The Natter Jack

January 2012 Issue 204

NEWSLETTER OF THE BRITISH HERPETOLOGICAL SOCIETY

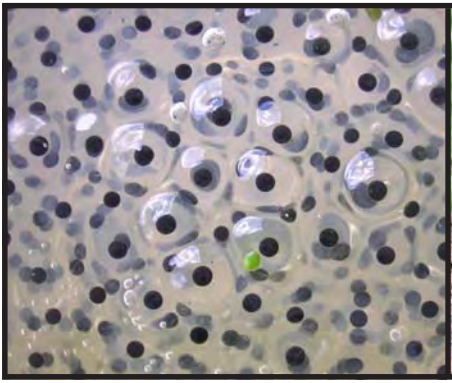
The Big Spawn Count 2012

It is a sad fact that Britain's amphibians and reptiles are declining – even the common toad has now been categorised as an 'at risk 'Biodiversity Action Plan (BAP) species. So in an effort to gather more information about the breeding success of the UK's common frog and toad, Pond Conservation in collaboration with Amphibian and Reptile Conservation (ARC) and Amphibian and Reptile Groups of the UK (ARGUK) have launched a brand new survey this year – The Big Spawn Count 2012.

Anyone with a garden pond can participate, all you need to do is check your pond regularly for spawn and record the number of clumps you find. Female frogs normally lay several thousand eggs that form a singular, jelly-like mass – this makes it possible to estimate the number of breeding females that have visited your pond. The information you collect will be essential to gaining an insight into just how many frogs breed in the UK's garden ponds.

Pond Conservation also request participants to record the presence of toad spawn. Common toads are often associated as 'loyal', larger water body breeders, but in recent years data indicates that common toads may now be breeding more frequently in garden ponds.

To learn more or to take part in the Big Spawn Count, visit Pond Conservation's website at www.pondconservation.org.uk ❖



The Biawak Dundees Saving Malacca's Injured Monitors

On a superbike and armed with a first-aid kit, an Aussie father-and-daughter team is hitting the roads of Malacca (Malaysia) – to find and treat injured monitor lizards. Documentary producer Luke Adam Mitchell, 48, and daughter Sarah Lee Honey Bee, 27, on their 250cc Yamaha motorcycle, have dubbed themselves the 'Biawak Dundees'.

The duo's rescue efforts began when Mitchell found an injured monitor lizard with a gash on its head along a highway in Semabok. The duo rescued the stricken lizard and treated the gash on its head. Their efforts were rewarded when the reptile got up and then made its way to the Malacca River just an hour after treatment.

"Our determination to do something for the welfare of animals saw the setting-up of the father-daughter rescue team," Mitchell said. We decided not to wait for 'superheroes' to come to the rescue of the monitors - or *biawak* as the lizards are known locally.

He said they would frequently go around the city to look for injured monitor lizards, adding that the treatment was similar to that given to crocodiles in Australia.

"I provide treatment on the spot if the injuries are relatively minor. There is no reason to stress the animal by taking it to the vet," said Mitchell.

A memorable experience was rescuing a monitor lizard that was stuck in the bathtub at a home in the city.

"By the time we reached the home, it was dark and there was no light. But we managed to take the little reptile out and release it back to its natural habitat," he said.

Mitchell added that the locals were unwilling to help injured monitor lizards due to its reputation of being a scavenger. ❖

Source: The Star, Malaysia

Smuggler Sussed in Argentina

A Czech man is facing up to ten years in jail after he tried to board a plane in Argentina with almost 250 endangered reptiles - including venomous snakes - and invertebrates in his baggage. Karel Abelovsky, 51, was en route to Spain when police spotted the reptiles in the X-ray scanner. They found 247 exotic and endangered species in all, packed inside plastic containers, bags and even socks.

Authorities believe the man was a courier for a criminal organisation that smuggles exotic species whose exports are banned. Authorities said Abelovsky had only arrived in Argentina days earlier and wouldn't have had time to gather all the animals.

Most of the animals are being held under quarantine at the Buenos Aires Zoo, while some of the venomous snakes were sent to Argentina's national health institute, which has a high-security department where scientists develop antidotes using venom from snakes.

