

The Natter Jack



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NEWSLETTER OF THE BRITISH HERPETOLOGICAL SOCIETY

Herp Conservation in Kinnaber

BHS Secretary Trevor Rose Stands up for Common Lizards in Montrose



Common lizard (*Zootoca vivipara*) © Mikaella Lock

It's a story we're all familiar with: land developers move in, hapless herps get hoofed out – or worse, uncereemoniously squished under the treads of workmen's boots and diggers. So when BHS Secretary and founder of Friends of Angus Herpetofauna (FAH) Trevor Rose heard about council plans to excavate a cycle track on Kinnaber Moor (Montrose) – a common lizard stronghold - he knew he had to take action.

Accompanied by ecologist Carol Littlewood, ranger George Addison and Angus Council representative Sally Young, Trevor along with a group of FAH

volunteers has been fighting hard to raise public awareness of Kinnaber Moor's herpetofauna and expose the detrimental impact digger excavations will inexorably have on the area's common lizard populations.

Over the past couple of weeks, FAH volunteers have been busy searching for, catching, and relocating to safer parts as many common lizards – and the odd toad - as they can find. FAH was also successful in persuading the council to divert the cycle track slightly to avoid a 'hot-spot mound', a particularly favoured basking site for a colony of common

lizards. The soil that has been excavated is being left as embankments to settle. Once these embankments have grown over with grasses and wildflowers, they will hopefully become suitable habitats for the lizards to return to and recolonise.

Mr Rose said the campaign to save the lizards had been successful at raising general awareness of the creatures' existence in that part of Angus.

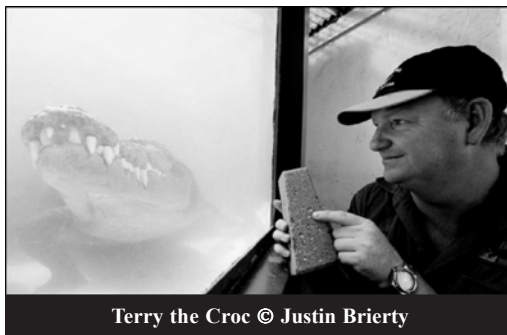
He said, "I will work with the council to put up a notice at the end of the path telling people to look out for the lizards, explaining the area to them ecologically and letting them know there is something special to see there." ❖

To learn more about the Friends of Angus Herpetofauna go to

<http://groups.arguk.org/fah/>

Sources: www.thecourier.co.uk & www.pressandjournal.co.uk

How to Get a Crocodile to Move - Throw a Brick at It



Terry the Croc © Justin Brierty

Terry the saltwater crocodile was happy doing what crocodiles do at Alice Springs Reptile Centre (Australia) - just snoozing and minding his own business. That is until an overzealous New Zealander - a tourist at the centre - decided to lob a couple of bricks at him. In a bid to 'make the crocodile move', the vacuous vacationist obtained

two bricks from a cordoned off site that was under construction and threw them at the crocodile.

Fortunately for Terry, reptile centre owner Rex Neindorf witnessed the whole thing and was able to avert a potential disaster.

"The crocodile grabbed the brick thinking it was food," Mr. Neindorf said. "He chipped three teeth, but they'll fall out and he'll grow new ones. If he'd actually swallowed the brick, it would most likely have killed him. It would have resulted in a lot of money lost for that tourist - one expensive trip to the zoo. The only reason he didn't swallow it is that I happened to see it, opened the gates and started bashing him on the nose to let it go."

3.4 metre Terry is now nursing a sore jaw but he will make a full recovery. ❖

Source: *Associated Press*

Words of the Wise? 'Analysing humour is like dissecting a frog. Few people are interested and the frog dies of it' ❖

E. B. White

Cannibalistic Crocodilians: Weeding out the Weak from the Strong

A new study has found that between 6 and 7% of young alligators fall victim to the cruel fate of cannibalism. But it appears a little gator-on-gator cannibalism may help keep their populations stable.

“Even the seemingly low rate of juvenile mortality attributed to cannibalism reported here may be an important factor in population regulation,” researchers from the Florida Fish and Wildlife Conservation Commission (USA) wrote in *Herpetologica*.

