THE NATTERJACK

Newsletter of the British Herpetological Society Established 1947

Tortoise & Turtle Conservation & Welfare Conference

Colchester Zoo, UK

This was a wonderful event held at Colchester Zoo with varied speakers sharing their love of chelonia and imparting knowledge on husbandry and welfare.

The theme was based around chelonian conservation and welfare in Europe and the event was held at Colchester Zoo. It was hosted by the Turtle Survival Alliance Europe and Turtle Welfare UK and was a great opportunity for tortoise and turtle fans to come together and talk about everything from husbandry through to research and conservation.

Different stands with feed, supplements and products for enclosures were available to buy and refreshments included homemade tortoise biscuits which was a great touch. A large amount of information, leaflets and care sheets were available to cater for all from beginners to advanced keepers. At the front of the lecture theatre were an array of preserved tortoises to show the differences which were wonderful specimens to look at.

Turtle and tortoise biscuits

Jane Williams, from Tortoise South East, started the conference talking about signs of stress, distress and pain in tortoises. Jane talked about her masters research work regarding environmental stress regarding husbandry. She talked about the indicators, how to identify and what can be put in place to minimise stress. Following Jane was a presentation with Ute O'Meara from the Suffolk Tortoise Group. Ute spoke on behalf of Wolfgang Wegehaupt who is about to release his latest book on chelonian species translated into English. Wolfgang has spent numerous years observing Mediterranean tortoises in their natural habitat and has used this knowledge to model both captive diet and environment. Wolfgang had provided a slideshow packed with a plethora of photographs for Ute to showcase the variety of landscapes and how difficult it can be to find these animals in amongst their native flora.

Ute O'Meara speaking on behalf of Wolfgang Wegehaupt

Eleanor Lien-Hua Tirtasana Chubb, who represented TSA Europe, Tortoise Welfare UK and the Tortoise Club UK spoke about their work affiliated with many zoos and organisations around Europe. The talk gave a strong

Eleanor Lien-Hua Tirtasana Chubb presenting.

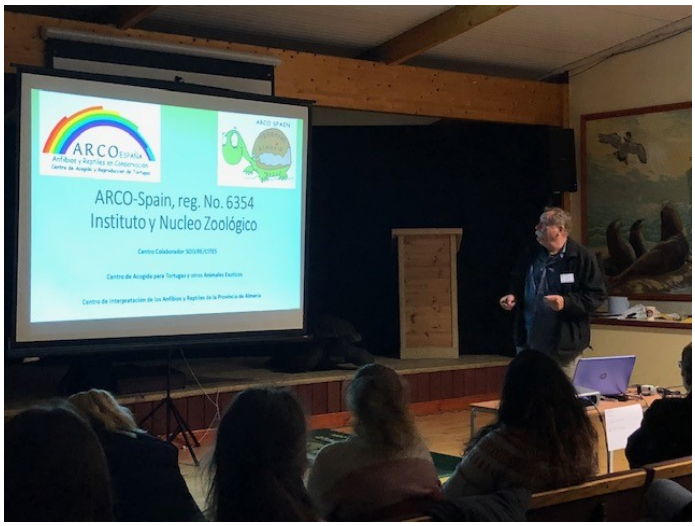
communication of how important it is for collaborative work. Eleanor shared the importance of using innovative methodology to gain more knowledge, increasing research opportunities through funding provision and providing accessible information and research through translated shared literature. Finally, to engage the chelonian community in working together to achieve the same goals.

Dr. Ama Groza, MRCVS Veterinary Specialist in exotic animal medicine and surgery, spoke on the veterinary husbandry and welfare of their chelonian patients. She gave advice on the layout of an recovery space for any recovering tortoises and why lighting, heating and hides are placed and maintained with this in mind. Ama's presentation covered access to exotic animal information through vets explaining that if your local vet does not have knowledge on chelonia, they can contact other vets who do have the knowledge and background. She gave advice on how to ensure the best husbandry to help your tortoise live and long life somewhat disease-free.

Dr. Ama Groza from Orwell Veterinary Group

Professor Dr. Hermann Schleich (as seen in the photograph below) gave two presentations about ARCO Spain and Nepal. Dr Schleich is a zoologist who is based mainly in Spain running a large facility from his home. There are multiple ponds housing various chelonian species. He explained how maintenance of the facility is time consuming and that volunteers assisting the project is essential to help with the day to day running. He has availability all year round to assist with this project with accommodation and training on site.

In 1997, ARCO Nepal, was founded with the aim to promote and educate regarding reptile and amphibian conservation. 'Its main field of activity is to enhance the awareness on biology, systematics and conservation of amphibians and reptiles in Nepal' (Schleich, H., 2018). The word 'arco' means "the bow" and the organisation uses the rainbow as a symbol for nature and the ecology



surrounding their work. There has been continual improvements and building of the ARCO Nepal site where they have accommodation and housing for research and education. Schleich talked about the collection and the trade of shells made into masks and that (as can be seen in the photo below) over time there has been a drop in the number of masks being sold. Again this area has ponds housing chelonian species. ARCO carries out education campaigns and bringing awareness to local communities to arouse interest in the field of herpetology. Schleich has carried out an amazing amount of work on both sites and continues to make changes and improvements. In order to continue this, he does need further help and support in the form of donations, memberships and volunteers.