The species include lizards native to Mexico and snakes, spiders, snails and other species from northern Argentina, Paraguay and Brazil. Some were already dead in the suitcase, while others have succumbed to stress since then. Many were quite weak on arrival at the zoo, but most are still alive. ❖ ***Source: Associated Press***

Cosmetic Chemicals Detrimental to Neurodevelopment in Tadpoles

A new study finds that low con centrations of the chemical methylisothiazolinone has subtle but measurable negative effects on the neural development of tadpoles. The chemical is found in some cosmetics, although the study does not provide any evidence that cosmetics are unsafe for humans.

Scientists, health officials, and manufacturers already know that a chemical preservative found in some products, including cosmetics, is harmful to people and animals in high concentrations, but a new Brown University study in tadpoles reports that it can also interrupt neurological development even in very low concentrations.

In the cosmetics industry, the biocide methylisothiazolinone or MIT, is considered safe at concentrations of less than 100 parts per million. Lab studies, however, have found that lower concentrations affected the growth of animal neurons. Picking up from there, the Brown researchers performed a series of experiments to investigate how 10 days of exposure at concentrations as low as 1.5 ppm would affect whole, living tadpoles as they develop.

"The lower concentrations we studied didn't kill the animals or cause any significant deformities or affect the behaviour you'd see just by looking at them," said Carlos Aizenman, associate professor of neuroscience and the study's senior author. "But then we decided to do a series of functional tests and we found that exposure to this compound during a period of development that's critical for the fine wiring of the nervous system disrupted this period of fine tuning."

When Aizenman and lead author Ariana Spawn explored the consequences of exposing tadpoles to two nonlethal concentrations, 1.5 ppm and 7.6 ppm, they found some deficits both in behaviour and in basic brain development.

In one experiment they shined moving patterns of light into one side of the tadpole tanks from below. As they expected, the unexposed tadpoles avoided the light patterns, swimming to the other side. Tadpoles that had been exposed to either concentration of MIT, however, were significantly less likely to avoid the signals.

Aizenman said consumers should know about the study's results and pay attention to the ingredients in the products they use, but should not become worried based on the basic science study.

Aizenman said one area where further studies may be warranted is in cases of repeated exposure in industrial or occupational settings, but the study's broader message may be that chemical manufacturers and independent labs should test more for neurodevelopmental effects of even low concentrations of products. In the specific case of MIT in tadpoles, he noted, "It's resulting in a non-obvious but real deficit in neural function." ❖ ***Source: Herp Digest***

'He who wants to be a dragon must eat many little snakes'

- Chinese Proverb

Reader Challenge

Can you identify these herps?

Answers from last issue

Rhino iguana *(Cyclura cornuta)* and Marbled newt*(Triturus marmoratus)*

NJ Puzzler No. **5** - Answers

Across

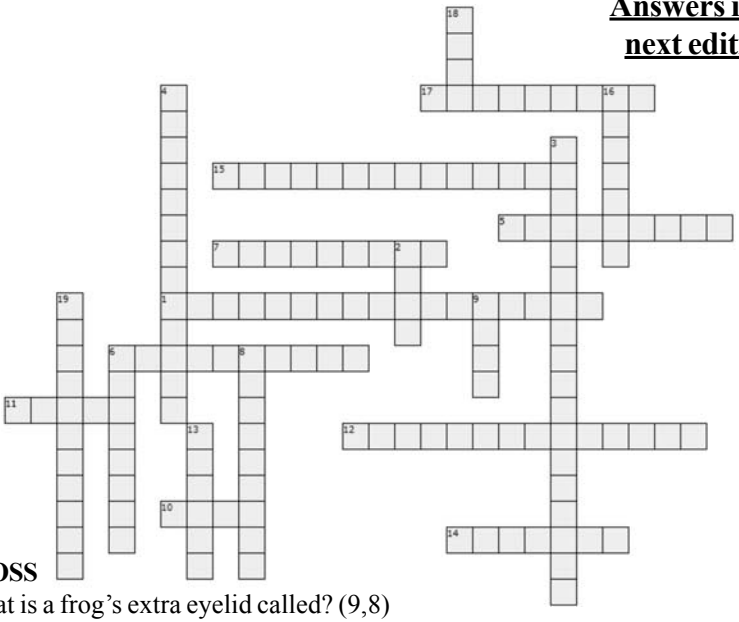
1. Snakes
4. Gonyosoma
6. Teeth
7. Contraceptive.
8. Two
10. Death adder
12. Waxy
13. Seven hundred
15. Mexico
17. *Chamaeleo zeylanicus*
20. Cuban tree frog

Down

2. Insects
3. Thirty-seven
5. Twenty-two mph
9. Breeding
11. Keratin
14. Green Iguana
16. Horsefield tortoises
18. Cryptobranchidae
19. Scale configuaration

The NJ Puzzler No. 6

Answers in the next edition!