The researchers analysed data from years of alligator tagging and tracking programmes at Orange Lake, a shallow, marshy body of water near Gainesville, Florida. Between 1981 and 1987, 267 stomachs from adult alligators that had been killed by hunters were examined for tags in an effort to find out how many tagged alligators

were being cannibalised by other gators.

Thirty-three of the stomachs contained tags, for a total of 56 tags in all. One particularly hungry alligator had eaten at least 14 other alligators. The others carried a tag or two in their stomachs. The



records associated with the tags revealed that 91% of the cannibalism victims were under three years old, which is juvenile by alligator standards.

The next step was to figure out how this small cannibalism sample would translate to the entire population of Orange Lake alligators. To do that, researchers needed to figure out how long tags tend to stick around in a gator's stomach without being excreted. So they fed ten alligators five tags each (to simulate natural digestion, the tags were attached to alligator feet removed from dead hatchlings). Over the next 588 days, the ten alligators were periodically X-rayed to check for tags in their stomachs. As it turned out, the tags stuck around. At the end of the experiment, 76% of the tags, or 38 in total, were still in the alligators' guts.

Taking into account the size of Orange Lake's alligator population and the likelihood of finding evidence of cannibalism in the form of tags in a guilty gator's stomach, the researchers estimate that about 6 to 7% of juvenile alligators become dinner.

That rate could vary in other lakes and swamps, the researchers wrote, because the prevalence of cannibalism depends on the abundance of other food options. Understanding how often alligators chomp on each other is important, they added, because wildlife officials have to understand population dynamics in order to set goals for both alligator protection and alligator hunting. ❖

Source: Stephanie Pappas, www.livescience.com

Reader Challenge

Can you identify these herps?



Answers from Issue 192-193

Musk turtle (*Sternotherus odoratus*) and
White's treefrog (*Litoria caerulea*)

NJ Puzzler No. 1 - Answers

Across

1. Button
4. Ecdysis
6. Australia
7. Fer de lance
8. Skink
10. Twenty-three
11. Ghost lizards
14. Two
16. Lizards
18. No

Down

2. Neoteny
3. Natrix natrix
5. Panamint
8. Swampjack
9. Snakes
12. Yes
13. Rinkhal
15. Eyecap
17. Madagascar
19. Puffadder

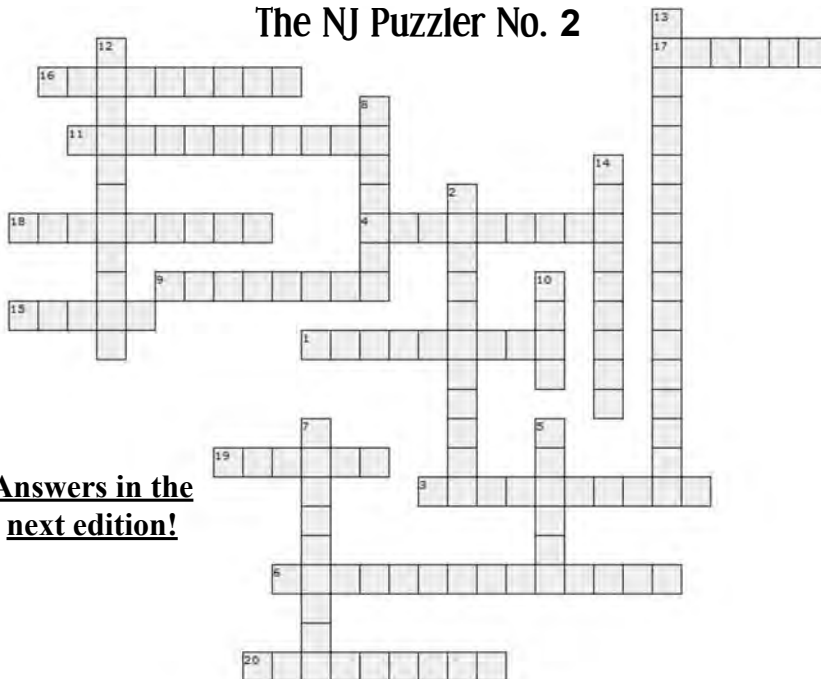
You Know You're A Herper When...