Tom Wilkinson was the last speaker, from Paignton Zoo Environmental Park talking about their giant tortoise renovation. They house numerous Aldabran tortoises and started a renovation project on their enclosure at the zoo. Tom talked about the original layout of the enclosure and

the location of heating and lighting and how, with expert advice, determined the changes that they want to make. He had talked about a tortoise that had damage to one of its vertebral scutes where the heating being focussed in a small space had affected the tissue under the scute. The team gained veterinary assistance to treat the tortoise. They had to take x-rays of the scute and the tissue under-

An Aldabran tortoise being x-rayed in it's enclosure at Paignton Zoo.

Shells made into masks and sold locally have dropped since the ARCO project has been in place.

neath to gain further understanding of the issue. They were able to remove the scute, clean the area underneath, 'vacuum' the area so they could place a synthetic scute above. This has been successful in the healing process and the tortoise is doing very well since the surgery.

Tom Wilkinson giving his presentation

We were shown numerous photos showing the changes and how the enclosure was sculpted and formed into the new layout. The pool was sculpted and looks very natural, there were larger lighting units included and places to provide browse to enable the tortoises to reach up more and stretch. In addition, the tortoises needed to dig to lay eggs in nest chambers but this wasn't possible with the concrete flooring. So, they found that they could pile up large mounds of soil to provide an appropriate nesting site instead. After doing this, the tortoises were curious enough to dig and try to use the mounds. A success not only as enrichment but enabling them to carry out natural behaviours.

They also place weighing scales in the pathway where the tortoises enter and leave their indoor enclosure. They are able to weigh the tortoises without manual handling or training just through strategic placement. This reduces

stress, time and effort on both parts. It was clear that the team at Paignton are working very hard to ensure the captive environment that their animals are living in is the best they can provide. This is not only for the animal but for the keepers to give the best husbandry for those individuals.

The day was a great success with raffles and fundraisers. Some of the money raised was given to ARCO to aid in their conservation work.

Written by Suzie Simpson

(Photographs taken at conference)

Round Island view from the top (Photo: David Hedding).

A brief escape into the tropics: An oasis for an enigmatic snake

By Aurelie Hector

Situated 22 km north of the cost of Mauritius, Round Island 219 ha, is a haven for many of the endemic reptile species that have long been extinct on the mainland due to introduced invasive predators. Even if the flora of this little refuge has greatly suffered from the introduction of goats and rabbits, most of its herpetofauna has survived on the island, but in a much lower density than expected due to habitat loss. With intensive conservation actions to restore the island's vegetation and eradicate the herbivores by the Mauritian Wildlife Foundation, the National Parks and Conservation Service and the Durrell Wildlife Conservation Trust, the population sizes of the reptiles has increased considerably, making the island a paradise for these survivors. The oasis is also home to the most enigmatic reptile species of Mauritius the keel-scaled boa, *Caesarea dussumieri*. This nocturnal snake is the only land vertebrate with an extra maxillary joint in its upper jaw, giving it the name of 'slip jaw snake', and has left scientists open-mouthed. This unique adaptation is believed to allow the snake to grab a very specific type of barrel shape lizard prey, like the Telfair's skink, *Leiolopisma telfairii*, another survivor species. Unfortunately, the Round Island burrowing boa *Bolyeria multocarinata* did not survive the habitat loss and is now considered to be extinct. The keel-scaled boa is, therefore, the sole living representative of the Bolyeriidae family and is ranked as the 4th rarest snake in the world (https://listverse.com/2014/09/14/top-10-rarest-snakes-in-the-world/). The snake was restricted to Round Island until 2012, but with their increase in numbers, the species has been successfully reintroduced to the neighbouring island, Gunner's Quoin by the Mauritius Reptile Recovery Programme. In the year 2016, the keel-scaled boa caught the attention of the EDGE (Evolutionary Distinct and Globally Endangered) Fellowship project team due to its uniqueness. The EDGE of Existence programme is a global conservation initiative developed by the Zoological Society of London (ZSL) that focuses specifically on

(1) Female boa (Photo: Nick Page), (2) Male boa (Photo: Nik Cole) and (3) Juvenile boa (Photo: Johannes Chambon).