ACROSS

1. What is a frog's extra eyelid called? (9,8)
5. If a black mamba's venom is neurotoxic, a puff adder's venom is…? (9)
6. The Ploughshare tortoise is endemic to which country? (10)
7. The goanna belongs to which family? (9)
10. The collective name for a group of toads is what? (4)
11. Which organ do Plethodontidae salamanders lack? (5)
12. The Sonoran milk snake has a unique defense – what is it known as? (7,7)
14. Which frog can weigh as much as a house cat? (7)
15. What term is given to the fear of amphibians? (14)
17. What is the leatherback sea turtle's primary prey? (9)

DOWN

2. The collective name for a group of frogs is what? (4)
3. Which venomous, south eastern American snake is the heaviest in proportion to its size? (7,11)
4. The mascarene grass frog is a species of which family? (13)
6. What period of time is known as the 'Age of Reptiles'? (8)
8. The first 32 cent US stamp featured which reptile? (9)
9. What classic collective term is given to a group of sea turtles? (4)
13. Approximately what percentage of snake are livebearing? (6)
16. Approximately what percentage of Australia's land dwelling snakes are venomous? (7)
18. True or false: the Egyptian hieroglyph for tadpole also means 100 000? (4)
19. Approximately what percentage of frogs and toads are found in tropical rainforest? (7-4)

Crooks Steal Caiman and Exotics in Pet Shop Raid

Thieves are on the run from police after around 100 exotic animals - including a 5ft crocodile - were swiped in a pet shop raid early this month.

The dwarf caiman was part of a haul including dozens of snakes and lizards snatched from Stockport Pet Warehouse in Heaviley, Greater Manchester. Officers are now hunting for the missing menagerie and have warned the thieves they could be risking life and limb trying to handle the stolen predator.

The owners of the shop, Jon Bibby, 40, and Paul Williamson, 45, are also concerned about the stolen animals who, they fear, may not survive if not cared for properly.

Mr Williamson said: 'There have been about 100 animals taken, the most dangerous being the crocodile, but also about 50 snakes, some of which are five to six foot.'

Around 40 lizards, including geckos and bearded dragons, were also stolen, he added.

Mr Williamson, who has run the store on Hallam Street, Heaviley, with his friend for five years, feared the animals may have been stolen to order.

Police have appealed for anyone with information to get in touch. Detective Sergeant David Jordan said: 'Should anyone come across these animals they should take care and inform the authorities immediately.

'We are appealing to anyone with information, and indeed to anyone who may know who is behind this very tenacious burglary. ❖

Source: Daily Mail

Teeming with Tads!

A mum had her home invaded by more than 200 rare (sic) African frogs after two amorous amphibians bred at her terrace house. Vanessa Williams bought two albino African clawed frogs from a pet shop and was told they would never breed in tropical tanks. But soon after buying them strange clicking noises started to come from the tank at night.

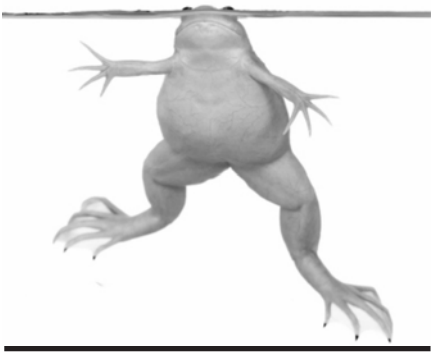
Vanessa, 34, from Holyhead, said, "I thought it was odd but had no idea what was happening. Then one morning I came down to find hundreds of white dots all around the tank."

In the wild the parents will often eat many of the young but animal loving Vanessa could not bear to see them suffer this gory fate. Instead she separated parents and young and has grown the tadpoles on herself using cat food pellets and fish flakes to feed them.

They defied the odds with more than 200 surviving but as they then grow to around 12cm it threatened a reptile (sic) invasion of her home on Cambria Street.

She has managed to re-home around 150 of the frogs with pet shops or private owners but is now pleading for help to find places for the others. ❖

Source: Daily Post



Well! I Never!

