the-phone rescue bid by a local snake catcher and her housemate.

The woman was handling the black-headed python in her Sippy Downs home when it bit her on the thumb and constricted her hands together. The woman's housemate was woken by her screams and contacted snake catcher Stuart McKenzie to assist.

After a few failed attempts at talking him through loosening the grip of the pet, the concerned

housemate sent him a picture of the bind.

Right: A snake catcher talked the terrified man through untangling the snake from his housemate's hands over the phone. Image: The Snake Catcher

"The guy was very relaxed and kept her calm while he tried to uncoil the snake, but with no luck.

"I then told him that he would have to head-grab the python in order to be a bit more forceful with uncoiling it... after about 20 mins on the phone they were finally able to get the snake off...

"Thank goodness for that!

At one stage I thought I was going to have to get in my car and drive over and give them a hand," he said.

Growling grass frog discovery in Victorian wetland boosts chances of receiving environmental water

By Simon Galletta, ABC News, 31 March 2017



Above: The growling grass frog lives in wetlands preying on other frogs, but can also survive on small insects. Image: Peter Barnes

The top north-west corner of Victoria is known for being a beautiful part of the state, with the mighty Murray River meandering through parts of the Mallee with red dust, river gums and salt bush dotting the landscape.

Now it could become well known for something else — the rare and endangered frog which has, until now, never been recorded at Neds Corner Station.

Neds Corner Station backs onto the Murray River, and includes a creek that can run about two metres deep during floods.



Above: Peter and Colleen Barnes point out where the endangered frogs were spotted on their property. Image: ABC News, Simon Galletta

The station's manager, Peter Barnes, said the Murray River flooding in November 2016 — which saw water levels rise as high as 10 metres — prompted the frogs' breeding. He said that was why they were now being spotted along the creek.

"They had to have probably been here sometime before, but we just haven't come across them," he said.

"Now [the creek has] dried back to just puddles in the bottom of it, with a lot of shrubbery and greenery around the sides — which is just perfect for the growling grass frog.

"We came along and found about 14 of them as we walked slowly along the bank."

Above: The endangered growling grass frog was spotted in wetlands in Victoria's north-west. Image: supplied Museum Victoria.

The growling grass frog is only a few centimetres long, and as they grow, they become a yellow or a pinkish grey colour with iridescent green pigment on their heads and along their spine.

They live in wetlands preying on other frogs, but can also survive on small insects.

Hopes for water allocations

Mr Barnes' wife Colleen is the conservation manager at the station and said the discovery of the frogs had increased the station's chances of receiving water allocations.

"If we don't have these water allocations they will eventually dry up and disappear along with a lot of these endangered species" she said.

James Kellerman, the executive co-ordinator of operations at the Mallee Catchment Management Authority (CMA), said they were always on the lookout for protecting environmentally endangered species.

He said while the discovery did not automatically open up the wetlands to water allocations, it did increase its chances.

"We keep a list of every single wetland that's in the region and the fact that there is that frog there is a consideration for us definitely," he said.

But Mr Kellarman said while the Mallee CMA would make recommendations, ultimately the decision lay with the Victorian Environmental Water Holder

A spokeswoman for the Victorian Environmental Water Holder said it was in the process of developing its state-wide water plan.

She said if the Mallee Catchment Management Authority proposed to water sites at Neds Corner Station, it might be eligible to receive environmental water in 2017-18.

The spokeswoman also said that water allocations for the environment were separate to industry, farming and irrigation allocations.

Dinosaurs' loss was frogs' gain: the upside of a mass extinction

By Robert Sanders, University of California -Berkeley, 3 July 2017

A new study by Chinese and American biologists shows that if the calamity had not wiped the planet clean of most terrestrial life 66 million years ago, 88 percent of today's frog species wouldn't be here. Nearly nine out of 10 species of frog today have descended from just three lineages that survived the mass extinction.



Above: The frog Hyla sanchiangensis from eastern China is a descendant of one of three lineages (Hyloidea) that made it through Earth's last mass extinction 66 million years ago to flourish worldwide today. It's ancestors diversified out of South America. Image courtesy of Peng Zhang, Sun Yat-Sen University.