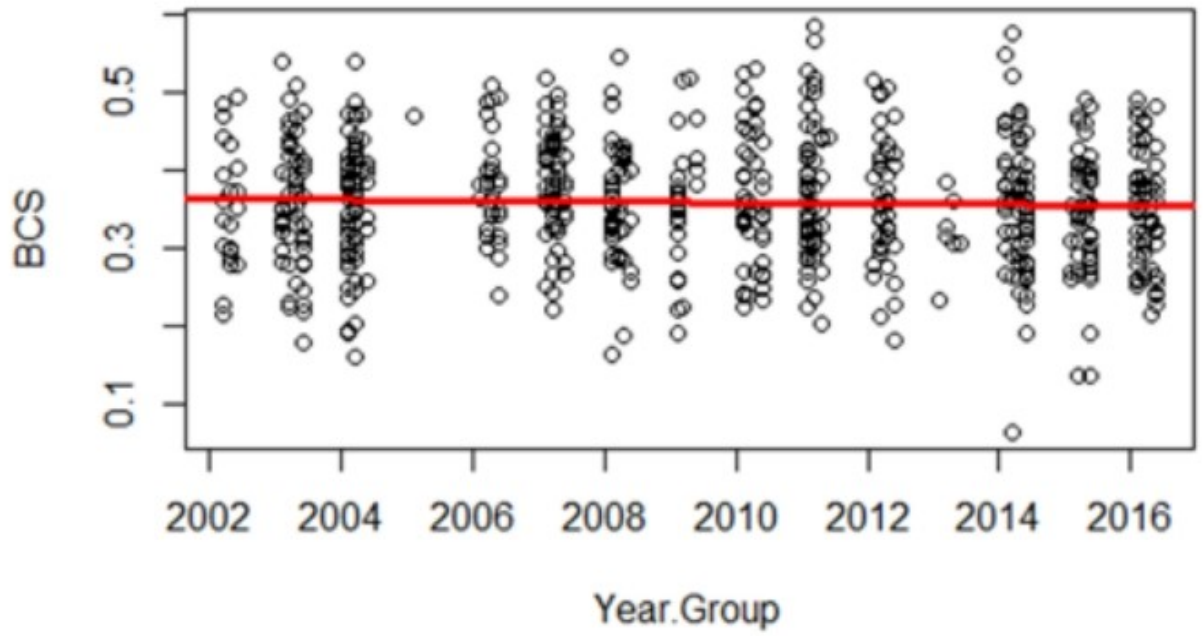
threatened species representing a significant amount of unique evolutionary history. Their goal is to raise awareness of the world's EDGE species, implement targeted research and conservation actions to halt their decline, and to train in-country scientists (called EDGE Fellows) to protect them now and in the future.

According to his article from the EDGE of Existence Website, Rikki Gumbs considered the snake to be among the top 10 most amazing EDGE reptile species in the world. The EDGE team has, therefore, made it their missions to encourage the conservation of this enigmatic species by providing two years' funding to an EDGE fellow, me, to dedicate my time to protect this species. This involves collection and analysis of population data and raising awareness of this unique threatened species, which is poorly known, amongst the local community.

On Round Island, I conduct boa night searches on a monthly basis. The snake shows sexual dimorphism, with females reaching twice the size of the males, which have longer tails. Juvenile boas of both sexes are orange in colour, but turn varying shades of greyish-brown as they mature. The keel-scaled boa is one of only a handful of snakes that show a natural physiological colour change, being able to change from dark greyish-brown to a lighter grey over a short period of time. The body of the snake is covered in small keeled scales giving its common name, 'keel-scaled boa'. Juvenile and male boas are frequently encountered in vegetated habitats and on trees, whilst female boas are largely terrestrial. When adult snakes are captured for the first time, they are microchipped for individual identity. Being able to identify individuals allows me to compile capture mark recapture data from which I can obtain estimates of their survival and abundance, which are is useful indicators that describe the structure of the population. This is helping me to develop a future management plan for the species.

With the data collected, I have been able to compare the body condition of female boas between years, and confirmed that it has remained constant between 2002 and 2016. This result suggests that there are ample food resources to support the growing population size of the snake.

The boa encounter rates per hour within the survey quadrats that were examined between 2006 and 2017 showed that there was a substantial increase in the number of boas found over the 11-year period. This is thought to be a



Body condition score (BCS – grams per millimetre) of female keel-scaled boas from 2002 to 2016.

sign that the habitat restoration efforts of the Round Island team are paying off.

Through the EDGE project, I am also using the boa as an ambassador to talk about the conservation work that we are currently doing in Mauritius. I speak to children during school visits and to the general public through the media. I believe that by making people aware of the amazing species in Mauritius, they will feel a stronger responsibility to protect our endemic heritage. By understanding better the work we are doing, they will also appreciate the importance of the many conservation initiatives undertaken by the Mauritian Wildlife Foundation and other organizations. The encouraging response I have had so far gives me hope that the long-term future of the keel-scaled boa is in safe hands.

School visit in Mauritius, children happy to learn how to handle rubber snakes (Photo: Aurelie Hector).

Reviewers: Bethan Govier, Phillip Lambdon, Mala Currooah, Raphael Merven and Nik Cole

Morphs, Mutations & Selective Breeding in Herpetoculture

Dr Tariq Abou-Zahr BVSc CertAVP(ZooMed) MRCVS

Introduction

There has been an explosion in the keeping of genetic morphs and mutations in the reptile hobby over the last couple of decades, particularly in highly popular species such as corn snakes, royal pythons, boa constrictors and bearded dragons. While many would argue that this has added a new dimension to the reptile/amphibian keeping hobby and ensured that reasonably easy to keep species have predominated the keeping landscape, others would argue that it has reduced interest in keeping/breeding rare or conservationally important species. Whether you like morphs or not, the majority are benign and can have welfare just as good as their normal/nominate conspecifics. In most cases therefore, it is purely down to individual preference, whether morphs are kept or not. However, a small number of colour/pattern/scalation-altering morphs are associated with genetic defects which may have a negative impact on their welfare. These morphs present an ethical dilemma within the hobby. An argument can be made that if there is evidence of potentially compromised welfare compared with conspecifics, perhaps it is unethical for us to be deliberately propagating those morphs and mutations.