Croc in a Box

A pet shop in the West Midlands is trying to find a new home for a young crocodile thought to have been abandoned on its doorstep. The South American crocodile, which could grow to 2.5m (8ft) long, was found in a plastic box outside Wickid Pets, Wolverhampton, earlier this month.

Owner Jimmy Wicks said legally bought crocodiles had to be microchipped.

"This has been scanned and there's no chip in it and so it's obviously come through the black market," he said.

He hopes to find a new home for the female crocodile, who is four or five years old and currently a metre long, at a local safari park.

Bob Lawrence, Director of Wildlife at West Midlands Safari Park, said people often bought exotic pets without realising what they were taking on.

"It's people like us and the RSPCA who have to pick up the pieces once they become unmanageable or escape," he said.

Mr Wicks said it was not the first time the shop had had to look after an abandoned crocodile.

"It's the fourth one we've had in 18 months and so now when we see a plastic box we have to approach it with caution," he said.

He said they had also had to find homes for turtles, birds of prey, snakes, and lizards that had been left outside the shop.❖

Source: www.BBC.co.uk

You Know You're A Herper When...

- You fail to understand why everyone else doesn't think a satanic leaf-tailed gecko is precious
- You think that just about everything can be turned into a cage, cage furniture or feeding platform.
- You assure visitors that you don't have a 'problem', that it is just a member of your free-range roach colony (they weren't supposed to be able to breed)!

Hellbender Study Could Shed Light on Global Amphibian Declines

A new study co-authored by University of Florida researchers on the endangered Ozark Hellbender (*Cryptobranchus alleganiensis bishopi)* is the first to detail its skin microbes, the bacteria and fungi that defend against pathogens.

Published recently in the online journal *PLoS One*, the study details changes in the salamander's declining health and habitat, and could provide a baseline for how changing ecosystems are affecting the rapid decline of amphibians worldwide.

"Scientists and biologists view amphibians as kind of a 'canary in the coal mine' and their health is often used as a barometer for overall ecosystem health, including potential problems that may affect humans," said study co-author Max Nickerson, herpetology curator at the Florida Museum of Natural History on the UF campus.

More than 2 feet long, the Ozark hellbender is the one of largest salamander species in the United States. Its unusual biological characteristics include the ability to regenerate injured or missing body parts.

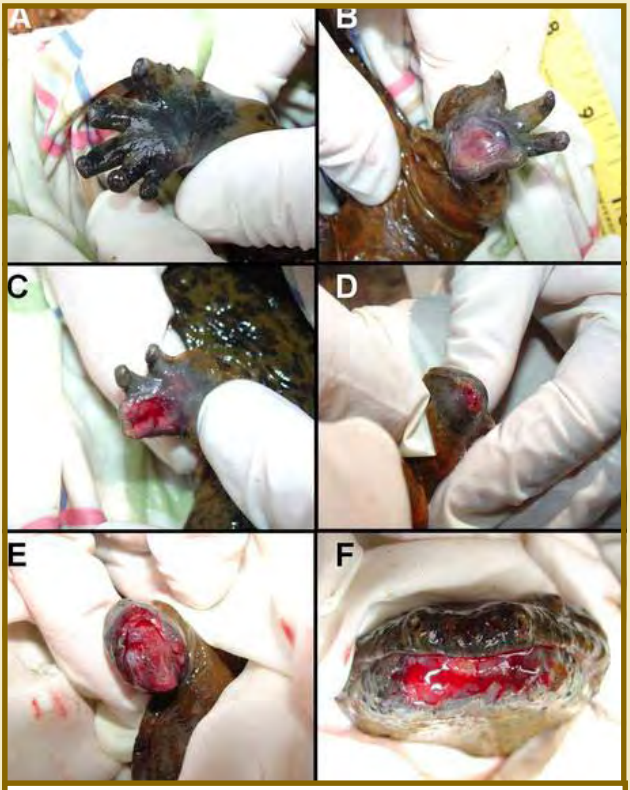
In the new study, lead author Cheryl Nickerson, a professor at Arizona State University, along with NASA and UF scientists, cultured and identified microorganisms from abnormal and injured tissue on the salamanders searching for pathogens that may be causing the lack of regeneration and population decline.

The researchers found several potentially dangerous pathogens, including *Aeromonas hydrophila*, a bacterium scientists believe is associated with disease and death in both amphibians and fish.