The results, to be published in the journal *Proceedings of the National Academy of Sciences*, are a surprise, because previous studies of frog evolution pinpointed the blossoming of the main frog lineages today to about 35 million years earlier, in the middle of the Mesozoic era. The new analysis of 95 genes from frogs within 44 of 55 living families shows that these three lineages started to take off precisely at the boundary between the Cretaceous and Paleogene periods -- the K-Pg boundary, formerly called the KT boundary -- when the last mass extinction occurred, and not 100 million years ago.

According to herpetologist and co-author David Wake, a University of California, Berkeley professor of the graduate school and a curator of the Museum of Vertebrate Zoology, new frog species likely radiated rapidly throughout the world because so many environmental niches were available after the animals occupying them disappeared.

"We think the world was quite impoverished as a result of the KT event, and when the vegetation came back, angiosperms dominated. That's when trees evolved to their full flowering," Wake said. "Frogs started becoming arboreal. It was the arboreality that led to the great radiation in South America in particular."

Trees are an ideal habitat for frogs not only because they allow them to escape from terrestrial predators, but also because their fallen leaves provide protection while the frogs are on the ground, breeding habitat and plenty of food, such as insects. Trees and other flowering plants took off in the late Cretaceous, and were ready for exploitation by frogs after they recovered from the extinction.

Another adaptation that became popular was direct development, that is, producing young without a tadpole stage, which is standard for about half of all frog species today.

"The majority of the frogs that thrive now are thriving because of direct development of eggs in terrestrial situations," he said. "It is a combination of direct development and use of arboreal habitat that accounts for a great deal of the radiation."

Previous genetic analyses of frog evolution focused on mitochondrial DNA and how long the molecular clock had been ticking for mitochrondrial genes. However, analysis of molecular evolution in mitochondrial DNA often produces dates for lineage divergence that are too old. In the case of frogs, such analysis pinpointed the radiation of most living frogs at about 100 million years ago, which was a puzzle, since Earth's environment was stable at that time. A changing environment typically drives evolution.

The new analysis, based on data assembled primarily by graduate student Yan-Jie Feng at Sun Yat-Sen University in Guangzhou, China, focused on the sequences of 95 genes located on chromosomes in the nucleus and how they changed over time. He and his colleagues gathered genetic data from 156 frog species and combined this with earlier information about two genes from 145 different frogs, for a total of 301 distinct frog species from all 55 families of frogs. The data were calibrated using 20 dates derived from fossils and Earth historical events.

The team, which includes scientists from the Florida Museum of Natural History at the University of Florida and the University of Texas, Austin, concluded that perhaps 10 groups of frogs survived the extinction, but only three of them (*Hyloidea*, *Microhylidae*, and *Natatanura*) flourished and diversified to claim habitats and niches around the world.

Nothing other than luck distinguishes the survivors, Wake said. Remnants of the other surviving lineages are scattered in isolated spots around the world, but are just as diverse today in their habitats and breeding strategies as the 88 percent.

Two of the three surviving lineages that subsequently radiated widely came out of Africa, which remained intact as the continents shifted around over the ensuing eons, with the breakup of Pangea and then Gondwana to form the continents we see today. The African rift zone and mountain building in West Africa generated new habitats for the evolving frogs, Wake noted. The third, *Hyloidea*, radiated throughout what became South America.

Today's frogs, comprising more than 6,700 known species, as well as many other animal and plant species are under severe stress around the world because of habitat destruction, human population explosion and climate change, possibly heralding a new period of mass extinction. The new study provides one clear message for future generations.

"These frogs made it through on luck, perhaps because they were either underground or could stay underground for long periods of time," Wake said. "This certainly draws renewed attention to the positive aspects of mass extinctions: They provide ecological opportunity for new things. Just wait for the next grand extinction and life will take off again. In which direction it will take off, you don't know."