In other areas of pet keeping, predominantly in the breeding of pedigree dogs, there has been a recent public outcry about selectively bred traits which can impair animal welfare. For example, breathing difficulties associated with certain brachycephalic dogs such as bulldogs, elbow or hip dysplasia associated with certain breeds and difficulties with parturition associated with other breeds. In response to this, the kennel club has altered several breed standards to minimise the exaggeration of some of these traits and various health screening schemes have been introduced to minimise breeding from individuals with those traits that are likely to compromise welfare.

While there are many examples of morphs and mutations with potentially deleterious potential welfare compromises to cover in this brief article, a couple of the more common examples are included below:

The Spider Royal Python

The spider has historically been one of the most popular mutations kept of the royal python (*Python regius*). The trait is dominant and is recognisable from its "spider web" type pattern, caused by alterations in the distribution of melanophores. Unfortunately, the morph is also associated with neurological disturbances and the presence of a so called "wobble syndrome". The wobble syndrome affects animals to different extents, with some animals showing almost no evidence of neurological deficits and others showing extreme neurological deficits and having great difficulties righting themselves. The wobble syndrome manifests itself as head wobbling, tremoring, star gazing and an impaired righting reflex. It appears that animals with only a very minor wobble syndrome can still produce offspring with severe neurological defecits. Attempts to selectively breed the wobble syndrome from the spider colour/pattern have thus far proven unsuccessful and it appears that the neurological trait is linked to the mutation causing the changes in skin colour/pattern.

Figure 1: A "wobble syndrome" is seen in the spider mutation of the royal python, *Python regius*

The "jaguar" mutation in carpet pythons appears to be very similar to the spider mutation in royal pythons and is also associated with a wobble syndrome.

The Silkback Bearded Dragon

The leatherback mutation in the inland bearded dragon (*Pogona vitticeps*) is an incomplete dominant mutation with reduced spiny scales over its body, with the homozygous form being the "silkback" – an essentially scaleless animal. Because of this lack of scales which naturally have a protective function, silkback bearded dragons are more prone to injury that their normal conspecifics. Injuries are very commonly seen in females associated with mating, as the male naturally grasps the female on the neck with his mouth to hold her. It is often proposed that female silkbacks should not be used for breeding for this reason. Problems with shedding (dysecdysis) are seen extremely frequently in silkbacks. Secondary to this, necrosis and subsequent loss of digits is a common finding. Assisted shedding can commonly lead to injury because of the silkbacks' thin skin. Silkback bearded dragons also seem prone to dehydration due to water losses across the thin skin.

While scaleless snakes are also popular, further research is needed to determine any potential welfare consequences. It certainly seems to be true that scaleless snakes due not suffer from dysecdysis, injury or dehydration to the same extent that silkback bearded dragons do.

What is being done?

Several veterinary organisations in the UK, including the British Veterinary Zoological Society (BVZS) and British Veterinary Association (BVA) have released position statements regarding morphs, mutations and selectively bred animals with negative health health/welfare consequences, in attempt to discourage the deliberate propagation of traits which have deleterious consequences for animal welfare. While no official position statement has been released by the reptile hobby organisations, the International Herpetological Society (IHS) have introduced a staged ban on the sale of three mutations at its annual breeders' meetings, namely, the spider royal python, the jaguar carpet python and the enigma leopard gecko. This started in 2018, with the single base mutations being banned initially, with combinations including the base morphs being banned thereafter.

There has been a great deal of support for the ban on social media, along with some opposition from reptile keepers.

My hope is that the hobby will continue to discourage the deliberate propagation of these problem morphs, not only from the point of view of animal welfare, but also to improve the image of the hobby of herpetoculture – that we as keepers should be focussed most on animal welfare,

Figure 2: Silkback bearded dragons are associated with many signs that can be considered deleterious to animal welfare. Dysecdysis (problems with shedding) as seen here are extremely common

Salamander-eating fungus found to be widespread in European private amphibian trade

Scientists warn a second amphibian chytrid panzootic could be on the horizon
ZSL London Zoo

A fungus deadly to salamanders and newts has been found to be widespread in the European private amphibian trade – with the infection being transmitted between several countries and discovered in Spain for the first time.

Published today (14 September 2018) in *Scientific Reports,* new research from scientists at ZSL's (Zoological Society of London) Institute of Zoology and Ghent University in Belgium, shows *Batrachochytrium salamandrivorans* or '*Bsal*' to be widespread in private amphibian collections in Western Europe. Of the eleven collections tested, seven were found to be positive for *Bsal*, with high rates of disease and mortality often associated. This study, funded by the Department for Environment, Food and Rural Affairs (UK), the Animal and Plant Health Agency (UK), the Royal Veterinary College, ZSL and the Research Foundation – Flanders, follows on from the first UK report of *Bsal* in collections, in 2015.

