

The Natter Jack



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NEWSLETTER OF THE BRITISH HERPETOLOGICAL SOCIETY

Back from the Brink - Grand Cayman Blue Iguana Success Story



While thousands of species are threatened with extinction around the globe, efforts to save the Grand Cayman blue iguana represent a rarity in conservation: a chance for complete recovery.

Coordinated by the National Trust for the Cayman Islands, the Blue Iguana Recovery Programme — a consortium of local and international partners (including BHS) — has successfully released more than 500 captive-bred reptiles since the initiative's inception in 2002, when the wild population of iguanas numbered less than two dozen.

“For the past several years, we’ve succeeded in adding hundreds of animals to the wild population, all of which receive a health screening before release,” said Dr. Paul Calle, Director of Zoological Health. Bronx Zoo.

Fred Burton, Director of the Blue Iguana Recovery Programme said, “We expect to reach our goal of 1,000 iguanas in managed protected areas in the wild in a few years. After that we will monitor the iguanas to make sure they are reproducing in the numbers needed to maintain the wild population. If we get positive results, we will have succeeded.”

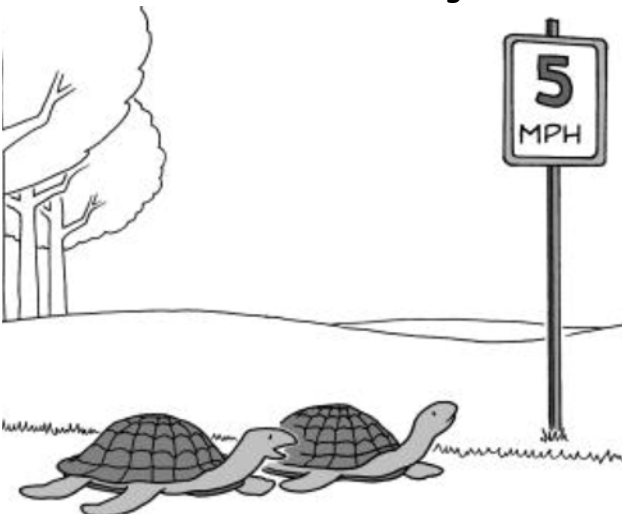
The Grand Cayman blue iguana is the largest native species of its namesake island, growing to more than 5 feet in length and sometimes weighing more than 25 pounds. The iguana formerly ranged over most of the island’s coastal areas and the dry shrub lands of the interior before becoming endangered by a combination of habitat destruction, car-related mortality, and predation by introduced dogs and cats. The entire island’s wild population in 2002 was estimated at only 10-25 individuals.

Recovery efforts to save the Grand Cayman blue iguana have mostly centered on the Salina Reserve, a 625-acre nature reserve located on the eastern side of the island. After being hatched and raised for a year or two in a captive breeding facility, each iguana receives a complete health assessment before release. This involves veterinarians taking blood and faecal samples for analysis, as well as weighing and tagging each reptile. The samples are analysed in a nearby lab at the St. Matthews Veterinary School while sampling continues. The iguanas are released after the lab results are reviewed and health is verified. This year the recovery programme is releasing iguanas into a new protected area, the Colliers Wilderness Reserve, established last year and managed by the Cayman Islands’ National Trust. ❖

Source: www.sciencedaily.com

Hilarious Herps

'Since when did the world get into such a big hurry?'



Gecko Treatments Slammed by Philippine Government

PHILIPPINES - The Philippines government has warned that using geckos to treat AIDS and impotence could put patients at risk. Environmental officials expressed alarm about the growing trade in the wall-climbing lizards in the Philippines. An 11-ounce gecko can reportedly sell for \$1,160 (£734).

Geckos are reportedly exported to Malaysia, China and South Korea to be used as aphrodisiacs and as traditional medicine for asthma, AIDS, cancer, tuberculosis and impotence. A health department statement said 'their use as medical treatments has no scientific basis and could be dangerous because patients might not seek proper treatment for their diseases'.

'This is likely to aggravate their overall health and put them at greater risk'. The statement said treatments for asthma are easily available and affordable, while there are antiviral drugs to control the progress of HIV.

Wildlife official Mundita Lim said her office asked law enforcers to look into the possibility that scammers may be trying to get involved in the trade because of the exorbitant prices being quoted online by buyers demanding geckos weighing at least 14 ounces.

