

The magazine for Britain and Ireland's best zoos and aquariums

# BIAZA NEWS

WINTER 2020 • Issue 25



## CARNIVOROUS PLANTS



**inside**

- A look at SEA LIFE Great Yarmouth . The Bug Issue
- Nature's long-lost meat-eating plants . The pine hoverfly
- Turtle rescue . Thermal elephants . Hoopoes are here

**BIAZA**  
BRITISH & IRISH ASSOCIATION  
OF ZOOS & AQUARIUMS

## carnivorous Plants



Chester Zoo welcomes back meat-eating plants

Cover Story  
BIAZA

# BIAZA NEWS

## regulars

- 4 Zoo News  
News from our zoos and aquariums
- 6 Featured Member  
SEA LIFE Great Yarmouth
- 10 Faces of BIAZA  
Frances Baines
- 14 New Enclosures  
Pandas and Bugs
- 16 Home and Away  
Owston's civets
- 17 Native Species  
Pine Hoverfly
- 18 Corporate Member Feature  
Wild Republic Retail
- 20 Research Spotlight  
JZAR special issue
- 22 Education  
Wellbeing and a Participatory Zoo Experience
- 28 BIAZA diary  
What's on and when

## features

- 8 Carnivorous plants
- 9 The Bug Issue
- 11 Wild tigers
- 13 Zoo working tour
- 24 Turtle rescue
- 25 Elephant thermal imaging
- 26 Hoopoes

Published by **Coast Agency** [www.coast.agency](http://www.coast.agency)



## 4 Otterly adorable

Chester Zoo celebrates a great year with over 2 million visitors, and we can see why.



## 8 Day of the triffids

Chester Zoo welcomes the return of meat-eating plants

## 14 Award winning panda pad

The Royal Zoological Society of Scotland opens new exhibit



## 23 A soft approach to education

Healthy ocean activities at Bristol Zoo Gardens



## Get in touch with BIAZA News

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**Our Vision** - To be a powerful force in the care and conservation of the natural world

**Our Mission** - BIAZA is a professional organisation which represents its members and promotes the values of good zoos and aquariums. It leads and supports its members to:

- inspire people to help conserve the natural world
- participate in effective cooperative conservation programmes
- deliver the highest quality environmental education, training and research
- achieve the highest standards of animal care and welfare in zoos, aquariums and in the wild

BIAZA is a member of:



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Submissions for BIAZA NEWS are welcome from all members of BIAZA, and should be sent, preferably by email, to [admin@biaza.org.uk](mailto:admin@biaza.org.uk)

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# ZOO NEWS

Keeping you up to date with all the latest news from our member zoos and aquariums

## UK breeding first

Two blue-spotted tree monitor lizards (*Varanus macraei*) have hatched at Bristol Zoo Gardens, a first for UK zoos. Weighing just 13 grams at hatching they will be 1.1 metres long when fully grown. Little is known about these animals in the wild; they were only discovered on the island of Batanta off the coast of Indonesia in 2001, but they are already listed as Endangered, largely because of the international pet trade. Senior Reptile Keeper Adam Davis said: "We hope now that having bred two we can go on to breed more and help sustain the population of blue-spotted tree monitor lizards into the future."



## 'Bug'ingham Palace

Students at Reaseheath College studying for a City & Guilds qualification designed and built a replica Buckingham Palace, appropriately named 'Bug'ingham Palace. After sending a photo to Her Majesty The Queen and His Royal Highness The Prince of Wales, they received glowing replies from both, showing appreciation and interest in native invertebrates.



## BIAZA Annual Conference tree planting

At the 2019 Annual Conference Drayton Manor pledged to plant a tree for every delegate. Steve Lomas, Park Operations Director, zookeepers and conservation volunteers planted 265 trees as part of Drayton Manor's 17-acre woodland restoration project. As well as providing habitats for native species this woodland will be a source of sustainably managed browse for zoo animals. Chris Mitchell, Head of Zoo Operations, said: "We were delighted

to host the 2019 Conference and happy that it could be a catalyst for further tree planting and habitat improvement on our estate."

## Test your wits

Every year the Trust for Sustainable Living hosts an international essay competition for schoolchildren focusing on a major sustainability challenge. It would welcome any assistance with promoting the competitions and invites everyone to test their wits on the Drawdown Challenge game, developed in collaboration with Project Drawdown <https://trustforsustainableliving.org/play-drawdown>



## Record-breaking year!

2019 was a record-breaking year for some of our members. Africa Alive! and Banham Zoo broke their all-time visitor records since the zoos first opened. Twycross Zoo saw a record-breaking 644,033 people visit and Chester Zoo reached a huge milestone, with two million visitors recorded for the first time. Jamie Christon, Chief Operating Officer, said: "Thank you to every single person that has visited the zoo and left feeling more empowered to protect wildlife. You have helped us to protect endangered species around the world."



## Well-travelled mandarin

Between 1999 and 2018 over 14,000 wild birds were ringed at Beale Park including 160 mandarin *Aix galericulata*. There are few movement records for this species but three birds have been found away from Beale Park, with one travelling all the way to Loch Spynie Reserve in Scotland, a total distance of 700km.



## Chester speaks at the EU Natural Resources Commission



Chester Zoo's Science Director, Dr Simon Dowell, was asked to appear before the EU Natural Resources Commission in Brussels to discuss sustainable palm oil. The success of Chester Zoo's 'Sustainable Palm Oil City' campaign could now see it scaled up and applied across EU member states. Dr Simon Dowell said: "We want to make sure that members of the Commission better understand the scale of the palm oil problem, deforestation and the catastrophic impact it's having on wildlife."