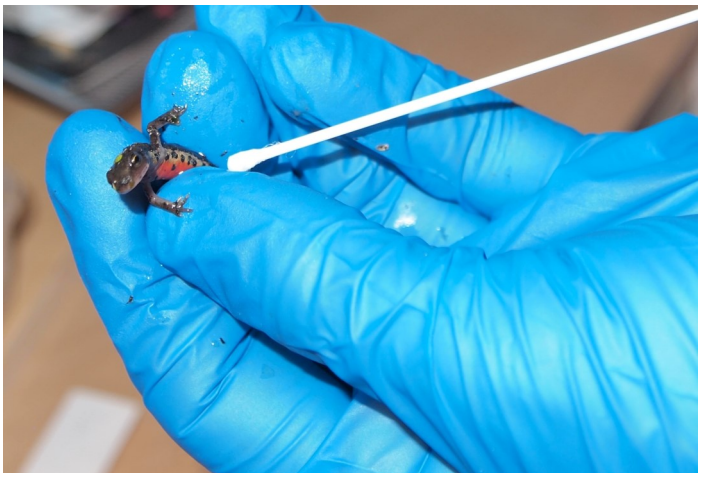
The private trade of amphibians (*i.e.* the trading and selling of individuals between collectors at a non-commercial scale) is causing concern for scientists at ZSL as they fear the salamander-eating fungus could soon find its way into wild populations of salamanders and newts in the UK and elsewhere in Europe, with severe consequences for amphibian conservation.

It has already been responsible for a 99% decline in a monitored population of fire salamanders (*Salamandra salamandra*) in the Netherlands, with population declines expanding into Belgium and Germany.

Lead author Liam Fitzpatrick from ZSL's Institute of Zoology said: "Once the fungus is in a wild population it is likely to be impossible to stop its spread and the loss of susceptible species. We already know that *Bsal* can be

lethal to a number of European salamander species, so understanding ways in which the fungus could be introduced to new areas is essential in our efforts to conserve wild amphibians."

Professor Andrew Cunningham from ZSL's Institute of Zoology said: "The presence of *Bsal* in amphibian collections increases the risk of *Bsal* infection being transferred to nearby wild amphibian populations, for example, through contaminated wastewater or released or escaped animals. The critical control point here is the prevention



of the fungus being introduced into amphibian collections in the first place.

"Along with international Government regulations being implemented to control the amphibian trade, biosecurity guidance and best practice methods for sanitisation need to be disseminated throughout the private trade immediately. This will help ensure that both traded individuals are healthy, and our wild populations of amphibians are protected – before it's too late".

During 2006, it was estimated that 131,000 live amphibians were imported into the UK with 98% believed to be

used for the legal pet trade. International trade controls on diseases solely impacting on wildlife have historically not been instigated, however the European Union has recently announced regulations for the movement of captive salamanders and newts in an attempt to limit the introduction and spread of *Bsal.*

Co-author, Professor An Martel from Ghent University

said: "Screening captive collections and treating *Bsal* positive individuals, along with engaging with collectors to improve sanitary protocols, are likely to be the most effective and feasible measures to protect both captive and wild salamanders and newts from *Bsal*."

The fungus – originally from Asia, is thought to have entered Europe as part of the pet trade before spilling over into wild amphibian populations; causing what is now termed as "pathogen pollution".

L. D. Fitzpatrick, F. Pasmans, A. Martel. A. A. Cunningham, Epidemiological tracing of *Batrachochytrium salamandrivorans* identifies widespread infection. *Scientific Reports*. www.nature.com/articles/s41598-018-31800-z

"Redstripe Ribbon Snake *Thamnophis proximus rubrilineatus* (Rossman, 1963) in the wild and in captivity"

By Steven Bol

Hibernation in captivity

I hibernate my Redstripe Ribbon Snakes for approximately 3 - 4 months (12-16 weeks) starting early November or December. I do this for the following reasons: keeping the snakes in a way that closely resembles the natural situation and breeding them according a planned method. For more details about my method hibernation please read Bol (2004).

Minimal 2-3 weeks before the start of the hibernation (early November) the snakes are offered food for the last time but I keep the terrarium well heated so that it no undigested food remnants stay behind in the intestine channel. After those 2-3 weeks in the heated terrarium without food I switch off the lamps/heating. The animals remain then in the unheated snakes room by temperatures that in this time roughly fluctuate between 12-18°C. After a (sometimes very) short period in the unheated terrarium (at most four weeks, mostly shorter), I place the snakes in a hibernation box. I use for this plastic containers (content approximately 6 liter) with limited ventilation capacity created by some holes in the lid. This is essential, since garter snakes are prone to dehydration during the hibernation (especially in the fridge). The containers are filled for two third with a mixture of sawdust and damp leaf (normally from the garden, no need for disinfection), and I make sure the substrate is slightly humid by sprinkling water over it. As long as the insides of the lid contains some water droplets due to condensation I consider the substrate to be damp enough, otherwise I sprinkle some extra water.

In this way the snakes hibernate, without water tanks, in the containers outside in a shed. Temperatures during hibernation range from 0,5-8 ºC. I check approximately once per month to see if the snakes are OK. Often the Redstripe Ribbon Snakes crawl away in the substrate. After opening the box the snakes react by tasting the air with their tongues or possibly slowly crawling around.

My experience is that as long as the substrate is damp enough the snakes survive this hibernation period of 3- 4 months easily, hardly lose any weight and they still are in perfect shape after the hibernation period. I have never seen any problems with a substrate which was too damp. Over the past ten year that I have hibernated this species in this way not a single one died. Also young snakes, which usually are a few months old in November, are hibernated in the same way as the adult animals (in the wild these young snakes also do not receive a special treatment). The only difference is that the duration is shorter: on average 6 weeks.