She said geckos in the wild tend to grow up to 7 ounces, and those in captivity can grow up to 10 ounces. According to Lim, geckos are dried and then pulverised to use as medicine, and there are anecdotal accounts of the saliva, tongues or internal organs being collected.

Environment Secretary Ramon Paje warned that collecting and trading geckos without a permit can be punishable by up to four years in jail and a fine of \$6,900 (£4,300). ❖ *Source: www.redorbit.com*

Editor's Note: The article refers to tokay geckos. The average salary for 2011 in the Philippines is \$5,800 (£3,673) per annum (Zdnet Asia).

The Toll of Trash - Sea Turtle Dies After Swallowing 317 Pieces of Plastic

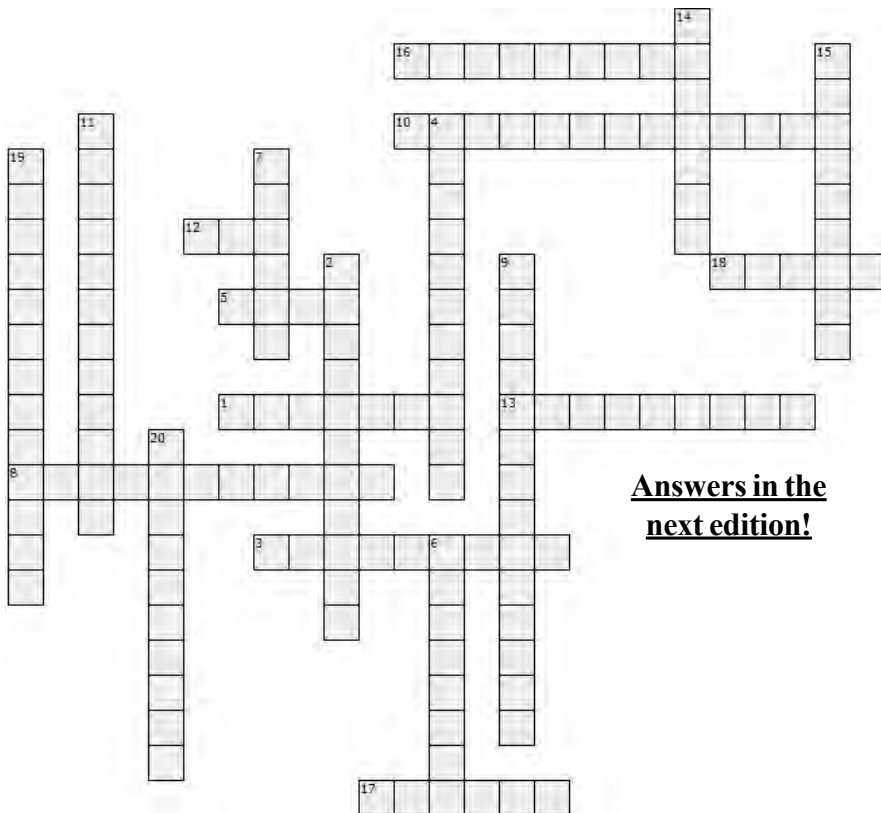
AUSTRALIA – Plastic bags, small lids and even lollipop sticks were among the 317 pieces of plastic found in the digestive system of a green sea turtle who washed ashore on a New South Wales beach in early August. The young turtle was the worst case Rochelle Ferris and her team of volunteers at Australian Seabird Rescue had seen during their 15 years of work in the area.

The team responds to 'about 40 sea turtle strandings a year that are directly related to plastic ingestion' according to Ferris. Unfortunately, the turtles mistake the plastic pieces for food.

A shocking 36 percent of sea turtles are affected by marine debris such as plastic, according to recent research at the University of Queensland. Although the Australian Federal Government has addressed the issue, it is obvious that more needs to be done to reduce the amount of waste entering the ocean and inevitably destroying its inhabitants. ❖

Source: Leanne Hall, www.abc.net.au

The NJ Puzzler No. 3



**Answers in the
next edition!**

NJ Puzzler No. 2 - Answers

Across

1. Sloughing
3. Hellbender
4. Chameleon
6. Brown tree snake
9. termites
11. Dwarf caiman
15. Tokay
16. Stink pots
17. Elapid
18. Mole viper
19. Lizard
20. Mussarana

Down

2. Smooth snake
5. Cobras
7. Dart frogs
8. Insects
10. Eggs
12. Midwife toad
13. Leatherback turtle
14. King cobra

You Know You're A Herper When...