While many different pathogens were found in the injured tissue, no single organism was found to be responsible for the lack of regeneration. Researchers believe the occurrence of abnormalities and injury in the Ozark Hellbender may have many contributing factors, including disease and habitat degradation, and say further study is needed

"If you don't understand an amphibian's skin you don't understand the amphibians," Nickerson said.

Scientists have known about the remarkable powers of salamander regeneration for more than 200 years, but beginning in the 1980s, researchers noticed a sharp



Significant lack of regeneration © Nickerson et al

decline in the Ozark Hellbender population. They also found a specific population from the North Fork of Missouri's White River was declining dramatically and losing the ability to regenerate.

"We were finding animals with no legs that were still alive with flesh wounds or bones sticking out of limbs," Nickerson said.

"Looking at the microorganisms on their skin can help us understand why these animals aren't regenerating at the rate we're used to seeing, and may lead to conclusions about population declines," he said.

Stanley Trauth, curator of amphibians and reptiles in the department of biological sciences at Arkansas State University, said public awareness of the species is increasing, and Hellbenders have recently been successfully bred for the first time in captivity at the St. Louis Zoo.

"There has been a dramatic decrease in the population and there are a number of factors that contribute to that," Trauth said. "But these types of studies will help provide more consistent results on the impact of microorganisms and animal health."

"In the last 20 years we have been finding a tremendous number of injuries on these animals and those injuries are not healing," Nickerson said. "Now the population is down to almost nothing and we are very worried about the species and the environmental changes around them."

The Ozark Hellbender's fossil record goes back 161 million years and it represents one of the most ancient lines of amphibian life.

"This is about as far, in phylogeny, as that type of regeneration goes, this is the most ancient group of salamanders that we know of," Nickerson said. "They have been through a lot and we want to find out what these changes mean."❖

Source: Science Daily

US Moves Ahead with Big Snake Ban

WASHINGTON, DC: The US Fish and Wildlife Service has finalised a rule that would ban the importation and interstate transportation of four non-native constrictor snakes that threaten the Everglades and other sensitive ecosystems across the United States, Secretary of the Interior Ken Salazar announced today (17th of January 2012).

The final rule which incorporates public comments, economic analysis, and environmental assessment lists the Burmese python, the yellow anaconda, and the northern and southern African pythons as injurious wildlife under the Lacey Act in order to restrict their spread in the wild in the United States. It is expected to publish in the Federal Register in the coming days.

"Thanks to the work of our scientists, Senator Bill Nelson, and others, there is a large and growing understanding of the real and immediate threat that the Burmese python and other invasive snakes pose to the Everglades and other ecosystems in the United States," Salazar said. "The Burmese python has already gained a foothold in the Florida Everglades, and we must do all we can to battle its spread and to prevent further human contributions of invasive snakes that cause economic and environmental damage."

The four species were assessed by the US Geological Survey as having a high risk of establishing populations and spreading to other geographic areas in the agency's 2009 report, Giant Constrictors: Biological and Management Profiles and an Establishment Risk Assessment for Large Species of Pythons, Anacondas, and the Boa Constrictor.

Sixty days after publication of the final rule in the Federal Register, interstate transport and importation of live individuals, gametes, viable eggs, or hybrids of the Burmese python, northern and southern African pythons and yellow anaconda into the United States will be prohibited. None of these species is native to the United States.

"Burmese pythons have already caused substantial harm in Florida," said U.S. Fish and Wildlife Service Director Dan Ashe. "By taking this action today, we will help prevent further harm from these large constrictor snakes to native wildlife, especially in habitats that can support constrictor snake populations across the southern United States and in U.S. territories."

Ashe said the Service will continue to consider listing as injurious the five other species of non-native snakes that the agency also proposed in 2010: the reticulated python, boa constrictor, DeSchauensee's anaconda, green anaconda and Beni anaconda.

Those who own any of these four species of snakes will be allowed to keep them if allowed by state law. However, they cannot take, send, or sell them across state lines. Those who wish to export these species may do so from a designated port within their state after acquiring appropriate permits from the Service.

The Burmese python has established breeding populations in South Florida, including the Everglades, that have caused significant damage to wildlife and that continue to pose a great risk to many native species, including threatened and endangered species. Burmese pythons on

North Key Largo have killed and eaten highly endangered Key Largo wood rats, and other pythons preyed on endangered wood storks.