Rare reptiles taken from outback Queensland, two men charged

By Leonie Mellor ABC News, 17 July 2017

More than 30 protected wild animals including rare frogs and snakes worth more than \$160,000 have been found by police in the car of two men in outback Queensland.

The officers pulled over the men, 19 and 27, during a patrol of Mt Isa on July 13, when they suspected suspicious behaviour.



Above: The animals have been given to the Environment Department for release back into the wild. Image: Supplied, Qld Police Service.

"The police conducted an inquiry with these two males on the side of the road and something didn't sit right with them," Detective Acting Sergeant Jarrod Horne said.

"Upon making further inquiries they realised there was something further happening here and as a result the vehicle was searched and those animals were located."

A search of their car uncovered 32 animals including a black-headed python, blue-tongue



Above: A spiny-tailed monitor was rescued from the men. Image: Supplied, Qld Police Service.



Above: The men, aged 19 and 27, are due in court next month. Image: Supplied, Qld Police Service.

lizard, rare frogs and lizards, snakes, geckos and skinks.

The two rare frogs died due to the poor conditions they were being kept in.

Detective Horne said police were yet to verify some of the animals.

He said the majority were believed to have been taken from the Northern Territory, but some had also come from north-west and south-west Queensland.

"Unfortunately we had two quite rare species of frogs," he said.

"They didn't make it. They perished. They just couldn't survive the conditions they were being kept in."

The creatures have been handed over to Environment and Heritage Protection staff and were released back into the wild.

A 19-year-old Dalby man and a 27-year-old Lower Beechmont man have been charged with nine counts of taking protected wildlife.

Further charges are expected to be laid.

The two men are scheduled to appear in the Mount Isa Magistrates Court on August 7. If found guilty they face a maximum of two years in prison.

A venomous paradox: how deadly are Australia's snakes?

By Ronelle Welton & Peter Hobbins, The Conversation, 22 June 2017

Australia is renowned worldwide for our venomous and poisonous creatures, from snakes, spiders and ticks on land, to lethal jellyfish, stingrays and stonefish in our waters. Even the shy platypus can inflict excruciating pain if handled without due care.

Yet while injuries and deaths caused by venomous snakes and jellyfish are often sensationalised in the media, and feared by international visitors, a recent review found that very few "deadly" Australian animals actually cause deaths. Between 2000 and 2013, there were two fatalities per year from snake bites across Australia, while the average for bee stings was 2.2 and for jellyfish 0.25, or one death every four years. For spiders – including our notorious red-backs and Sydney funnel-webs – the average was zero.

Snakes nevertheless strike fear into many people who live in or visit Australia. When we have a higher risk of injury or death from burns, horses, bee

stings, drownings and car accidents, why don't we fear these hazards as we do the sight of a snake?

Snakes and statistics through history

When settlers arrived in Australia in the late 18th century, they believed that Australian snakes were harmless. By 1805 it was accepted that local serpents might kill humans, but they were hardly feared in the same way as the American rattlesnake or Indian cobra.

Until the 1820s, less than one human death from snake bite was recorded each year; in 1827 visiting surgeon Peter Cunningham remarked that:...comparatively few deaths [have] taken place from this cause since the foundation of the colony...

Similar observations were made into the 1840s. What the colonists did note, however, was the significant death toll among their "exotic" imported animals, from cats and sheep to highly valuable horses and oxen.

By the 1850s, living experiments in domestic creatures – especially chickens and dogs – were standard fare for travelling antidote sellers. Given the popularity of these public snake bite demonstrations, from the 1860s, doctors and naturalists also took to experimenting with captive animals. It was during this period that official statistics on deaths began to be collated across the Australian colonies.

One sample from 1864–74, for instance, reported an average of four snake bite deaths

per year across Victoria, or one death per 175,000 colonists. In contrast, during the same period one in 6,000 Indians died from snake bites each year; little wonder that around the world, Australian snakes were considered trifling.