- You have more pictures of reptiles on your computer than anything else
- Your reptile cages are clean and spotless but the house is a total wreck.
- You don't need a ceiling light in your room because your reptiles UVB and heat lights are bright enough.

ACROSS

1. These are often laid down when conducting a survey on the presence of herpetofauna at a site. (7)
3. What does the leatherback turtle's main diet consist of? (9)
5. How many species of mamba are there? (4)
8. What is the heaviest turtle in the world? (11)
10. Parasites such as ticks that live outside the body are known as? (13)
12. Abbreviation of a standard measurement of length taken for reptiles? (3)
13. A young amphibian newly transformed to its adult stage is a...? (9)
16. What is the Latin name of the Cape cobra? (4, 5)
17. Komodo dragons inhabit the Lesser Sunda Islands, Padar, Komodo and which other island? (6)
18. The Namaqua chameleon is found in which desert? (5)

DOWN

2. If an animal is active at night it is nocturnal. What is an animal that is active at dawn and dusk? (11)
4. The olm (*proteus anguinus*) feeds predominantly on small what? (11)
6. Currently how many extant species of caecilian are there? (5, 3)
7. Complete the mnemonic associated with the eastern coral snake: red touch yellow, kill a...what? (6)
9. The monkey tailed skink is indigenous to where? (7, 7)
11. What family does *Nasikabatrachus sahyadrensis* belong to? (12)
14. Which chameleon is the heaviest in the world? (7)
15. A burrowing animal that lives predominantly underground is described as...? (9)
19. Having the toes of each foot arranged in pairs, with two toes in front and two behind like a chameleon is known as? (13)
20. The horned lizard belongs to which genus? (10)

Reader Challenge

Can you identify these herps?



Answers from Issue 196

Berber's skink (*Eumeces schneideri*) and European glass lizard (*Pseudopus apodus*)

Burms the Bane of the Florida Everglades - And Now Nile Monitors...

The Nile monitor (*Varanus niloticus*) is one of the many non-native invasive species plaguing Florida. These reptiles are a serious threat to native animal species in all state habitats. The first of these aggressive and powerful lizards was found in the wild in 1981, followed by the discovery of an established (breeding) population in 1990. Since then, their numbers in the wild have been increasing steadily throughout the state.

Nile monitors were originally brought to the USA from their native habitats in southern and central Africa as part of the exotic pet trade. Their introduction into the wild is most likely due to escapes or intentional releases by owners who could no longer handle them. These big semi-aquatic lizards can grow to over seven feet (2.42 metres) in length and weigh as much as 20 pounds (10 kg).

The increase in wild population of this invasive species is primarily a result of females laying as many as 60 eggs at a time. Eggs are laid in sand or dirt nests located near water. A female abandons the nest after depositing her eggs, relying on sunlight to incubate the eggs. Gestation typically takes four to six months.

When babies hatch, normally during the months of February through April, they immediately head for the protection of water near the nest. The apparent successful reproduction rate of this invasive species has increased the number of sightings and captures of Nile monitors in Florida over the past 10 years.

These intelligent lizards create a problem for native species because their diet includes invertebrates, endangered burrowing owl, insects, carrion, fish, young alligators,

young American crocodiles, snakes, turtles, and any terrestrial or aquatic vertebrate they can overpower. They are especially a threat to native egg-laying animals such as birds, turtles, and alligators. Nile monitors dietary preference is a nest filled with eggs or new born young.

Known for their sharp teeth and bad tempers, Nile monitors are excellent swimmers and are not limited to any specific habitat. Their known range extends from the Florida Keys to the northern portions of the state. They are found in the Everglades, Cape Coral, Sanibel Island, Tampa Bay, and Key Largo.

The range of this invasive species is likely to expand beyond Florida's borders, because these reptiles hibernate during cold months. The limit of their range is unknown. However, their ability to adapt to most habitats may extend their range into bordering southeastern states.

In an effort to eradicate Nile monitors, the National Wildlife Research Center (NWRC) is investigating methods to control the spread of this invasive species capable of eating anything it can overpower and fit in its mouth. The NWRC is experimenting with acetaminophen-laced dead mice and quail chicks as oral toxicant bait. Initial testing points to possible successful eradication efforts using these baits. ❖

Source: David R. Wetzel, *Decoded Science*



**'The snake bites
the tamer first'**

-Romanian
Proverb



Well! I NEVER!