In the Everglades alone, state and federal agencies have spent millions of dollars addressing threats posed by pythons - an amount far less than is needed to combat their spread. If these species spread to other areas, state and federal agencies in these areas could be forced to spend more money for control and containment purposes.

The Interior and its partners, including the Florida Fish and Wildlife Conservation Commission (FWC), South Florida Water Management District, and others are committed to controlling the spread of Burmese pythons and other large nonnative constrictors. For example, FWC recently implemented the use of a snake sniffing dog to help in its efforts to find and eradicate large constrictor snakes. This dog was present at the Secretary's announcement today, along with a 13-foot-long Burmese python.

Under the injurious wildlife provisions of the Lacey Act, the Department of the Interior is authorised to regulate the importation and interstate transport of wildlife species determined to be injurious to humans, the interests of agriculture, horticulture, forestry, or to wildlife or the wildlife resources of the United States.

For more information on injurious wildlife and efforts to list the four species of snakes as injurious under the Lacey Act, please visit: http://www.fws.gov/invasives/news.html. ❖

Source: US Fish and Wildlife Services

Frog World's Tiniest Vertebrate

A frog that can perch on the tip of your pinkie with room to spare has been claimed as the world's smallest vertebrate species. The adult frogs are about three-tenths of an inch long and so small that Louisiana State University herpetologist and environmental biologist Christopher Austin had to enlarge close-up photos to describe them.

But the title of world's smallest vertebrate is being contested: the males of a species of deep-sea anglerfish are about 2 mm smaller, said University of Washington ichthyologist Theodore Pietsch, who described them in 2006. The males don't have stomachs and live as parasites on 1.8-inch-long females.

Austin discovered the tiny frogs - along with another small frog species - in August 2009 while on a trip to Papua New Guinea to study the extreme diversity of the island's wildlife. He said he knew about the anglerfish but felt that average species size made more sense for comparison.

Steven J. Beaupre, a University of Arkansas scientist and president-elect of the American Society of Icthyologists and Herpetologists, said many vertebrates have males and females of very different sizes, 'so it is reasonable that the world's smallest vertebrate may end up being either the males or the females of some specific fish or amphibian species'.

He said he doesn't pay attention to "tiniest" reports, but the frogs themselves are a significant discovery.

"The discovery of two new frog species comes as great news against the background of more prevalent accounts of tropical amphibian extinction," Knowing

about such tiny creatures and their ecology, he said, helps scientists 'better understand the advantages and disadvantages of extreme small size and how such extremes evolve. Fundamentally, these tiny vertebrates provide a window on the principles that constrain animal design'.

Austin said that since these frogs hatch out as hoppers rather than tadpoles and live on the ground, their existence contradicts the hypothesis that evolution at large and small extremes is linked to life in water.

At least 29 species of minuscule frogs in equatorial regions worldwide live in leaf litter or moss that is moist year-round and eat even tinier invertebrates, creating a previously unknown "ecological guild" of similar animals with similar life habits, he said.

"We realized these frogs were probably doing something incredibly different from what normal frogs do - invading this open niche of wet leaf litter that is full of really tiny insects that other frogs and possibly other creatures weren't eating," Austin said.

"This frog has a call that doesn't sound like a frog at all. It sounds like an insect," he said. The calls seemed to surround them, and it took a while to be sure they were coming from the ground.

"We found it by grabbing a whole handful of leaf litter and putting it into a clear plastic bag and very, very slowly going through that litter leaf by leaf by leaf until we saw that small frog hop off one of those leaves," he said.

Getting photos took some effort — the frogs can leap 30 times their own length. After hopping around for a bit, they settled down long enough for a close-up or two, Austin said. ❖

Source: www.time.com

New Species of Horned Viper Discovered

© Tim Davenport, WCS

The Wildlife Conservation Society (WCS) in conjunction with Museo delle Scienze of Trento (Italy) has announced the discovery of a spectacularly coloured viper from a remote area of Tanzania in East Africa.The striking black-and-yellow Matilda's horned viper measures 2.1 feet (60 centimetres) and has horn-like scales above its eyes.

The discovery is described in the December issue of Zootaxa. Authors of the study include: Michele Menegon of Museo delle Scienze of Trento, Italy; Tim Davenport of the Wildlife Conservation Society; and Kim Howell of the University of Dar es Salaam

The authors are keeping the exact location of the new species a secret, since the snake could be of interest to the illegal pet collectors. Its habitat, estimated at only a few square miles is already severely degraded from logging and charcoal manufacture. The authors expect the species will be classified as critically endangered and have already established a small captive breeding colony.