# ATL

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# Featured member

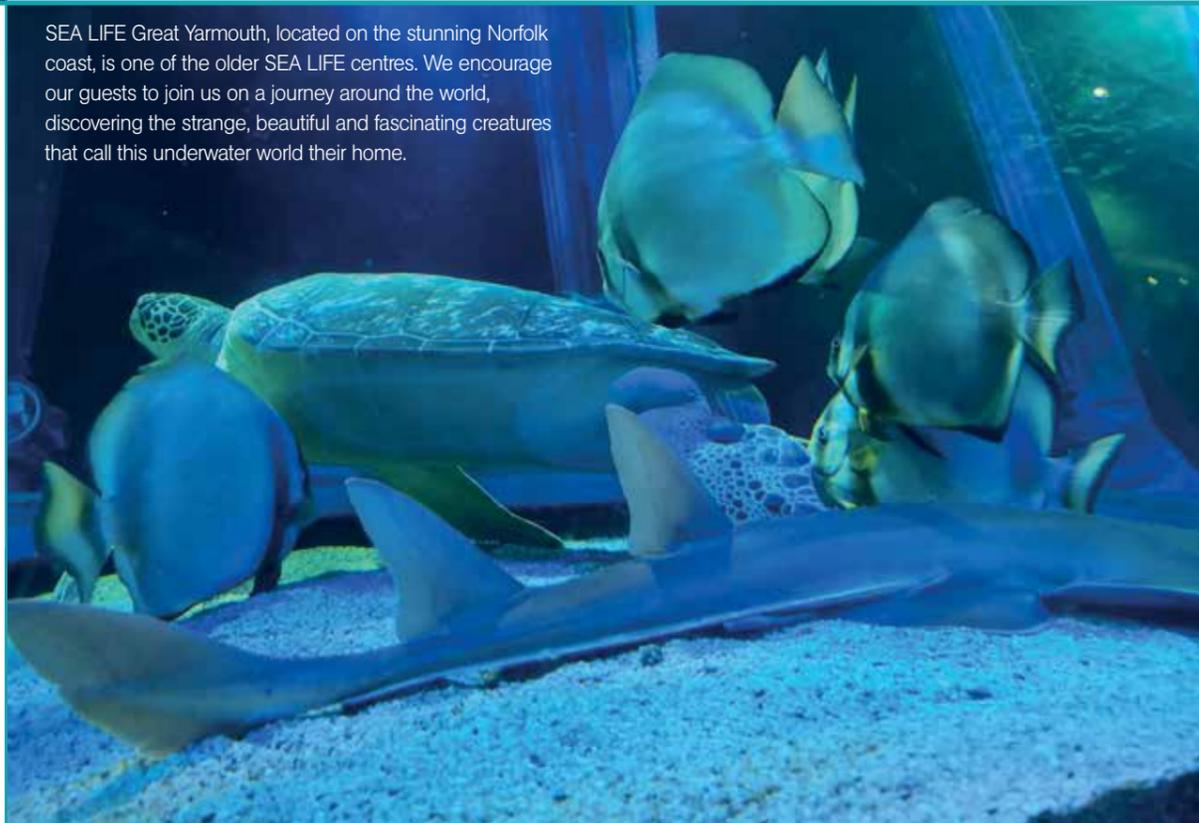


SEA LIFE is the world's largest aquarium brand with over 50 aquariums and two sanctuaries. We invite explorers into our incredible underwater world as part of our mission to inspire a love for the ocean and its creatures, and to encourage people to preserve them for the future.



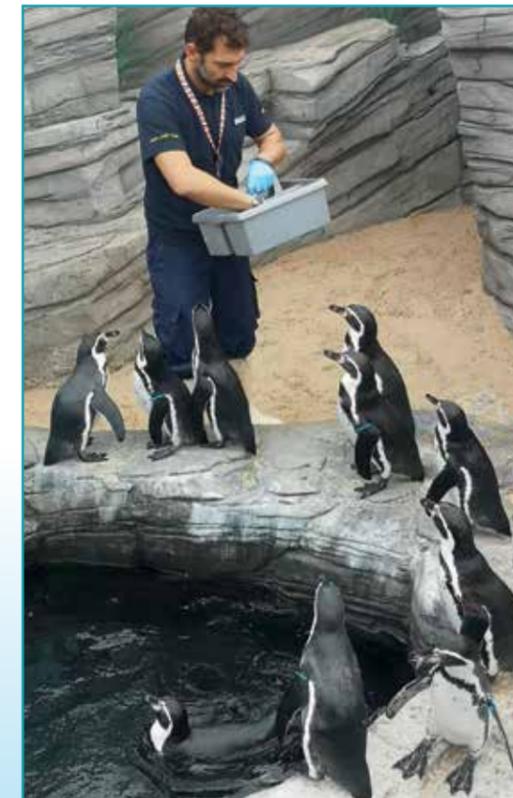
By Chris Sturdy,  
Curator,  
SEA LIFE  
Great Yarmouth

SEA LIFE Great Yarmouth, located on the stunning Norfolk coast, is one of the older SEA LIFE centres. We encourage our guests to join us on a journey around the world, discovering the strange, beautiful and fascinating creatures that call this underwater world their home.



of miles from the centre. These birds are the UK's rarest seabird and populations continue to decline. We help warden the nest sites and help with diversionary feeding tactics on the kestrels which predate on the terns. Our next campaign is focused on reducing plastic pollution, especially the doughnut shaped frisbees which can get trapped around the neck of seals and other wildlife. This is especially important for us as 40% of the global grey seal population is found on the Norfolk coastline and we are seeing more injuries from these toys.