- You see a rabbit outside and you wonder if it would be small enough for your snake.
- You are afraid of getting bitten by your child's hamster, but being bitten by a snake doesn't phase you.
- You must determine the species of every reptile you see in movies, TV shows and magazines.

Hilarious Herps



The NJ Puzzler No. 2



**Answers in the
next edition!**

ACROSS

- 1 Ecdysis is also known as...(9)
- 3 What is the common name for *Cryptobranchus alleganiensis* (10)
- 4 Which family of lizard is Madagascar most famous for? (9)
- 6 For which snake has the island of Guam become infamous for? (5,4,5)
- 9 What do thorny devils prefer to eat? (8)
- 11 What is the world's smallest crocodilian? (5,6)
- 15 Which Asian gecko is best known for its call? (5)
- 16 Musk turtles are also known as...? (9)
- 17 If the rattlesnake is a viperid, what is the death adder? (6)
- 18 The stiletto snake is also known as the...? (9)
- 19 What type of animal is the horned toad? (6)
- 20 What is the common name of *Clelia clelia*?

DOWN

- 2 Which is the UK's rarest snake? (6,5)
- 5 Which snakes are commonly used by charmers? (6)
- 7 South American tribes utilise the toxic secretions from which animals? (4,5)
- 8 What is the main prey item for the rough green snake? (7)
- 10 The family dasypeltinae is best known for eating what food? (4)
- 12 This amphibian is best known for carrying its eggs around with it (7,4)
- 13 What is the world's largest chelonian? (11,6)
- 14 What is the longest venomous snake? (4, 5)

Diagnosing Cryptosporidiosis - The Disease the Hobbyist Dreads

The gastrointestinal disease cryptosporidiosis represents a particularly severe problem: although it is rarely otherwise serious in mammals, reptiles seem especially prone to it and the condition is often fatal. Furthermore it is highly contagious, so early diagnosis would represent a good way to limit its spread among reptiles. Unfortunately diagnosis is extremely difficult...

Scientists at the University of Veterinary Medicine, Vienna have developed a test for the identification of the cryptosporidia that cause the disease, enabling them to assess its prevalence in pet lizards and snakes. The results are published in the current issue of the *Journal of Veterinary Diagnostic Investigation*.

Although known for over a century, cryptosporidiosis was believed to be an extremely rare condition and it only gained attention with the discovery that it can affect humans, especially immune-compromised individuals. It is caused by a single-cell parasite, one of a family known as cryptosporidia. Some cryptosporidia also infect reptiles, where after a sometimes lengthy incubation period they cause gastrointestinal problems even in otherwise healthy individuals. The condition is usually persistent and is presently impossible to cure. It is therefore important to minimise infections and in this regard reliable diagnostic procedures are essential.

Diagnosis is based on the detection of parasites in faeces but is complicated by the fact that snakes in particular excrete parasites that they swallow together with their prey, so the presence



of cryptosporidia in faeces does not necessarily mean the animals are infected. For this reason it is essential to be able to distinguish between 'prey' cryptosporidia and those that cause infection in the snake. Barbara Richter and colleagues at the Institute of Pathology and Forensic Veterinary Medicine at the University of Veterinary Medicine, Vienna now report a DNA-based procedure able to determine not only whether cryptosporidia are present but also whether they are of mammalian or snake origin.

By means of the test, Richter was able to show that a particular type of cryptosporidium is present in about one in six samples from the popularly kept corn snake and in about one in twelve samples from the attractive leopard gecko, a lizard frequently found in reptile collections. These prevalence figures are far higher than previously suspected, showing the widespread nature of the disease. The corn snake in particular seems highly susceptible to infection. Worryingly, the new tool revealed that a large proportion of captive leopard geckos

contain cryptosporidia of one form or another. It is possible that some of the infections do not inconvenience the host geckos but the animals nevertheless represent a source of infection for other reptiles that come into contact with them.