SCAREMONGERING SPECTACULAR! - Killer BOA ON THE LOOSE!

Police in Ipswich have warned parents to keep their children and pets indoors after a seven-and-a-half foot long ‘hungry and unfriendly’ boa constrictor escaped. The deadly pet snake - which has not eaten for three weeks and is due a feed - slithered out of its owner’s cage in Brooms Crescent, Ipswich.

Police admit they ‘cannot rule out a danger to the public’ and have issued a warning to parents to keep children and pets inside until the snake is caught. The nocturnal female snake called Diva eats small mammals and when hungry will climb trees and pounce on her prey. She disappeared from a home

just 50m from Piper’s Vale Primary School.

A spokeswoman for Suffolk Police said that although Diva is not venomous she may bite if approached and warned anyone who spots her to dial 999 immediately. She said: “The owner describes the snake as unfriendly, and it might bite if approached. However, it is not venomous.”

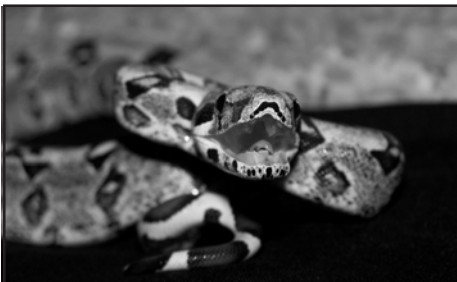
“The snake is nocturnal and is likely to hunt at night and will bask in the warm grass or on rocks in the sun during the day. It will hide for example under sheds when not hunting or basking. She was last fed about three weeks ago and is due a feed.”

Broom Crescent is a small cul-de-sac of 28 houses but runs alongside the playing fields at Piper’s Vale Primary School.

Neighbour Alexander Drummond, 59, said, “We’re right next to a school I reckon if I were a boa constrictor I’d be looking to hide out in the playing fields. There’s plenty of grass and concrete it can hide under. I’m not too afraid of a boa. If I see it I’ll smack it over the head with something. If that doesn’t work then I’m a fast runner.”

Anyone who spots the snake should not approach it, interfere with it or harm it but ring 999 immediately. If possible, they should keep the snake in sight, but from a safe distance until the police arrive. ❖ *Source: www.telegraph.co.uk*

Editor’s Note: What a wonderfully accurate piece of reporting. I shall remember the boa’s deadly nature and pouncing abilities the next time I am handling one of my many boas. And I sincerely hope I never meet Mr. Drummond...!



Baby boa constrictor © Neil Bennie

Words of the Wise?

‘If it’s your job to eat a frog,
it’s best to do it first thing
in the morning. And If it’s
your job to eat two frogs,
it’s best to eat the biggest
one first’ ❖

Mark Twain

A+ ANOLES - NEW STUDY SHOWS LIZARDS CAN PROBLEM SOLVE JUST AS WELL AS BIRDS AND MAMMALS



Anolis evermanni hunting for hidden worms © Manual Leal, Duke University

A Duke University experiment tested Puerto Rican anoles on several cognitive tasks and found they can learn and remember to solve a problem they've never faced before. The results challenge the scientific stereotype that reptiles have limited cognitive abilities and methods for finding food.

The lizards' success on a worm-based test normally used on birds was 'completely unexpected', said Duke biologist Manuel Leal, who led the study.

He tested the lizards using a wooden block with two wells, one that was empty and one that held a worm but was covered by a cap. Four lizards, two male and two female, passed the test by either biting the cap or bumping it out of the way.

The lizards solved the problem in three fewer attempts than birds need to flip the correct cap and pass the test, Leal said. Birds usually get up to six chances a day, but lizards only get one chance per day because they eat less. In other words, if a lizard makes a mistake, it has to remember how to correct it until the

next day, Leal said. He and Duke graduate student Brian Powell describe the experiment and results online in *Biology Letters*.

Leal's experiment 'clearly demonstrates' that when faced with a situation the lizards had never experienced, most of them were able to devise a way to solve the problem. Their ability to 'unlearn' a behaviour, a skill that some mammalian species have difficulty in, is the mark of a cognitively advanced animal, said Jonathan Losos, a biologist at Harvard who was not involved in the study.

The results 'should cause researchers to re-evaluate what they think they know about the evolution of animal cognition', Losos said.