With our continued commitment to animal welfare and conservation, we decided the time was right for us to go that extra mile and join BIAZA! Alongside joining, we created the role of Conservation, Learning and Discovery Officer which is the first time we have had a position dedicated to just conservation, education and research. Our Curator joined the BIAZA Research Committee and the Animal Welfare Working Group. Our Lead Aquarist has also helped set up a Syngnathid (seahorses and pipefish) focus group. We look forward to getting involved with other BIAZA activities, including Grab That Gap and Big Bug Bonanza.



The first zone explores our native seas, showcasing the shimmering shoals of bass and bream, the acrobatic antics of our native rays and the powerful beak-like jaws of the grey triggerfish. Guests can become a rockpool explorer and touch a starfish as they discover the wildlife of the coastline. This area, Under the Ray-dar, is used to highlight the conservation issues of our native habitats, especially the wonderful ecosystems that can be found on our doorstep in Norfolk.

Great Yarmouth ready for the launch of the enclosure, we helped Hunstanton SEA LIFE free up some space in their seal hospital by housing two seal pups who needed fattening up before release.

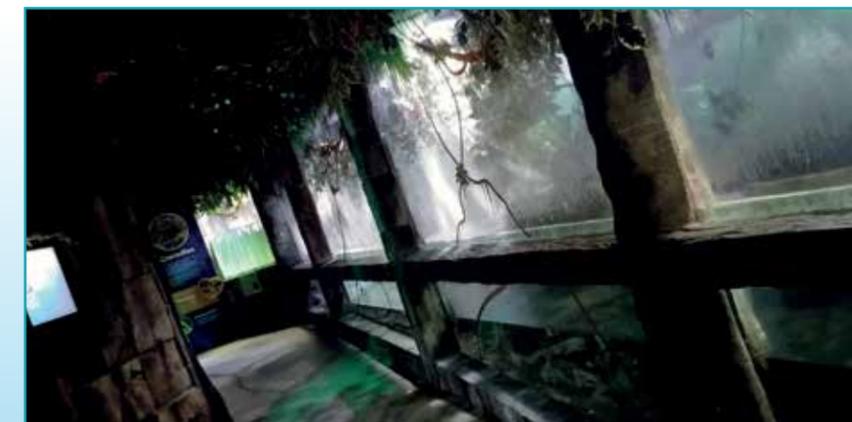
Next we have Jelly Invaders, our new zone for 2019. Here our guests can get up close to jellyfish and follow the life cycle. There are plans to develop this area further with breeding facilities so that we can become self-sufficient in jellyfish and develop our breeding techniques.

The journey continues through our rainforest where guests find Ntombi and Masozi, our West African dwarf crocodiles. Meandering through displays of colourful fish, guests reach our 250,000-litre tropical ocean display full of fish, blacktip reef sharks and our green sea turtle Noah. The blacktip reef sharks were born in Germany as part of an ongoing breeding programme with future plans to achieve SEA LIFE's first second-generation captive blacktip reef shark births.

Leaving our native shores, guests come face to face with our colony of Humboldt penguins. We have recently upgraded their enclosure to make it more realistic and to provide additional land space. Whilst we were redeveloping their enclosure the penguins took a trip to Scarborough SEA LIFE where they decided to start nesting. Unable to move the penguins back to

Naturally, conservation is at the heart of what we do. Last year we committed to carrying out monthly beach and river cleans, sometimes we did more. We have removed the normal rubbish, straws and packaging, but also computers, trollies and a motorbike! The total to date is over 860 kg which is heavier than an adult giraffe! We are also working with the RSPB protecting the little tern nesting sites which are on the sand dune systems just a couple

SEA LIFE carries out a number of projects abroad through our Working in the Wild programme. In 1998 the Maldives lost 90% of coral reefs due to a rise in sea temperature, and a tsunami in 2004 destroyed many shallow reefs. In 2007 a local project began to rebuild the reef by producing coral frames which allowed new corals to settle and grow, thereby providing a safe haven for the fish that live there. SEA LIFE has been involved with the project since 2015, seeing many members of our staff going to the Maldives to support this important work. Over 600 coral frames have been produced and placed on the reef!



Plans for the future? We will continue to develop our conservation programme, working with local organisations on local habitats. We will continue to develop our education offering and join Learning Outside the Classroom to demonstrate we have achieved a high standard. We also have an exciting development plan in place that concentrates on bringing an ageing building to the forefront of animal welfare and conservation, creating wow displays and amazing discoveries!



# Nature's forgotten carnivores

Chester Zoo is home not just to animals, but a bounty of plant life. National Collections recognised for their incredible international conservation value, including 72 species of cactus and 750 species of orchid, are held here, with a team of expert staff working to ensure their health and protection.

By Ben Evans, Chester Zoo

We have a long history of carrying out rare plant reintroductions across the UK, such as the Critically Endangered and endemic *Cotoneaster cambricus* on the Great Orme of Llandudno. With our work at home and in the field, we seek to use our position as a zoo to raise awareness of the key role of plants in global ecosystems.