The new diagnostic procedure represents a precise method for the early diagnosis of cryptosporidiosis in lizards and snakes, before the animals show symptoms of disease. Nevertheless, Richter still raises a cautionary note. "A further problem is that cryptosporidia are often present in faeces in very low numbers so it is easy to miss them in a single test. We are working to make our method more sensitive but it is very important to test the reptiles repeatedly. A negative result does not necessarily mean that the animal is really free of the parasite." ❖

Source: www.sciencedaily.com



Well! I NEVER! **SAHARA THE GECKO ON** **AN EBAY ESCAPE**

It's amazing what you can find on the internet - but not many would expect to get a gecko delivered by second-class post.



S a h a r a the leopard gecko unwittingly made a 100-mile trip in an envelope sent by his owner Lisa Richardson from his home in Sedgeford, near Birmingham.

The lizard spent two days inside the package before being opened by Phillipa Durrant, 44, who had been expecting the parcel to contain a belt she had bought on the internet shopping site eBay. Mrs Durrant, from Finchampstead in Berkshire, said: 'My daughter opened the envelope and came running upstairs saying "There's something alive in the package".'

The mother of seven took the reptile to a vet where it was given the all clear. She said: 'I was worried that it might be poisonous but we soon realised it was harmless.'

Mrs Durrant had bought the belt on eBay from Sahara's owner, Lisa Richardson. The package containing the belt had been left near the reptile's tank shortly before it was posted. It wasn't clear how he made it from the tank to the envelope.

Housewife Mrs Richardson, 33, said: 'We didn't realise Sahara was missing until we went to feed him later that night. 'There was absolute pandemonium. We cut the bottoms off the sofas to see if he was stuck in there. We were up until 2am looking for him. 'Then the email arrived the next day from Phillipa saying, "Hi Lisa, received the belt in the post, only one problem - there's a live reptile in the parcel".'

The gecko is now on his way back to Birmingham via a courier. ❖

Source: www.dailymail.co.uk

INTRODUCING SRI LANKA'S NEW GENUS OF FOAM-NESTING FROGS - THE TARUGA

Boosting Sri Lanka's image as an amphibian hotspot, a group of Sri Lankan scientists have introduced a new genus of frogs that is endemic to the island. The new group is named *Taruga* meaning 'tree climber' in ancient Sinhala and Sanskrit.

Taruga is currently the only genus of endemic frogs among the tree-frogs (Rhacophoridae). Definition of a new genus is a rare occurrence, and for a vertebrate group, even rarer. The task of separating these species into a new genus is indeed complex and demanding. The researchers have to analyse molecular DNA and morphological data such as the outward appearance as well as the form and structure of the internal parts like bones and organs of both adult frogs as well as tadpoles to distinguish this ancestry unique to Sri Lanka.

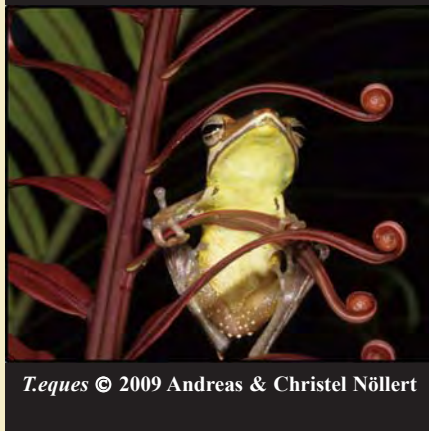
Dr. Madhava Meegaskumbura, the principal scientist behind this task, said, the research outcome published recently has been already updated in reputed amphibian journals further strengthening Sri Lanka as one of the world's most important amphibian hotspots.

Three of the endemic tree frogs that were previously called Polypedates (whipping tree frogs) were re-classified under this new genus and have been given new scientific names — *Taruga eques*, *Taruga fastigo* and *Taruga longinasus*.

The identification of a set of cone-like projections around the vent, a curved fold above the ear and a more pointed snout helped scientists reclassify these three frogs to the new genus *Taruga*.



T.fastigo © Madhava Meegaskumbura



Teques © 2009 Andreas & Christel Nöllert

Furthermore, during the larval stage key morphological differences between Polypedates and *Taruga* have also been identified: the vent of Polypedates forms a tube between the left leg and tail, and in *Taruga*, there is only an opening between the leg and tail.