The snake is named after the daughter of co-author Tim Davenport, Director of WCS's Tanzania Programme. For more information visit http://www.atherismatildae.org. ❖

Source: Herp Digest

65TH BHS ANNUAL GENERAL MEETING

Saturday 31st March 2012

Natural History Museum, Cromwell Road, London

Final programme and details will be advertised soon so please keep watching the website and look out for our mailshots. This is a definitely a date to keep free in your diary - why not spend the morning looking around the amazing museum before coming along to the AGM in the afternoon!

BCG SPRING SYMPOSIUM

To be held at the Berrill Theatre, Open University, Walton Hall, Milton Keynes on Saturday 10th March 2012. A day of lectures from Prof. John Cooper & Mrs. Margaret Cooper, Dr. Justin Gerlach, Mr. Martin Lawson and Miss Emma Wood. Further details and booking instructions are available from www.britishcheloniagroup.org.uk, or email symposium.bcg@ntlworld.com

Frank Bowles Recognised for Sterling Efforts in Field of Herpetology

Congratulations to Frank Bowles our Scottish Groups Liaison Officer! Frank was recently inaugurally awarded the Julia Wycherley Award – an accolade given by the ARG UK to individuals who have made significant contributions to UK herpetology.

Frank is 80 years young and has always been very proactive in the field of herpetology monitoring Scotland's conservation laws, encouraging data recording and being a crucial point of contact for anyone interested in herpetology in Scotland. Well done Frank! ❖

Frank Bowles *(left)* receives his award from Peter Leach, Scottish Rep for ARG UK.

Did You Know?

Keeping cool is a challenge in the desert where temperatures top 40 °C in the shade - but the gila monster can keep its body 3 °C below the ambient temperature by allowing water to evaporate from its cloaca. Why Gila monsters resort to this unusual measure rather than simply opening their mouths, as some other reptiles do, is not clear, but scientists speculate that this might compromise the quality of their venom, which is released into the mouth like saliva. ❖

Sunny Smarts - Reptilian Intelligence Increased by Warmer Temperatures?

As climate change alters the temperatures of reptile habitats around the globe, tests of one lizard species suggests warmer nests could make some reptiles smarter. When researchers incubated the eggs of *Bassiana duperreyi*, a mountain-dwelling Australian skink, at warmer-than-usual temperatures, they grew up to perform especially well on a learning task.

Herpetologists knew reptiles incubated in warmer nests developed differently, but linking hotter egg temperatures to increased intelligence is a first.

"We have 16 to 17 years of data on the effects of incubation temperature on skinks. We know the hotter guys are bigger, faster, absorb more [egg] yolk," said herpetologist Joshua Amiel of the University of Sydney, whose research was published on 11 January in *Biology Letters*. "But hardly anyone has given a look at the effect on reptile learning."

Cooler incubation temperatures in the Eastern three-lined skink, for example, produce smaller, less-agile hatchlings that are more likely to be male. Similar effects are seen in turtles. In crocodiles, extremes of temperature produce more females.

Thanks to their reduced metabolism and sun-bathing behaviours, reptiles are rarely viewed as intelligent animals. Research on their mental ability, much less the effects of climate upon it, is lacking.

Amiel and colleague Richard Shine developed a simple predator avoidance test. At each end of a rectangular tub, they placed an upside-down flower pot into which skinks could run and hide. The entrance to one pot was blocked by clear plastic.

After incubating two different sets of eggs at different temperatures - the warmer set mimicking natural incubation settings of skinks at lower elevations, the cooler set mimicking higher elevations — Amiel and Shine tested the hatchlings.

They sent each lizard running by touching its tail then measured how long it took to find the open shelter and how often it tried to enter the blocked door. Warm-incubated lizards learned to find the open flower pot much more readily than their cool-incubated siblings. In the wild, improved learning abilities likely increase chances of survival.

As global temperatures continue to shift, Amiel thinks some reptile species living in warming climates may become innately smarter. In cooling climates, they could become less intelligent.

The mechanism by which intelligence shifts is unclear, but Amiel suspects warm temperatures alter the production of hormones that regulate reptilian brain development.