Some of the most fascinating but little-known roles plants play are as carnivores. *Nepenthes* pitcher plants, in particular, display marvellous adaptations to capture their insect prey. Around 170 species exist, 130 of which can be found here in the Chester Zoo collection. Most commonly, *Nepenthes* species live in the forest and mountain regions across South East Asia, though some are extant in Madagascar, the Seychelles, Australia, Sri Lanka and India. Specialising to grow in poor soil where nutrients are scarce, carnivorous adaptations allow the plant to obtain key resources, giving it a competitive advantage over other plant species fighting to survive. The pitchers themselves have evolved to maximise their prey capture. Enticing nectar produced by the plant attracts insects on the hunt for a meal.



Photo: Indonesian Institute of Sciences

Those daring enough to traverse the smooth peristome (rim) fall victim to nature's slip and find themselves unable to escape the viscous pool of digestive enzymes below.

These fantastic adaptations are at risk however, with the habitats that *Nepenthes* rely on rapidly disappearing due to threats including climate change and the continuous pressure of illegal collection. Some species are highly endemic, such as *Nepenthes clipeata* found exclusively on the rocky cliffs of Mount Kelam in Indonesian Borneo. Over recent years, Chester Zoo has supported the Indonesian Institute of Sciences (LIPI) in carrying out surveys of key *Nepenthes* species across Indonesia. In 2020, our attention is turning to the creation of a *Nepenthes* conservation centre in the South East Asian nation to ensure the species most at risk of extinction are not lost.

Often people are surprised to hear that you do not have to travel around the world to find the rarest carnivorous plants. Here in the UK, we have fascinating examples living on our doorstep. In partnership with the Lancashire Wildlife Trust we have supported the North

West Rare Plant Initiative's founder and plant expert, Joshua Styles, in carrying out conservation of the great sundew (*Drosera anglica*).

The leaves of this striking yet tiny plant are coated in many tiny tentacles, tipped with droplets of what at first appears to be morning dew – giving the plant its name. These droplets are actually globules of a sticky, sweet-smelling liquid which is irresistible to passing insects. Any curious individual unfortunate enough to become trapped has no chance of escape. The sundew's tentacles roll up and tighten around its prey, smothering and drowning the insect in the sticky fluid. Digestive enzymes are then slowly secreted, breaking the insect down into a meal, which it then absorbs. Eventually, the leaf unfurls, freeing what little is left behind - an empty insect exoskeleton.

Much like many *Nepenthes* species, the great sundew has dwindled under human pressures, disappearing across most of England. Our support for our partners aims to see the sundew's long-term return to the mosslands of Manchester for the first time since its disappearance 150 years ago.



# The Bug Issue

By Tyrone Capel, ZSL Whipsnade Zoo

The BIAZA Terrestrial Invertebrate Working Group (TIWG) are excited to announce the launch of their new conservation campaign: The Bug Issue!

As some of the most well-known megafauna face an extinction crisis, invertebrates are often overlooked. It has been stated that 20% of invertebrate life is at risk of extinction and it is predicted that over 150,000 species of invertebrates will go extinct by 2050 unless we take action. Some of these species from overseas already exist in breeding programmes e.g. Partula snails, Desertas wolf spiders, and Gooty sapphire ornamental tarantulas, but many species on our doorstep are also facing similar threats.

In the UK we have roughly 40,000 native invertebrate species, many of which are facing extinction. You are probably thinking they are small brown insects that you have never heard of, but some of the invertebrate species disappearing from our native wildlife may be a little more familiar, recognisable and even more stunning than you can imagine.

To give an example, the rainbow leaf beetle (*Chrysolina cerealis*) is only recorded in Britain from high up on two peaks in Snowdonia, where it feeds on the flowers and leaves of thyme. Arguably one of the UK's most beautiful invertebrates this small but amazing beetle unfortunately could be extinct with few sightings in the last 20 years. One of the contributing factors is climate change: as the planet gets warmer this beetle is believed to be going higher up the peaks where it is likely to run out of mountain and meet its demise. This is just one of many species in the UK facing extinction. It may be too late for the rainbow leaf beetle but all is not lost!

The Bug Issue is proposing a new way to address the conservation of 20 native species. By working with TIWG, zoos local to the species will become conservation hubs and coordinate species action plans following advice and guidance from local experts and groups.

Zoos and aquariums will provide whatever support the species requires, e.g. field surveys, habitat restoration, breeding, research, raising public awareness and more, in hope we can as a collective make a big impact for the local wildlife.

The action plans will be initiated and carried out by zoos. This could see keepers, staff and volunteers heading into the field to carry out conservation-based surveys and habitat work to assist these vulnerable invertebrates.



Photo: Beau-Jensen McCubbin

Photo: Micky Andrews

These species survive in only a handful of sites in the UK and are in urgent need of collaborative action to protect them from extinction. To make this campaign a success we need your zoological collection's help! We ask any and all collections interested and wanting to get involved to register their interest today. To date we have had an amazing response from zoos and aquariums up and down the country but the more zoos we have involved the bigger impact we can have and the greater our chance of saving local invertebrates.

**A meeting will be held before April 2020.**  
**Can you help? Please email:**  
**[bugissue2020@outlook.com](mailto:bugissue2020@outlook.com)**



Photo: Chester Zoo

# Faces of BIAZA



## Frances Baines

This edition's Faces of BIAZA is Frances Baines, Honorary Associate Member, retired veterinary surgeon and part of the Reptile & Amphibian Working Group.