These three species have a restricted distribution: *Taruga eques* can be found 1000m above sea level in the central hills and the Knuckles range. *Taruga longinasus* can

be found below 600m in the wet-zone lowlands of Sri Lanka while *Taruga fastigo* is present only at 900m above sea level in the Rakwana mountains.

Sri Lanka is currently home to 111 amphibians with 92 of them being endemic. The IUCN has categorised 11 species of Sri Lankan amphibians as critically endangered and a further 36 as endangered. Sri Lanka has already lost 21 amphibians - and deforestation, fragmentation, disease, pollution, and climate change are exacerbating the problem.

“We have now realised that legal protection alone is insufficient to secure the future of these species. They need active conservation intervention, such as captive breeding and improved habitat security, in addition to regular monitoring of the existing populations so that any decline can be detected and addressed,” points out environmentalist Rohan Pethiyagoda.

Mr. Pethiyagoda added that at present, the only species on which the government spent money on conservation were elephants. Yet, hundreds of Sri Lanka’s endemic species and whole genera are threatened with extinction. “If only a fraction of the funds spent on managing elephants were diverted to the conservation also of other threatened species, the outcome for the country’s biodiversity would be much better,” he said. ❖

Source: Malaka Rodrigo, *The Sunday Times*

Cambodia’s First Legless Lizard DISCOVERED

A new species of blind, legless lizard has been found in the mountains of Cambodia, conservationists have announced.

6-inch-long *Dibamus dalaiensis*, is the first of its kind discovered in the Southeast Asian country. The animal joins more than 200 legless lizard species and about 50 other new reptiles discovered worldwide in the past decade.

Herpetologist Neang Thy of Fauna & Flora International recently found the new species under a log in the Cardamom Mountains in the southwestern part of the country.

“At first I thought it was a common species,” Thy said in a press release. “But looking closer, I realised it was something I didn’t recognise.”

New species have been pouring out of the Cardamom region in recent years, because the mountains had been closed off to researchers until the 1990s.

“We hardly know anything about this area or the animals in it, since it was a region formerly held by the Khmer Rouge,” said conservation biologist Jenny Daltry, also of Fauna & Flora International.

“The first survey of animal life wasn’t until ten years ago, and [Thy] keeps coming back with amazing new discoveries.” ❖

Source: *National Geographic News*



D. dalaiensis © Thy Neang et al, Zootaxa/Flora & Fauna International

Lizard Fossil Provides Missing Link to Show Body Shapes of Snakes and Limbless Lizards Evolved Independently



C. hassiaca © from Nature 471:296

Genetic studies suggest that snakes are related to monitor lizards and iguanas, while their anatomy points to amphisbaenians, a group of burrowing lizards with snake-like bodies. The debate has been unresolved - until now. The

recent discovery by researchers from the University of Toronto Mississauga (Canada) and the Museum für Naturkunde Berlin, (Germany) of a tiny, 47 million-year-old fossil of a lizard called *Cryptolacerta hassiaca* provides the first anatomical evidence that the body shapes of snakes and limbless lizards evolved independently.

“This fossil refutes the theory that snakes and other burrowing reptiles share a common ancestry and reveals that their body shapes evolved independently,” says lead author Professor Johannes Müller of Humboldt-Universität, Berlin.

The fossil reveals that amphisbaenians are not closely related to snakes, but instead are related to lacertids, a group of limbed lizards from Europe, Africa and Asia. “This is the sort of study that shows the unique contributions of fossils in understanding evolutionary relationships,” says Professor Robert Reisz from the University of Toronto Mississauga, the senior author of the study. “It is particularly exciting to see that tiny fossil skeletons can answer some really important questions in vertebrate evolution.”

The German research team, led by Müller and American graduate student Christy Hipsley, used X-ray computed tomography to reveal the detailed anatomy of the lizard’s skull and combined the anatomy of *Cryptolacerta* and other lizards with DNA from living lizards and snakes to analyse relationships. Their results showed that *Cryptolacerta* shared a thickened, reinforced skull with worm lizards and that both were most closely related to lacertids, while snakes were related to monitor lizards like the living Komodo dragons.

Even though snakes and amphisbaenians separately evolved their elongate, limbless bodies, the discovery of *Cryptolacerta* reveals the early stages in the evolution

of burrowing in lizards. By comparing *Cryptolactera* to living lizards with known lifestyles, co-author and University of Toronto Mississauga paleontologist Jason Head determined that the animal likely inhabited leaf-litter environments and was an opportunistic burrower.