Leal tested cognition of the Puerto Rican anole (*Anolis evermanni*), after seeing sparrows flip a cap to get a worm and wondering if lizards could do the trick, too.

"They'd put their snout under the little plastic chip and then quickly bump it," Leal said. "They don't do this in the wild."



A. evermanni © Michele A. Johnson

Even when Leal covered both wells, the lizards chose to flip the cap covering the well with the worm. They had learned to associate the colour or brightness of the chip with their reward.

To see if the lizards could reverse this association, Leal next placed the worm under the other cap. At first, all the lizards bumped or bit the formerly lucrative blue cap. But after a few mistakes, two of the lizards figured out the trick. “We named these two Plato and Socrates,” Leal said.

The lizards’ performance doesn’t necessarily mean that reptiles are smarter than birds, said McGill University biologist Louis Lefebvre, who studies learning and behaviour in birds and was not involved in the new study. He said a better way to use these new results would be to compare cognitive abilities among reptile species, rather than between reptiles, birds and mammals.

“We know birds and mammals have bigger brains and that within bird species

and within mammal species, the bigger the brain is, the higher the chance that larger-brained species making it when moving to a new environment,” Lefebvre said. “It may be the same with lizards.”

Research has shown that large-brained lizards are better than small-brained lizards at colonising new areas. “My guess would be that the lizard genus in which Manuel Leal has shown fast learning would be among the larger-brained lizards,” Lefebvre said.

Compared to other lizards, anoles are better at exploiting diverse habitats and they exhibit complex behaviour, factors that may favour the evolution of higher-level mental processing. The lizards’ ability to perform on the lab tests may also be an indication of the traits that allowed the group to successfully spread across the tropics, Leal said.

He plans to test other species of lizards and compare their brain to body size later this year. ♦

Source: www.sciencedaily.com



A. evermanni © Christofer Bang

Treefrogs' Self-Cleaning Feet Could Lead the Way for New Adhesives

“Tree frog feet may provide a design for self-cleaning sticky surfaces, which could be useful for a wide range of products especially in contaminating environments — medical bandages, tyre performance, and even long lasting adhesives,” says researcher, Niall Crawford at the University of Glasgow.

Tree frogs have sticky pads on their toes that they use to cling on in difficult situations, but until now it was unclear how they prevent these pads from picking up dirt.

“Interestingly the same factors that allow tree frogs to cling on also provide a self cleaning service. To make their feet sticky tree frogs secrete mucus, they can then increase their adhesion by moving their feet against the surface to create friction. We have now shown that the mucus combined with this movement allows the frogs to clean their feet as they walk,” says Mr. Crawford.

The researchers placed a White's tree frog on a rotatable platform and measured the angles at which the frog lost its grip. When the experiment was repeated with frogs whose feet were contaminated with dust they initially lost grip, but if they took a few steps their adhesive forces were recovered. “When the frogs did not move the adhesive forces recovered much more slowly,” says Mr. Crawford. “This shows that just taking a step enables frogs to clean their feet and restore their adhesion ability.”

White's tree frogs have tiny hexagonal patterns on their feet, which allow some parts of the pad to remain in contact

with the surface and create friction, whilst the channels between allow the mucus to spread throughout the pad. This mucus at once allows the frog to stick and then, when they move, also carries away any dirt. If this can be translated into a human-made design it could provide a re-useable, effective adhesive. ❖

Source: www.sciencedaily.com

Tortoise Sanctuary Issued with Closure Order in Cornwall

A tortoise sanctuary in mid Cornwall has been issued with a closure order by Cornwall Council. The council reclassified the attraction in Sticker, St Austell, as a zoo because they said tortoises were ‘wild’ animals, not domestic pets.

Owner Joy Bloor was told to apply for an official licence but is unable to pay the licence costs.

MP for Newquay and St Austell, Stephen Gilbert, said it was “democracy gone absolutely bonkers”.

Mr Gilbert said, “The whole issue depends on whether you think a tortoise is normally domesticated in the UK, or not. Of course they are normally domesticated within the UK, you don't see tortoises wandering across our fields or walking down the street.”

Allan Hampshire, the council's head of Public Health and Protection, said that while the authority had sympathy for the situation, it had to uphold the law.

“We can't pick and choose the laws we enforce, whilst it would be easy to overlook this, or to turn a blind eye, we have to uphold a fair and consistent approach to issuing these licences,” he said.