The 1890s represented a dramatic period of divergence, though. On one hand, statistical studies in 1882–92 suggested that on average, 11 people died annually from snake bite across Australia. Similar data compiled in Victoria led physician James Barrett to declare in 1892 that snakes posed "one of the most insignificant causes of death in our midst". On the other hand, by 1895 standardised laboratory studies, aimed especially at producing an effective antivenom, saw a global recognition that Australian snake venoms were among the most potent in the world.

In Sydney, physiologist Charles Martin claimed that Australian tiger snake venom was as powerful as that of the cobra. In 1902, his collaborator Frank Tidswell ranked local tiger



Above: A Coastal Taipan is milked for its venom. The Coastal Taipan is considered the second deadliest snake in the world, its bite has enough venom to kill 50 adult humans. Image: Reuters/Mick Tsikas.

snake, brown snake and death adder venoms at the top of the global toxicity table.

Over the ensuing century, this paradox has remained: why do so few Australians die from snake bites when our serpents have the world's most potent venoms? Why aren't they more deadly?



Above: Australian scientists researching the long glanded blue coral snake have found it could provide clues to improving pain management in humans. AAP Image: Tom Charlton, University of Queensland.

Deadly fear

Scientific research has delivered ever-expanding knowledge about venoms, what they do, how they work, how they affect us clinically, and their comparative "potency" based on animal studies. In response we have introduced first aid measures, guidelines, effective clinical management and treatment, which in Australia forms one of the world's best emergency health care systems.

In contrast, countries where snakebites cause far more deaths generally face challenges in accessing affordable essential medicines, prevention and education options.

Above: Australian scientists researching the long-glanded blue coral snake have found it could provide clues to improving pain management in humans. Image: Tom Charlton, University of Queensland

Snakes form an essential part of their ecosystems. They do not "attack" humans, mostly being shy animals, but are defensive and prefer to escape.

It would seem that venom potency is not a good measure of deadliness, and it may be a combination of our history, behaviour and belief that creates a cultural fear.

Without understating the potential danger posed by venomous snakes, what we offer instead is reassurance. As nearly two centuries of statistics and clinical experience suggest, most snake bites in Australia are survivable, if managed quickly, calmly and effectively. In fact, encounters with humans all too often prove deadly to the snakes themselves – a paradox that is within our power to change.

World Snake Day - 16 July 2017

Information from: 2017 Days of The Year Ltd "Snakes have gotten something of a bad rap over the past few thousand years. What with that one snake tricking that nice lady nice lady into eating an apple way back when, thus condemning the entire human race to mortality, snakes have been mistrusted if not flat-out feared. And while it is understandable that people may fear an animal that can easily kill them, we think these fascinating, diverse creatures that range from several inches to 30 feet long, and from friendly and docile to aggressive and deadly, deserve for people to find out more about them.

The History of World Snake Day

The snake is one of the oldest mythological characters and has been revered by civilizations the world over. There are about 3,458 species of snakes known so far, ranging from the semifrozen tundra of northern Canada to the steamy jungles of the equator and most of the world's oceans. Snakes are highly effective predators and play a vital role in maintaining the balance of nature in each of these realms. Snakes are also fascinating in that they have a prehistoric lineage, thus giving us a glimpse back to a prehistoric time when the earth was ruled by reptiles—many people have no idea that modern reptiles are literally the living, breathing cousins of dinosaurs.

The species that seem to fascinate people the most are the King Cobra, the largest venomous

snake in the world most people have seen in movies being coaxed out of a basket by a snake charmer; the Rattlesnake, that has forced countless people to suck its poison out of the bite before it's too late; and the Reticulated Python, the world's longest snake that kills its prey by strangling it.

World Snake Day was created to help people learn more about these animals and how much they contribute to the world as we know it.

To celebrate the legless reptiles, National Geographic is showing off a collection of Joel Sartore's vivid snake photographs. From a pet snake in Japan to a green tree python at the Riverside Zoo in Nebraska, the following pictures showcase pieces from the National Geographic Photo Ark, which Sartore uses to spread awareness about animal conservation.



Above: A European long-nosed viper, Viper ammodytes ammodytes, at the St. Louis Zoo. Photography by Joel Sartore, National Geographic Photo Ark.





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