“*Cryptolacerta* shows us the early ecology of one of the most unique and specialised lizard groups, and also reveals the sequence of anatomical adaptations leading to amphisbaenians and their burrowing lifestyle,” says Head. “Based on this discovery, it appears worm-lizards evolved head first.” ♦

Source: www.dailymail.co.uk

Tortoise Smuggler Arrested at Stanstead Airport

Fifteen endangered tortoises worth up to £4,500 were discovered by UK Border Agency officers at Stansted Airport after a passenger tried to smuggle them into the UK. A 54-year-old woman from Plymouth was arrested when she returned from Morocco following a holiday in early May.

The spur-thighed tortoises were found still alive, but underweight and infested with ticks, in three cardboard boxes that had been placed in a bag in the hold of the aircraft. The tortoises survived their ordeal and are currently being cared for in quarantine while plans are drawn up for them to be re-housed.

The woman was released on bail while UK Border Agency enquiries continued.

The importation of tortoises is restricted under the Convention in International Trade in Endangered Species (CITES) and they can only be brought into the UK if the correct permits have been applied for and issued. Further inquiries by UK Border Agency officers revealed the tortoises did not have the necessary accompanying paperwork and permits.

They were seized by UK Border Agency officers under EU Wildlife Trade Regulation Annex A which affords them the highest level of protection for a wildlife species within the EU.

UK Border Agency Assistant Director of Criminal and Financial Investigations, Malcolm Bragg, said: “The illicit trade in endangered animals is a serious contributory factor to the threat of extinction faced by many endangered species.” *Traffic*

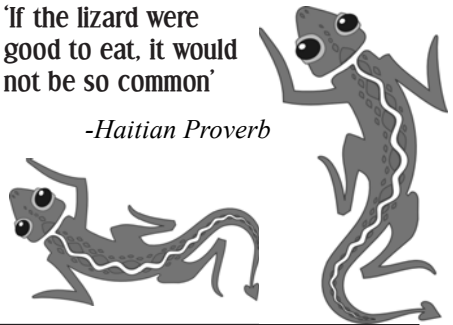
Words of the Wise?

'I went into a French restaurant and asked the waiter, 'Have you got frog's legs?' He said, 'Yes,' so I said, 'Well hop into the kitchen and get me a cheese sandwich.'

Tommy Cooper

'If the lizard were good to eat, it would not be so common'

-Haitian Proverb



Biophysics of a Snakebite - How Do Venomous Snakes Inject Venom?

Most snakes do not inject venom into their victims' bodies using hollow fangs, contrary to common misconceptions. The fact is that most snakes and many other venomous reptiles do not have hollow fangs. Physicists have now uncovered the tricks these animals use to force their venom under the skin of their victims.

For years Professor Leo von Hemmen, a biophysicist at the Technische Universität Muenchen (Germany), and Professor Bruce Young, a biologist at the University of Massachusetts Lowell (USA), have been researching the sense of hearing in snakes. While discussing the toxicity of their snakes, it dawned on them that not that many snakes actually 'inject' venom into their victims' bodies using hollow fangs. Yet, even though the vast majority of venomous reptiles lack hollow fangs, they are still very effective predators.

Only around one seventh of all venomous snakes, like the rattlesnake, rely on the trick with the hollow fang. The vast majority have developed another system. A typical representative of this class is the mangrove snake, *Boiga dendrophila*. Using its twin fangs, it punches holes into the skin of its victims. The venom flows into the wound between the teeth and the tissue. But there is an even easier way: many fangs simply have a groove the venom flows along to enter the wound.

The researchers asked themselves how this simple method could be so successful from an evolutionary perspective, considering that bird feathers,



Fang showing groove © Bruce A. Young

for example, should be able to easily brush away any venom flowing along an open groove. To get to the bottom of this mystery, they investigated the surface tension and viscosity of various snake venoms. And the measurements showed that snake venom is in fact amazingly viscous. The surface tension is high, about the same as that of water and as a result, the surface energy pulls the drops into the fang grooves where they then spread out. In the course of evolution, snakes have adapted to their respective preferred prey using a combination of optimal fang groove geometry and venom viscosity. Snakes that prey on birds developed deeper grooves to keep the



viscous venom from being brushed away by bird feathers.