Mrs Bloor said the council had “interpreted DEFRA’s guidelines to suit themselves and decided they’re not pets at all, they are wild animals”.

In a statement the council said, “If Mrs Bloor chooses not to apply for a Zoo Licence once the Zoo Closure Notice has been served she will have 28 days to appeal to a magistrates’ court before it comes into force.

“This does not, however, mean that Mrs Bloor is required to dispose of the collection - just not open to the public without a zoo licence.”

The zoo licence costs £275 for the first four years, but licensees also have to pay fees for government-appointed inspectors when they apply and for any subsequent formal inspections.

Mrs Bloor said the sanctuary was unable to meet the extra costs and already struggled to meet the £25,000 annual cost of caring for and feeding the animals. ❖

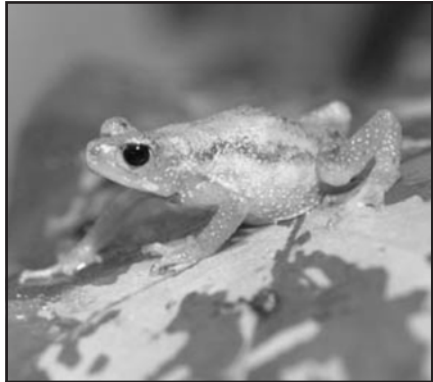
Source: www.bbc.co.uk

Kihansi Spray Toads Thriving in US Lab

A species of tiny toad, which quickly became extinct in the wild after it was discovered in Tanzania, is thriving in a laboratory at the Staff University of New York College of Environmental Science and Forestry (SUNY-ESF) in Syracuse, USA.

ESF scientists are studying Kihansi spray toads in an effort to find ways to safely reintroduce the animals to the Kihansi River Gorge in southeastern Tanzania.

“This is a species that’s extinct in the wild but it’s right here in Syracuse. This species, without the help of captive breeding, will go extinct,” said Dr. James Gibbs, an ESF conservation biologist.



Kihansi spray toad © Bronx Zoo

The Kihansi spray toad was discovered in 1996 in conjunction with the construction of a dam on the Kihansi River. A population of the toads was found living near the bottom of a waterfall where the river plunged more than 3,000 feet. The toads lived in a nearly vertical wetland created by the forceful spray that came off the pounding water. Gibbs compared the environment to living next to an open fire hydrant.

“There was an unusual species of amphibian found there,” he said. “And after much searching, it turned out to be a truly endemic and unique species. They have never been seen anywhere else. It might be the four-legged vertebrate species with the smallest range in the world.”

Construction of the dam resulted in reduced spray in the toads’ habitat and their numbers quickly declined. Some 500 of them were removed to the Bronx Zoo, where they continued to decline until some were transferred to the Toledo Zoo, where researchers stabilised them and got them to reproduce. After dwindling to about 50 individuals, the captive population has rebounded.

The Tanzanian government would like to reintroduce the animals but they want

to be sure the environment has been stabilised enough to provide a suitable habitat. "That's where we come in," Gibbs said.

Scientists are concerned about how a returned toad population might be affected by pesticides in the river, particularly endosulfan from upriver agriculture, and the chytrid fungus that is harming amphibians worldwide. "Nobody wants to put lots of toads back if they're going to suffer and not succeed in the restored habitat," Gibbs said.

In an agreement with the National Environment Management Council of Tanzania, Gibbs and his team are researching the effect of the fungus and the pesticide, both together and separately, on the toads. ♦

Source: *SUNY-ESF*

There's an App for that...ID Texas Snakes on Your iPhone

Texas Tech herpetology graduate student Jeremy Weaver has created a new way to identify snakes in the palm of your hand. The new app is called TX Snakes 1.1 for iOS, and it makes identifying any snake species in the state of Texas as easy as 1,2,3.

You can search by county for what snakes might be found in those areas. Or you can even search by using a description of the snake. Does it rattle? Does it have a certain type of pattern? Weaver hopes his app will help people have a better understanding of which snakes they should actually be wary of.

"If you've seen snakes around your house and your wondering if their venomous or not you can use it and look at what snakes are found there," Weaver

explained. "You can also search over 250 counties in Texas for what snakes are more likely to be from those areas."

Weaver says he hopes the app will help people who are afraid of snakes get over their phobias. "It'll help squash some of the misconceptions that are found and hopefully give people a greater appreciation for snakes," Weaver said.