Ain't no mountain high enough! Two new frog species found on Vietnam's highest mountain

Conservationists believe the frogs could already be Endangered

(*Megophrys fansipanesis* © Benjamin Tapley)

Conservationists at international wildlife charity ZSL (Zoological Society of London) are heralding the discovery of two new species of frog, found 3,143 meters above sea level on Indochina's highest mountain in northern Vietnam.

Named by conservationists as the Mount Fansipan horned frog (*Megophrys fansipanesis*) and the Hoang Lien (pronounced as written) horned frog (*Megophrys hoangliensis*) - after the places where they were found – the remarkable discovery demonstrates just how little is known about this fascinating region of Vietnam.

While the discovery of a new species is always a cause for celebration, ZSL's amphibian experts are already concerned that the two species could be facing the risk of extinction, due to development of their habitat to support the large numbers of tourists who flock to the area to enjoy the cool climate and natural beauty. Published today (*1 November 2018*) in *Zootaxa*, the frogs were described by a team of experts from ZSL, the Australian Museum Research Institute and The Centre for Rescue and Conservation of Organism, with the support of the Natural History Museum (London). ZSL's Curator of Herpetology, Benjamin Tapley said; "The discovery of these frogs is extremely exciting but identifying them as two new species has been by no means easy. At first glance, the frogs looked very similar and even their calls sounded identical, like a loud insect chirp on repeat – but we simply couldn't identify them as any known living species just by looking at them. It wasn't until we recorded and analysed their calls and DNA, that the pieces of the puzzle came together. "Because frogs are so vulnerable to predators when they call, they stopped calling when we approached. This meant that we often had to wait for long periods of time in precarious situations, such as, in the

(*Megophrys fansipanesis* © Benjamin Tapley)

(*Megophrys hoangliensis* © Benjamin Tapley)

middle of a waterfall in the depths of the night – just waiting for a few snippets of audio. Yet collecting these calls was vital in allowing us to finally confirm they are in fact, two, completely new separate species. "However, we did unfortunately observe an enormous amount of habitat destruction and degradation at many of our study sites due to infrastructure being built for tourists and from tourists littering and defecating in the streams; posing a long-term threat to the species if controls are not put in place soon. "There is also an urgent need for additional amphibian surveys, particularly at high elevation sites in Vietnam where other undiscovered and potentially highly-threatened amphibian species could occur. However, the important message is, now that these species are named – we can determine how to try and conserve them". The discovery concludes the third new frog species to be discovered from Mount Fansipan, in five years, with the first being found in 2017 by the same ZSL lead team. This most recent discovery occurred during an expedition that was funded by The Ocean *Park Conservation Foundation Hong Kong and the Mohamed bin Zayed Species Conservation Fund.* Mr Chung Nguyen, from the Centre for Rescue and Conservation of Organism in Vietnam said: "The discovery of two new species in the Hoang Lien Range demonstrates how little we know about amphibians in this region. The fact that we are still finding new species that are potentially extremely threatened, highlights the need for ongoing research, so that we can determine the true diversity of amphibians in the Hoang Lien Range and protect them".

(*Megophrys hoangliensis* © Benjamin Tapley)

(*Megophrys fansipanesis* © Benjamin Tapley)

Since 2004, there has been an astonishing number of new amphibian species discovered worldwide, with 87 new amphibian species described from Vietnam alone. Mount Fansipan, in the Hoang Lien Range is Indochina's highest mountain and is particularly rich in frog species; lying in a junction between two major hotspots for biodiversity. As a result, this region is home to more than 80 species of amphibians alone. However, the promotion of responsible ecotourism must be addressed, to ensure the incredible amphibian diversity located in the region, is safeguarded, before it's too late.

To find out more about ZSL's conservation efforts around the globe, please visit www.zsl.org

(*Megophrys hoangliensis* © Benjamin Tapley)

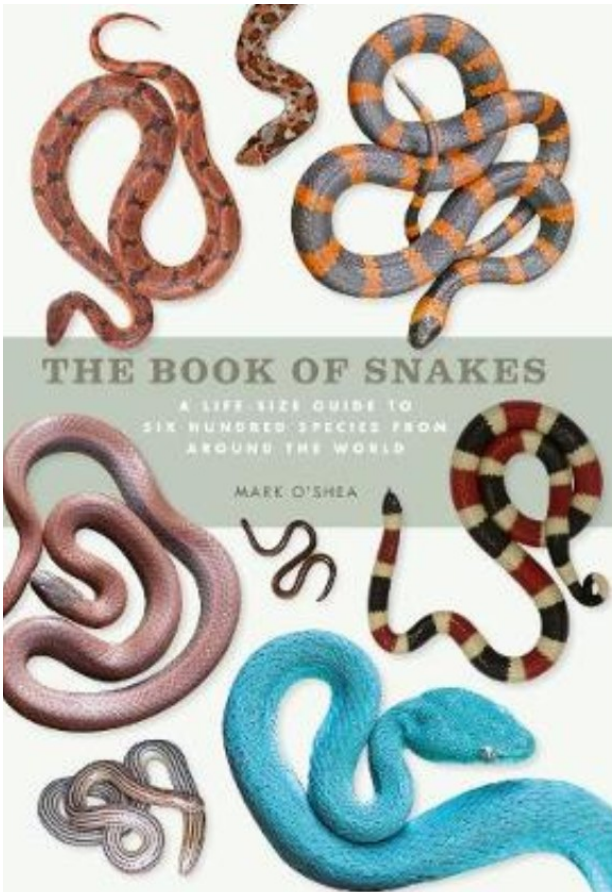
Book Review:

The Book of Snakes: A life-size guide to six hundred species from around the world

Mark O'Shea

(Hardback) 656pp.