The researchers also found an answer to the question of how snakes manage to ferry the venom well under the skin of their prey. After all, only there can it unfold its deadly effect. Here too, snakes developed a trick in the course of evolution: When a snake attacks, the fang grooves and the surrounding tissue form a canal. Just like blotting paper, the tissue sucks the venom through this canal - and snake venom has a very special property to facilitate this effect: Just like ketchup, which becomes significantly more fluid upon shaking, the sheer forces that arise from the suction cause the venom to become less viscous, allowing it to flow through the canal quickly as a result of the surface tension.

Scientists refer to substances with these characteristics as non-Newtonian fluids. These have a very practical consequence for snakes - as long as there is no prey in sight, the venom in the groove remains viscous and sticky. When the snake strikes, venomous 'tears' flow along the groove and into the wound, and the venom can then take its lethal effect. ❖

Source: www.sciencedaily.com

The Serpent Express: Cobras Cause Chaos on Train in Vietnam

*Source:
The Telegraph (UK)*

Passengers on a train in Vietnam fled in terror after discovering bags of highly venomous king cobras under a seat. Railroad official Pham Quynh says passengers were terrified when the four cloth bags containing the writhing snakes were spotted. The snakes were alive but had their mouths stitched shut.

Security staff removed the cobras, which were likely destined for restaurants in Hanoi. Snake meat is considered a delicacy in Vietnam, but cobras are protected by law. Mr Quynh says the cobras were given to forest rangers after they were caught who then released them back into the wild. ❖

Human Development Destroys Habitat But it Could Also Provide Amphibians with Safe Havens from Infection

Amphibians that inhabit natural environments are more likely to be infected with the fatal *Batrachochytrium dendrobatidis* (Bd) fungus that has devastated frog and salamander populations worldwide than those living in habitats disturbed by human development.

The results, in the Proceedings of the National Academy of Sciences, challenge the assumption that habitat loss necessarily exacerbates the spread of disease.

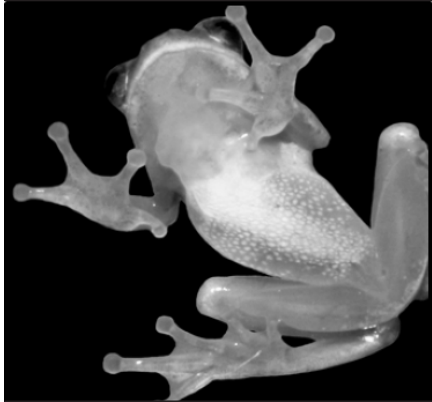
“I don’t think anyone will be going up in the mountains cutting down trees in the hopes of getting rid of Bd or anything,” said Forrest Brem who researches amphibian epidemiology at the Univeristy of Memphis (USA) and was not involved in the research. “But I think this study will remind everyone how complex host-pathogen-environment systems are and encourage us to incorporate this complexity in their thinking, teaching, and research.”

Bd is a member of the chytrid fungus family, which attacks some 350 amphibian species. In the last 15 years, it has caused massive declines of amphibian populations around the world, even driving some species to extinction. The fungus, spread by skin-to-skin contact or through the water, kills by causing the outer layer of skin to thicken and become less permeable to the water-borne electrolytes amphibians absorb to keep their hearts beating. And for those amphibians that absorb oxygen through their skin, a Bd infection suffocates them.

Since the international trade of amphibians as food, pets, and lab animals



Common rain frog © T. Beth Kinsey



Golden lesser tree frog © Guilherme Becker



Stony creek frog © Shibz Eden

took off in the 1970s, Bd has passed to every continent that supports amphibian species. “It’s spreading like a wave,” said C. Guilherme Becker, a graduate student in ecology and evolutionary biology at Cornell University (USA), “especially in Central America and Australia.”

In addition to the spread of Bd, amphibians across the globe are suffering from loss of habitat caused by human development. The combination of the disease and habitat loss is a ‘double threat’, said Becker, and implementing successful future conservation efforts requires an understanding of interactions between these two forces.