**Frances Baines has spent the last 15 years researching the use of specialist lighting in the husbandry of reptiles and amphibians, and more recently, mammals, birds and invertebrates. She is a member of the Reptile & Amphibian Working Group and lives in Wales with a little horde of lizards.**



When our much-loved family pet, a bearded dragon, developed metabolic bone disorder, despite use of a much-acclaimed UV lamp, I was astonished to discover how little good information on UV lighting was available. In 2004 I met electronics engineer and chameleon breeder Andy Beveridge, an Associate Member of BIAZA. Along with two other friends, we imported the first Solarmeter UV meters into the UK, began testing UV lamps with these and with Andy's spectrometer, and we set up the website "UV Guide UK".

Andy introduced me to BIAZA and the zoo world. Douglas Sherriff, then at Chester Zoo, invited me to present my work at my first Herp TAG meeting, at Blackpool in 2005. In June 2007, BIAZA Herp TAG was transformed into the Reptile & Amphibian Working Group (RAWG) and Richard Gibson, then curator at ZSL, took over as Chair. To my great surprise, he insisted that I become a "RAWG UV Advisor".

The following year, Andy Beveridge and I gave a

presentation on UV lighting at the Annual Meeting, held at ZSL, and a UV Focus Group was set up by the RAWG Steering Committee. It took us several years to develop, but we launched the first version of the BIAZA UV-Tool in November 2012. This has been updated several times and now offers estimates for suitable UV provision for 266 species of reptiles and amphibians.

I am very proud of our Group's achievement. The publication of this in JZAR has led to the "Ferguson Zones" for safe UV provision being promoted in numerous other places worldwide!

The work of the Focus Group has now broadened to include visible light and infrared, covering the full spectrum of sunlight. We are currently trialling combinations of T5-HO UVB and short-wavelength infrared heaters, with intense visible light from metal halide or LED floodlights.

This year, we have also developed a BIAZA Certified Workshop, a practical session enabling zookeepers to explore the basic properties of UV, light and infrared and to become confident in the use of hand-held meters and interpretation of the data they record.

I have seen enormous changes in perspective regarding animal welfare over the course of my career. As an "outsider" working with zoos, I cannot really give advice on a zoo career; but I will say that the zookeepers I have worked with have all been among the most caring, thoughtful and enthusiastic people I have met, and their dedication to their animals has been remarkable.

Zoos, especially when working together to share knowledge under an umbrella such as BIAZA, are in an ideal position to undertake extremely valuable research. Advances in husbandry, nutrition, health and psychological welfare can improve the lives of all animals in captivity and greatly benefit conservation projects such as *in situ* and *ex situ* breeding programmes.

Joining BIAZA and working with RAWG and TIWG (Terrestrial Invertebrate Working Group) has been a wonderful experience. I am rapidly approaching retirement. The last few years have been some of my busiest – and best – and I am so very pleased to think that because of the many enthusiastic RAWG folk, I have literally worked myself out of a job!



www.wildtigerhealthcentre.org

Photo: WCS Russia

## The best Christmas present tigers have ever had...

By Olivia Walter, Wildlife Vets International

**...was how Debbie Martyr, Fauna & Flora International, described the Wild Tiger Health Centre (WTHC) website when she first saw it. This unique online resource, funded by BIAZA zoos, gives reliable and up-to-date information on many aspects of wild tiger health.**

The WTHC website (www.wildtigerhealthcentre.org) was designed by renowned big cat expert, Dr John Lewis, supported by Wildlife Vets International. Throughout his career John has provided training and manuals to tiger conservationists and in-country vets, and given talks and written scientific papers on a wide variety of tiger health issues. Over recent years, while talking to colleagues about the best way to disseminate up-to-date and peer reviewed information on veterinary issues relating to wild tigers that would be accessible and freely available to all interested conservation professionals, the concept for WTHC evolved.

While a website cannot replace the value of *in situ* workshops it can provide a very wide range of basic information, at minimal cost, to a large number of vets and biologists working in the field. WTHC will facilitate the constantly evolving pooling of global expertise in a way which has not been possible before.

A considerable number of leading tiger experts have already contributed to the content and more will come on board as content is added. We hope that through interaction with the website, connections will be built between vets and conservationists working on similar issues thousands of miles apart.

Contributors to date include: Linda Kerley, ZSL Russia; Alexeevka Tiger Rehabilitation Centre, Russia; Primorski State Academy of Agriculture, Russia; Adam Barlow and Christina Greenwood, WildTeam UK; Debbie Martyr, Fauna & Flora International; Dr Martin Gilbert, Cornell University; Dr Jane Hopper, Aspinnall Foundation; Dr Dale Miquelle, WCS Russia; Dr John Goodrich, Panthera; Dr Bongot Radjagoekgoek, Taman Safari Indonesia; Dr Mahbub Alam, WildTeam Bangladesh; Dr Stuart Patterson, Royal Veterinary College, London and Dr Amir Saduala, veterinary surgeon to Chitwan National Park, Nepal.

This project demonstrates Wildlife Vets International's belief that the greatest impact we can have is through advocating the use of veterinary science as an important tool to front-line conservationists, sharing knowledge, giving advice and providing training and equipment to in-country organisations.

The website was launched on Global Tiger Day in July 2019. Over a hundred people have registered to use the site including students, people working in zoos and veterinary practices, tiger conservation managers, conservationists based in universities and biologists in nine tiger range states.