Reviewed by: Suzie Simpson



On first glance, this book is glossy and exhibits several eye catching photos on the front. It is large and weighty in size so if you are looking for a pocket guide, this is not. The book covers 600 species of snake picked from all 32 families and shows them in their glory on paper. You can guarantee on an extremely eye-pleasing wealth of photographs and information.

The aim of the book is to focus on species for not only the novices to enjoy but also to provide information and awareness for the more advanced field biologists or herpetologists. The first 35 pages cover aspects such as evolution and diversity, what a snake is, prey and hunting, reproductive strategies, snakes in culture and venoms. The text is accompanied by sketches and photos for cross referencing.

It's not often you come across a book about snakes where the photographs are actual size. They have been included to look like the snakes are just sitting on your book while you read. The good quality, colour photos on the white background give a real feel which adds to the luxury of this book. The pages are purposely not crammed so it is clear that the author wanted to give you succinct information and let the images impress. Clearly, if you want more detailed information you can research other sources but the book allows the reader to have a taste in order to make that decision, 'Have I been drawn in enough to look further?'. To advanced herpetoculturists, there may be snakes that they were unaware of and this in part is what O'Shea also wants to achieve. To raise awareness from beginner to expert of the rarer, less publicised species. In addition, well recognised pet snakes such as cornsnakes, kingsnakes and boas are included and this gives snake keepers information and inclusivity regarding animals they may own.

It is easy to read and navigate through, with uncomplicated language. In the rear, there are indexes for both common and binomial names depending on which you are more familiar to help you locate what you are searching for. There is a glossary of terms and additional sources for reference.

It is, in summary, a little more than just a "coffee table book" of rich, diverse photos. There are fascinating details regarding phylogeny, diagrams illustrating internal organ locations, dentition and scalation. Anyone who comes across it would want to open and browse through the pages. A great way to hook people in to learn more and indulge in these wonderful creatures. If you think you know a lot on this subject, challenge yourself and read it.

Price: £22.50 - £35.00 (UK sterling) price may vary
Publisher: The Ivy Press
ISBN: 9781782405597
Dimensions: 270 x 180 mm

MONASH University

Biological Sciences

Two PhD projects: CT Scanning and Ecomorphology of Australian Lizards: Monash University, Melbourne, Australia

Two PhD projects are available from 2019 in the research groups of Assoc Prof David Chapple (https://www.chapplelab.com/) and Assoc Prof Alistair Evans (http://evomorph.org/) at Monash University in Melbourne, Australia.

The two PhD projects will focus on using CT scanning techniques to investigate the evolution and diversification of morphology within the diverse Australian lizard fauna (~810 species). The project will be supported by an Australian Research Council Linkage Project Grant (mid-2018 to mid-2021) and involve collaborations with Museum Victoria (Dr Jane Melville, Dr Joanna Sumner, Dr Katie Smith-Date), the South Australian Museum (Dr Mark Hutchinson), Dr Christy Hipsley (University of Melbourne), Dr Johannes Müller (Museum für Naturkunde – Berlin), and Prof Shai Meiri (Tel Aviv University, Israel).

Interested students should email their CV, academic record, and research interests to Assoc Prof David Chapple (David.Chapple@monash.edu) by **Friday 30th November 2018**. The successful applicants will need to complete and submit an online PhD scholarship application (see https://www.monash.edu/science/schools/biological-sciences/postgrad/how-to-apply).

Students will need to successfully obtain a PhD scholarship. Australian and New Zealand citizens can apply for a Research Training Program (RTP) stipend or Monash Graduate Scholarship (MGS). International students can apply for a Monash International Postgraduate Research Scholarship (MIPRS) or Monash Graduate Scholarship. For further information regarding PhD entry requirements see: http://www.monash.edu/migr/future-students/support/scholarships

PhD on effects of climate change, disease and invasives on UK amphibians

Mitigating the effects of climate change, emerging disease and invasive species on native amphibian populations in the UK

An exciting opportunity for an aspiring amphibian researcher! PhD opportunity to work on non-natives, disease and climate change - and their interactions - in sunny Wales, with the University of Plymouth, ZSL and ARC.

Project description

Amphibians are the most threatened group of vertebrates, with global declines driven by and associated with emerging infectious disease, invasive species and climate change (North et al. 2015; O'Hanlon et al. 2018; Pounds et al. 2006).

Two emerging infectious diseases severely impacting amphibian populations are chytridiomycosis, caused by a novel lineage of the fungus *Batrachochytrium dendrobatidis* (Bd; O'Hanlon et al. 2018), and ranavirosis, caused by a group of viruses from the Iridoviridae family (Price et al. 2014).

To mitigate emerging disease-driven amphibian declines, we need to understand host-pathogen interactions. Key to pathogen success are reservoir hosts which serve as a pathogen source, but do not develop any signs of the diseases (Garner 2018).