To this end, he and his advisor, Kelly Zamudio, compared habitat loss and Bd infection data from tropical sites in Costa Rica (for the common rain frog) and in eastern Australia (for the stony creek frog). In contrast to past studies of other human and animal diseases, they found that the frogs in disturbed habitats were less likely to be infected. Field surveys of disturbed and natural habitats of the golden lesser tree frog in the Brazilian Atlantic Forest confirmed these findings.

Despite many studies showing that habitat disturbance increases disease in human and animal populations, in the case of Bd “it is not surprising that disease risk is higher in more natural habitats,” Ross Alford, professor of tropical ecology at James Cook University in Australia who did not participate in the research. Bd is very intolerant of the hot, dry environments that often result from habitat disturbance, he explained. Furthermore, natural environments support a greater number of hosts that could help spread the fungus, added Becker.

The three species studied, however, are habitat generalists that are relatively

tolerant to human disturbance. But other species are not so hardy, and will either suffer from the changing habitat itself, or retreat to natural habitats, where Bd is more prevalent. “Disturbed habitats may act as shelters from disease, but only for the very few species that can tolerate deforestation,” Becker and Zamudio wrote in their paper.

“This study contributes to our understanding of the interactions of Bd with amphibians and may well aid in thinking ‘outside the box’ in developing management tools,” said Alford. ♦

Source: Jessica P. Johnson, The Scientist

Xenopus Study Leads to New Understanding of Cardiac Development

During embryonic development, cells migrate to their eventual location in the adult body plan and begin to differentiate into specific cell types. Thanks to new research at the University of Pennsylvania, there is new insight into how these processes regulate tissue formation in the heart. A developmental biologist at Penn’s School of Veterinary Medicine, Jean-Pierre Saint-Jeannet, along with a colleague, Young-Hoon Lee of South Korea’s Chonbuk National University, has mapped the embryonic region that becomes the part of the heart that separates the outgoing blood in *Xenopus*, a genus of frog.

Xenopus is a commonly used model organism for developmental studies, and is a particularly interesting specimen for this kind of research because amphibians have a single ventricle and the outflow tract septum is incomplete.

In higher vertebrates, such as chickens

and mice, the cardiac neural crest provides the needed separation for both circulations at the level of the outflow tract, remodelling one vessel into two. In fish, where there is no separation at all between the two circulations, the cardiac neural crest contributes to all regions of the heart.

“In the frog, we were expecting to find something that was in between fish and higher vertebrates, but that’s not the case at all,” said Saint-Jeannet. “It turns out that cardiac neural crest cells do not contribute to the outflow tract septum, they stop their migration before entering the outflow tract. The blood separation comes from an entirely different part of the embryo, known as the ‘second heart field.’”

“As compared to other models the migration of the cardiac neural crest in amphibians has been dramatically changed through evolution,” he said.

Saint-Jeannet’s research was published in the May edition of the journal *Development*.

To determine where the neural crest cells migrated during development, the researchers labelled the embryonic cells with a fluorescent dye, then followed the path those marked cells took under a microscope. “We label the cardiac neural crest cells in one embryo and then graft them onto an embryo that is unlabelled. We let the embryo develop normally and look where those cells end up in the developing heart,” said Saint-Jeannet.

Knowing these paths, and the biological signals that govern them could have implications for human health.

“There are a number of pathologies in humans that have been associated with abnormal deployment of the cardiac neural crest, such as DiGeorge Syndrome,” said Saint-Jeannet. “Among other developmental problems, these patients have an incomplete blood separation at the level of the outflow tract, because the cardiac neural crest does not migrate and differentiate at the proper location.”

DiGeorge syndrome is present in about 1 in 4,000 live births, and often requires cardiac surgery to correct.

“Xenopus could be a great model to study the signals that cause those cells to migrate into the outflow tract of the heart,” said Saint-Jeannet. “If you can understand the signals that prevent or promote the colonisation of this tissue, you can understand the pathology of something like DiGeorge syndrome and perhaps figure out what kind of molecule we can introduce there to force those cells to migrate further down.”❖

Source: Biology & Nature

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