Dr John Lewis said: "I am delighted by the way in which the Wild Tiger Health Centre website has been favourably received in such a wide variety of tiger range states. The website continues to be populated every month and we have new requests for access every week". Interest is gathering momentum and we look forward to reporting back to supporters in 12 months time.

The BIAZA members listed below have funded this initiative since its beginning. They believe in Wildlife Vets International's professional way that we help front-line conservation.

- Chessington World of Adventures
- Colchester Zoo: Action for the Wild Fund
- Zoological Society of Hertfordshire (formerly Friends of Paradise Wildlife Park)
- International Zoo Veterinary Group
- Shepreth Wildlife Conservation
- Big Cat Sanctuary
- Twycross Zoo

Our impact can only be measured as a contribution to the success that our partners have and this is difficult to quantify and pass on to our funders. BIAZA members have always been very good at supporting small specialised organisations, such as Wildlife Vets International, so please keep it up!

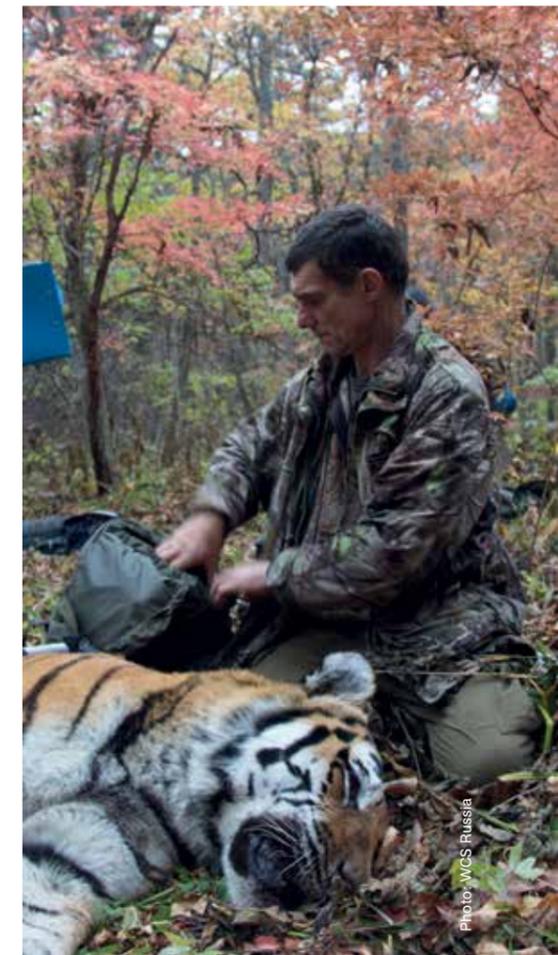


Photo: WCS Russia



XL Insurance

# Zoo Working Tour

By Adam Douglass, Mammal Keeper,  
Chessington World of Adventures Resort

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Photos: Adam Douglass

**Collaboration and the distribution of knowledge amongst zookeepers has long been one of the pillars of the animal management profession. It may be a cliché, but there is always something to be learned by visiting other animal collections. However, to really get the most out of your visit to the zoo: chat to the keepers, arrange some behind the scenes access, or better still, spend a day or two working there. From 26 November to 5 December, I travelled across the north of England and Scotland working at five different BIAZA collections – Yorkshire Wildlife Park, Knowsley Safari, Blackpool Zoo, RZSS Edinburgh Zoo and RZSS Highland Wildlife Park.**



When chatting with friends about my intended tour, my plans were met with a mixture of approval and confusion. "Why?" was a common response. The reasons are multiple: to learn, to gain new ideas, to develop professionally, to share my own knowledge and experiences, to strengthen professional connections and because it is fun! A few years ago, I travelled throughout the UK and Ireland volunteering my own time working at five different elephant collections to supplement my full-time elephant keeper role. I found these experiences highly valuable and was keen to repeat this with a new range of species.

I am currently employed as a Mammal Keeper at Chessington World of Adventures Resort, working primarily with carnivores and primates. As such, I researched which collections would be appropriate to visit based on their species relevance, geographical location and collection plans. Once I had contacted all of the collections I intended to visit and the dates were approved, I booked my annual leave, arranged accommodation and refuelled the car, before setting off on a 1,200-mile round trip across the length of the UK.

Throughout the tour, the hospitality was unanimously warm and welcoming. At each of the host collections, the sense of community amongst fellow zoo professionals was tangible. Each member of staff that I encountered was eager to show me around, demonstrate their management practices and engage in lengthy discussions on all aspects of animal husbandry. It was clear to me that each keeper believed that we are all working towards a common goal, regardless of the logo on your polo shirt.

I am a firm believer that keeper collaboration is vital to the success of our industry. Providing opportunities for keepers to network and grow professionally is something that I have been helping to facilitate for several years as a member of the ABWAK Council. Do not restrict your own professional growth to just workshops and conferences. I would encourage all keepers to maximise their knowledge intake by seeking out colleagues in other collections to enquire about spending some time working with them. If there is something that you have seen that has caught your interest and you would like to learn more you should nurture your curiosity and get in touch with that collection.

I would like to thank all of the zoo staff that I met throughout the tour for their outstanding hospitality and for being so willing to share their expertise with me. I would also like to extend the invitation to other professional keepers wishing to visit Chessington with the aim of improving their husbandry skills. We have a team of knowledgeable, friendly and enthusiastic keepers who would be more than happy to show you around the collection and share their experiences with you. Knowledge sharing is a vital component of our industry and ultimately helps us all to work towards our common goal of ensuring optimum welfare conditions for all species held within zoological collections.