These reservoir host are a consistent source of the infective stage of pathogens when the susceptible amphibian host populations decline and are pushed towards extinction; in many cases these reservoir hosts are invasive amphibian species.

Wales, UK, has an ideal amphibian system to study these host-pathogen interactions, with both native, declining populations of amphibians as well as newly discovered smooth and alpine newts, which are an invasive species to the area.

limate change has already affected ranavirus disease dynamics in wild frogs, but it is currently unknown how future changes will affect disease dynamics in other hosts, or how amphibian community composition will impact outcomes (Price et al. 2018).

We seek a candidate who is self-motivated and interested in developing analytical skills in ecology, immunity, spatial epidemiology, climate modelling and experimental biology.

You will become part of a team of researchers based at 4 UK HEIs with the ultimate aim to develop conservation strategies to effectively conserve the endemic amphibian fauna through climate change and emerging disease. Indirectly, the student will work with researchers at ZSL, UCL, Imperial College, QMUL, Liverpool and DICE embedded in a larger project on amphibian declines and emerging disease.

Applicants must meet the eligibility requirements of the ARIES DTP. The successful candidate should have the scientific ability and motivation to do the best possible quantitative research in the field as well as in the laboratory. Flexibility to live in Plymouth and spend time in London as well as Wales for fieldwork.

For further details look up the ARIES website or Arc Trust.

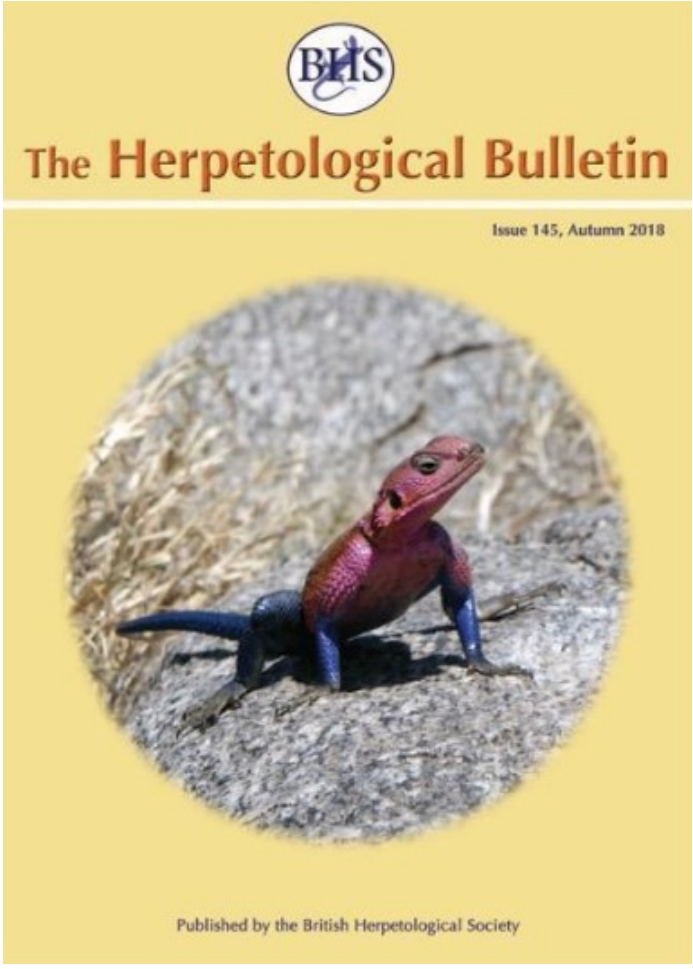
2018 Herpetofauna Workers Meeting

Saturday, 03 Feb 2018 09:30 – Sunday, 04 Feb 2018 16:30

Location: The Hilton Hotel, Watering Lane 100, Collingtree, England

The annual Herpetofauna Workers Meeting will be held at the Hilton Hotel in Northampton on 3-4 February 2018. Once again, we will join with Amphibian and Reptile Conservation to welcome over 200 delegates representing a lively mix of professional herpetologists, volunteers, academics, students, representatives from the statutory agencies and other conservation organisations; drawn from all corners of the UK and beyond. There will be the usual mixture of workshops and presentations, bringing you all the latest information and updates on our native herpetofauna, with plenty of opportunities for discussion and social networking, including our special Gala Dinner and quiz.

Why not take a look at our other publications?



Being a member of the British Herpetological Society gives access to all three publications for just **£25 a year**.

THE NATTERJACK

Newsletter of the British Herpetological Society *Established 1948*

To our BHS members,

We are always interested in hearing from you. Please feel free to contact me if you would like to share anything regarding herps. We would love to about your animals, your experiences, their care and husbandry, ideas, training, research and more.

It is important to us that you have that opportunity to share with the wider community, as we all benefit from sharing knowledge and experience.

Kind regards,

Suzie Simpson

We would like to wish you all a

Merry Christmas and a Happy New Year

as the next issue will be out in January!

Email: natterjack@thebhs.org

Find out more about The British Herpetological Society on our website at:

https://thebhs.org/

Check out our social media pages too:

https://www.facebook.com/The-British-Herpetological-Society-BHS-295241210567422/

https://www.facebook.com/groups/454242811428496/

Twitter: @britishherpsoc