You can see pictures and more information about his app on <http://www.herpapps.com>, TX Snakes 1.1 is \$0.99 (£0.63p). ♦

Source: *Alex Butler, www.KCBD.com*

Lizard Smuggler Caught Red-Handed

A US man was sentenced to 15 months behind bars for attempting to smuggle 15 live lizards from Australia through customs at Los Angeles International Airport by strapping the reptiles to his chest. Michael J. Plank, 42, the owner and operator of a Lomita company dealing in reptiles, pleaded guilty to a charge of smuggling wildlife into the United States.

The US Fish and Wildlife Service said Plank was returning from Australia when US Customs agents found two geckos, two monitor lizards and 11 skinks stuffed into a money belt he was wearing. Assistant US Attorney Dennis Mitchell said the skinks were gravid and seven offspring have subsequently been born. The confiscated reptiles are now at the San Diego Zoo.

During an interview with investigators, Plank admitted smuggling lizards twice before using the money belt, according to court papers. ♦

Source: *www.myfoxla.com*

Burrowing Skinks Are Stay-at-Home Parents

The great desert burrowing skink, a lizard living on the sandy plains of Central Australia, has been discovered to live in family groups within elaborately constructed tunnel complexes.

Published in *PLoS ONE*, researchers Steve McAlpin, Paul Duckett and Adam Stow from Macquarie University, in partnership with Parks Australia, found that family members of the great desert burrowing skink contribute to the construction and maintenance of burrow systems that can have up to 20 entrances, extend over 13 metres, and even have their own specifically located latrines.

These social lizards invest in a long-term housing structure that benefits them, their offspring and siblings: behaviour that is unprecedented among lizards and may provide a unique insight into the evolution of family groups and cooperation. According to the researchers, the faithful nature of adult pairs, which were found to breed together over consecutive years, is likely to be essential for this family cohesion, though they also observed that 40 percent of the male lizards had produced offspring with different females.

The shared home of the great desert skink, *Liopholis kintorei*, can be continuously occupied for up to 7 years. Multiple generations participate in construction and maintenance of burrows, with tunnels mostly excavated and maintained by adults, and immature lizards contributing small 'pop' holes to the network. Parental assignments based on DNA analysis show that immature individuals within the same burrow were mostly full siblings (all immature lizards were full siblings in 18 of 24 burrow systems), even



Burrowing skink © Dr. Danny Brown

when several age cohorts were present. Offspring were therefore delaying their dispersal to stay at home. Parents were always captured at burrows containing their offspring, and females were only detected breeding with the same male both within and across seasons.

The construction and maintenance of a long-term family home occurs in many other taxa; in vertebrates there are examples from most phyla. Cooperative behaviours generally occur among related individuals, but mate fidelity is not common in lizard species, and this may explain the rarity of such social behaviour. Future work will further investigate the parental care that the great desert skink provides, the effort different individuals put into home making and identifying lazy siblings that might be shirking their home maintenance responsibilities, and how this is managed by other group members. ❖

Source: Alex Butler, www.KCBD.com

**'There is nothing
so eloquent as the
rattlesnake's tail'**

- Native American



Hybridisation Big Problem for Cuban Crocs

A new genetic study by a team of Cuban and American researchers confirms that American crocodiles (*Crocodylus acutus*) are hybridising with wild populations of critically endangered Cuban crocodiles (*Crocodylus rhombifer*), which may cause a population decline of this species which is found only in the Cuban Archipelago.

Cuban crocodiles and American crocodiles have been confirmed to interbreed in captivity and were suspected to hybridise in the wild. This is the first genetic study that confirms wild hybridisation.

Known for their leaping ability and aggressive disposition, Cuban crocs are a charismatic and culturally significant species in Cuba. Exact population estimates for the species remain unknown, though scientists believe that a minimum of 3,000 individuals remain in the Zapata swamp. A smaller population exists in the Lanier Swamp on the Island of Youth. The species was extensively hunted from the middle of the 19th century through to the 1960s resulting in drastic population declines.

The team collected and analysed DNA from 89 wild-caught Cuban and American crocodiles in the wild and two samples from crocodiles in zoos.

The genetic data produced an unsuspected result. American crocodiles in Cuba are more closely related to Cuban crocodiles than other American crocodile populations found along mainland Central America. The study found just a 1 percent genetic sequence divergence between Cuban crocodiles and American crocodiles in Cuba yet an 8 percent divergence



Cuban croc © Jessie Cohen, NZP

between American crocodiles in Cuba and other American crocodile populations living in mainland Central America.