# New enclosures

## Yang Guang and Tian Tian's new home

By Sarah Sutton, RZSS Edinburgh Zoo

## Bugs at Home

By Lauren Lane and Steve Nash, Wild Planet Trust



The Royal Zoological Society of Scotland's new giant panda enclosure at Edinburgh Zoo was nominated for three global awards just six months after Yang Guang and Tian Tian settled into their new home.

Construction work at the former Corstorphine Hospital site next to the zoo prompted the relocation as the species is particularly sensitive to noise and vibrations. Work began on the new habitat in late 2018, providing the zoo team with an opportunity to reflect upon everything they have learned about the animals' needs and behaviours since they arrived in 2011.

Their new home is in a quieter, more natural setting. The outdoor enclosures feature tree trunks for the pandas to scratch against and climb, large wooden climbing frames and tree houses, caves and ponds. Each panda also has an off-show area where keepers weigh the pandas each morning and carry out important training.

Mr Li Chunliang, Vice Administrator of China's National Forestry and Grassland Administration, and Roseanna Cunningham, Cabinet Secretary for the Environment, Climate Change and Land Reform, officially opened the new habitat in September 2019.

The enclosure was nominated in several categories in the Giant Panda Global Awards 2019, including Most Educational Panda Enclosure and Most Beautiful Panda Enclosure. The panda pair's moving day was nominated for Panda Moment of the Year. The zoo's male giant panda, Yang Guang, was nominated for Panda Personality of the Year and the panda team for Panda Keeper Team of the Year. Results were announced on 3 January 2020 during the award ceremony at Pairi Daiza in Belgium, with Yang Guang winning gold and the panda keeper team winning silver.



In 2014, Paignton Zoo opened its first-ever invertebrate house, Investigate. Although popular with guests it became clear that there were some issues, and the decision was made to close it in 2018. In October 2019, we opened Bugs at Home, an innovative new display that showcases our invertebrates and takes a new direction on guest engagement.

Bugs at Home does not set out to teach guests about invertebrates. Instead, it presents these incredible creatures in a way that encourages empathy and promotes advocacy. It is an exhibit designed around a message, not a species, and it represents the first incarnation of our new strategic interpretation plan that has advocacy and nature connection at its heart.

The interpretation focuses on a universal notion (home) that every single guest can relate to, and uses it to promote empathy for species that are traditionally viewed as unrelatable. Guests will see that home is important, regardless of what species you are. They will see that, like them, every species needs a home. They will see that some species are losing their homes and, most importantly, that they can help us to fix this by making new homes for bugs at home.

The building is next to a large indoor play area and catering outlet. It is a particular focus for families with young children, so the theming and tone of the artwork and signage is child friendly, whilst still attracting adults. On the other side of the exhibit is the newly renamed Wild at Home garden. Guests can follow the mural from indoors to the garden and, once there, discover top tips about making their own garden more bug-friendly, as well as discovering our conservation work with white-clawed crayfish.

We wanted to move away from traditional zoo signage. It is important that we consider context as well as content, and provide engagement opportunities that are meaningful and relevant to our visitors. We have incorporated some incredible murals and artwork which, along with the use of natural materials, clever lighting and paint colours, helps to create a calm and reflective space for people of all ages to see our amazing invertebrates up close.

Bugs at Home houses around 40 species. The six main exhibits contain multiple species and offer a huge choice of microclimates. The large enclosures allow us to provide full-spectrum lighting, filtration systems, basking opportunities and automatic misting systems that create complex gradients, unachievable in smaller



Photos: Paignton Zoo

spaces. We have incorporated live plants, deep, biologically appropriate substrates, and aquatic zones, all of which were designed and constructed in-house. We also have a leafcutter ant (*Atta cephalotes*) exhibit and a spider wall displaying the diversity of spiders.

We have created habitats such as arid grasslands, swamp forests and coastal forests. All the species have their own space, and complement one another to ensure a peaceful coexistence. We expected - and are seeing - many more natural behaviours, but we are also seeing many unexpected behaviours, which are not often seen in smaller exhibits. Our millipedes climb to sleep in tree tops all day and come back to the forest floor at night; clumps of beetles sleep under large leaves till the hottest parts of the day, then leave to feed.

All the invertebrates appear to be thriving, and this has made it exciting for guests. There is always something going on, and this is helping people to appreciate and connect with this often overlooked group of animals. It is amazing to overhear comments like "Aren't they beautiful", "Look at the colours" or "Wow, look at its wings" rather than words like "gross" or "creepy", which are traditionally used in relation to invertebrates. Parents want to stay even after the kids are done - this is important, as children have a natural fascination with the invertebrate world but this tends to change as we get older. It feels great to see this beautiful exhibit working for all ages.





# Operation Save Our Civets

by Zak Showell, Director, Shaldon Zoo

Photo: Newquay Zoo

## A small group of BIAZA zoos are leading the way in saving the elusive Owston's civet.

The Owston's civet, *Chrotogale owstoni*, is currently found in Vietnam, Laos PDR and southern China and may be a candidate for the most threatened species of carnivore in the world. Currently classified as Endangered by the IUCN, there is a distinct possibility that they will be reevaluated as Critically Endangered at their next assessment. The main pressure facing this species is hunting. The species is not directly targeted but is caught as bycatch when hunters are snaring for wild meat and pelts. There is also some evidence that individuals are caught for the pet trade.