"Now that we've seen this in one context, it will be nice to do some different trials, like a maze or food-encouraged learning, maybe even try some other species and see if this is generally true of reptiles," he said. ❖

Source: Dave Mosher, www.wired.com

'When the master is away, the frogs hop in'

- Ugandan Proverb

Cold-Blooded Cognition: Tortoises Pretty Smart After All

Tortoises aren't noted for their speed but they are surprisingly quick-witted

"It all stems from Moses," says Anna Wilkinson. Moses is her pet red-footed tortoise and a bit of a celebrity in the science world. Why? First, he outsmarted rats in a maze. Then he was the inspiration for a new lab studying reptile intelligence and the evolutionary origins of cognition. Now he has helped Wilkinson win an Ig Nobel prize. Victory for slow and steady.

Moses's first big academic break came in 2006. Wilkinson was attending a lecture on how rats remember their paths through a maze, when she started thinking, "Moses can do that." Afterwards, she asked the lecturer, Geoffrey Hall, if anyone had tried putting tortoises in such mazes. A literature search indicated that reptiles in general have proved pretty dim when subjected to cognitive tests. Undeterred, Hall and Wilkinson decided to see what Moses was capable of.

The pair set up a tortoise-sized test maze similar to the eight-armed radial structure used for rats and mice then put Moses through his paces. As with the rodents he was placed in the centre of the maze and given eight chances to retrieve food from the arms - each of which had a morsel at its end. Moses quickly learned to find his way around so that he didn't revisit arms where he had already eaten the food. Like the rodents, he seemed to create a 'cognitive map' from the objects he could see in the world beyond the maze. However, when Wilkinson and Hall obscured these landmarks, Moses took up a different strategy - he systematically visited the arm next to the one he had just left, allowing him to retrieve all eight food scraps. This flexibility of behaviour has never been seen in mammals, which seek new landmarks when old ones are removed.

Wilkinson and Hall were now interested in why reptiles had performed so poorly in previous cognitive studies. Taking a closer look at the reports, they found the problem. The earlier research had been done at cool temperatures, which left the cold-blooded animals feeling sluggish. Moses, by contrast, had performed at 29 °C, near the average temperature of the red-footed tortoise's native habitat in Central and South America. The warmer temperatures boosted Moses's metabolism, making him alert, lively and ready to conquer a maze.

Having finished her dissertation, Wilkinson started postdoctoral research at the University of Vienna, Austria. There, her supervisor Ludwig Huber encouraged her to pursue her interest in reptiles. In 2007 they set up the cold-blooded cognition lab. With seven more red-footed tortoises - as well as some jewelled lizards - they were ready to find out just how smart reptiles are.

One skill Wilkinson and Huber were keen to explore was gaze-following. The ability to look where another individual is looking is important because it can alert you to potential predators, or food. It is also a complex behaviour, which requires understanding that another animal's gaze can convey useful information, working out where it is looking and turning to focus on the same spot. Gaze-following has long been thought of as a talent exclusive to primates, but recently it has been found in goats and a few birds. It turns

out that red-footed tortoises can do it too.

When Huber and Wilkinson shone a laser pointer at an overhead screen to attract the attention of one tortoise, they found that another individual, behind the screen, also looked up.

Gaze-following had never been tested in reptiles before. The fact that red-footed tortoises can do it was surprising, given that they are usually solitary in the wild so may not be expected to evolve the ability to take cues from others.

Their performance on a second task was even more intriguing. The researchers found tortoises can learn to find hidden food by watching another tortoise walk around a wall to collect a treat. This indicates that tortoises are capable of social learning, a trait thought to have evolved as a special cognitive adaptation in social animals. The discovery raises the possibility that social learning may simply be an extension of general learning capabilities rather than a specialist skill.

Moses and his pals have done much to raise the intellectual standing of tortoises, but there is one test they famously failed. Contagious yawning is thought to arise from empathy, but Wilkinson doubted this theory. She spent six months teaching one tortoise to yawn in the hope that others would learn the trick - even though tortoises lack empathy. The yawns stubbornly refused to spread, Wilkinson and Huber reported in a paper that earned them the Ig Nobel prize earlier this year.

Reptiles are clearly far smarter than we thought. Wilkinson has one explanation - at least for Moses and his ilk. Tortoises receive no care after they hatch, so they have to learn on their own, she points out. And with a very high attrition rate, there is strong natural selection for intelligence. "They learn things very fast because they have to do so to survive," she says. "They are learning machines." ❖ ***Source: New Scientist***

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