This finding indicates that Cuban crocodiles and American crocodiles in Cuba may represent two evolutionary significant units (ESUs) – populations considered distinct for conservation purposes and represent an important component of the evolutionary legacy of the species.

The authors say that hybridisation may be one of the most important threats to Cuban crocodiles, along with illegal hunting and habitat modification. Hybridisation can result in both replacement and genetic mixing, and one lineage may cause the extinction of another.

Based on evidence of hybridisation between the two species, the authors strongly urge that efforts to avoid anthropogenic causes of hybridisation be taken into account for future management plans of Cuban crocodiles. ❖

Source: *Herp Digest*

Fossil Live Bearer First of its Kind Discovered in China

A 120-million-year-old fossil is the oldest pregnant lizard ever discovered, according to scientists. The fossil, found in China, is a complete 30cm (12in) lizard with more than a dozen embryos in its body. Researchers from University College London, who studied the fossil, say it was just days from giving birth when it died and was buried during the Cretaceous period. The team reports the findings in the journal *Naturwissenschaften*.

The fossil is especially interesting to scientists because it is a reptile that produced live young rather than laying eggs. Only 20% of living lizards and snakes produce live young, and this shows it is an ancient, if unusual, trait.

"I didn't think much of the fossil when I first saw it," said Prof. Susan Evans, joint lead author of the paper, from University College London.

But when her colleague, Yuan Wang, from the Chinese Academy of Sciences, examined the fossil he spotted the tiny remains of at least 15 almost fully developed embryos inside it.

"Sure enough, when I examined it under the microscope, I could see all these little babies," Prof. Evans recalled.

The fossil is so well preserved that the minuscule teeth of the developing young are visible on very close inspection.

"This specimen is the oldest pregnant lizard we have seen," said Prof. Evans. "It implies physiological adaptations, like adequate blood supply to the embryos and very thin shells – or no shells at all – to allow oxygen supply, evolved very early on."



Up until now the fossil records only contained examples of marine lizards giving birth to live young.

Scientists thought that, in extinct reptiles, live birth was restricted to aquatic species, such as marine ichthyosaurs. These creatures would have been able to move through water with relative ease, even when heavily pregnant.

Prof. Evans said, "We do know that this lizard lived near to water and we think it likely that they could swim even though they primarily lived on land."

"This would make sense as a pregnant lizard would be less constrained by carrying offspring – she'd be able to escape into water if a hungry dinosaur came along."

The fossil comes from world famous rocks of the Jehol Group in northeastern China, where the fine limestone there has been worn away to gradually reveal hundreds of exquisite specimens of not only dinosaurs, but also fish, amphibians, reptiles, birds and mammals, plants and invertebrates.

The mother lizard has been identified as a specimen of *Yabeinosaurus*, a large, slow-growing and relatively primitive lizard. ❖

Source: Victoria Gill, www.bbc.co.uk

Fascinating Look at Territoriality in Kukrisnakes

The independent evolutionary origin of a complex trait, within a lineage otherwise lacking it, provides a powerful opportunity to test hypotheses on selective forces. Territorial defense of an area containing resources (such as food or shelter) is widespread in lizards but not snakes. Studies on an insular population of Taiwanese kukrisnakes (*Oligodon formosanus*) show that females of this species actively defend sea turtle nests by repelling conspecifics for long periods (weeks) until the turtle eggs hatch or are consumed. A clutch of turtle eggs comprises a large, long-lasting food resource, unlike the prey types exploited by other types of snakes. Snakes of this species have formidable weaponry (massively enlarged teeth that are used for slitting eggshells), and when threatened, these snakes wave their tails toward the aggressor. Bites to the tail during intraspecific combat bouts thus can have high fitness costs for males as the hemipenes are housed in the tail. In combination, unusual features of the species (ability to inflict severe damage to male conspecifics) and the local environment (a persistent prey resource, large relative to the snakes consuming it) render resource defense both feasible and advantageous for female

kukrisnakes. The apparently unique evolution of territorial behaviour in this snake species thus provides strong support for the hypothesis that resource defensibility is critical to the evolution of territoriality. ❖

Source: PNAS

Visit <http://intl.pnas.org> to access the paper in full

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