Owston's civets have been kept in BIAZA zoos since 2004, when three pairs were imported from the Carnivore and Pangolin Conservation Program, based in Cuc Phuong National Park, Vietnam. 15 years on the population is still very small, with 11 animals housed in four UK zoos. A second population exists at what is now Save Vietnam's Wildlife centre in Cuc Phuong National Park. Unfortunately, their population is currently only males, although they are expecting a female from a Vietnamese zoo in the near future.

In April 2019 more than 60 delegates from across the globe convened in Hanoi, Vietnam, to develop the first ever conservation strategy for the species. Within that group there were representatives from three BIAZA collections: Newquay Zoo, Paignton Zoo and Shaldon Wildlife Trust. The five-day meeting focused on all aspects of conservation for the species, including an *ex situ* component. The vision for the *ex situ* population is as follows: "In the next 10 years, a thriving insurance population will be established. This will provide suitable animals for reintroduction which support recovery of wild populations in the future. This insurance population will be self-sustaining, genetically diverse, healthy, and demonstrating species-appropriate behaviour."

It was fantastic that it was acknowledged that an *ex situ* component was required for the ongoing conservation of the species, and as the majority of the *ex situ* population was in the UK it highlighted how important our role is in helping save this species.

We are now in the process of formally setting up an Owston's civet working group which will tackle many of the action points that have arisen from the conservation strategy. There is still relatively little known about the life history and biology of Owston's civets and so the individuals in our care are crucial in helping us answer

questions on not only how best to conserve the species but also fundamentals of their biology.

Despite not yet being a formal group, the UK holders have all met and begun sharing their knowledge and practices. A full diet review has been coordinated and diets across the board have changed. There have been historic incidents of tooth decay and obesity which should now be a thing of the past with their new species appropriate diets. We have enlisted the assistance of the EAZA reproductive management group who, courtesy of Ronnie Cowl based at Chester Zoo, will be analysing faecal samples for hormones, a world first for this species. Christa Van Wessem, Veterinary Associate at Paignton Zoo, who is the veterinary advisor for the Owston's civet EEP is also planning on health checking every individual prior to the upcoming breeding season.

There are innumerable species out there that need our help but regardless of the size of your zoo Owston's civet is an example of how much more powerful we can be working together as a community. As we said in Vietnam

– Here's to Owston's!



Photo: Zak Showell



Photo: Tran Phuong Mai

## Native species

# Saving a species with jam jars and hummus pots

By Dr Helen Taylor, Conservation Programme Manager, RZSS and Vickie Larkin, Senior Keeper, RZSS Highland Wildlife Park

## This year, staff at the Royal Zoological Society of Scotland took pine hoverfly (*Blera fallax*) through a full breeding cycle at Highland Wildlife Park for the first time, heralding a potentially crucial lifeline for this endangered species.

Invertebrates are in crisis, but despite their perilous status and importance to healthy ecosystems, they are often overlooked. The pine hoverfly is a perfect example of this. An important pollinator, pine hoverflies are found as far east as Japan and as far south as the Pyrenees, but are thought to be in decline wherever they exist due to habitat loss. In the UK they are restricted to just one site in the Cairngorms National Park in Scotland. No-one has seen a wild adult pine hoverfly in the UK for over seven years. The species is UK red-listed as critically endangered and in need of a drastic boost in numbers. That is where the RZSS pine hoverfly conservation breeding project comes in.

Breeding pine hoverflies in captivity is not easy and working with such a rare species is nail-biting stuff. Following the decision to bring 25 larvae from Curr Wood in the Cairngorms into RZSS Highland Wildlife Park, our animal husbandry team worked hard and got creative to meet the challenge.

In the wild, pine hoverfly larvae live in rot-holes in mature pine trees. To mimic this, we house larvae in microcosms consisting of a jam jar filled with a mix of pine sawdust shavings and rainwater. Inside the larval microcosm, there is a block of pine wood that acts as a bridge to a plug of moss in the top of the jar, where the larvae go when they are ready to pupate.

Pine hoverflies spend up to 12 months of their life cycle in larval form and this is definitely the easier part of their husbandry regime. We visually check the microcosms daily and empty them out for a full census once a month. Once the larvae start to pupate in the moss plugs, we transfer them in the moss plug into cleaned out hummus pots and spray as needed to prevent drying out. After around a month, the adult flies emerge and the hard work begins.

Adult pine hoverflies live for anywhere from a few days to a month; in this short window, we need to ensure as many matings and egg-laying attempts as possible.



Photo: Steven Fark



Photo: Helen Taylor

We house adults in flight cages fitted with fluorescent strip lights on a timer to give a constant source of gentle heat and the correct photoperiod for the time of year. We try to get a visual on each fly every day, which can be a challenge; as is changing their food flowers every other day without allowing any flies to escape. We spray water onto the roof every two hours and also observe the adults for courtship and mating, which can last up to an hour! When females look ready to lay, we transfer them into poly bags filled with pine sawdust and rainwater to simulate the rot hole, seal them in, and watch for ovipositing.

The result of all this work is that we now have 16 new, captive-bred larvae to take into a second breeding season. This may not sound like much, but we are just getting started. Now that we have successfully gone through the process once, we will be refining our husbandry techniques and hopefully upscaling our breeding facility. Our aim is to breed pine hoverflies in substantial numbers so that, in partnership with other members of the pine hoverfly steering group, we can reintroduce this important insect into newly created habitat and save it from extinction.

# Corporate member feature

## Wild Republic Retail

This issue's featured corporate member is Wild Republic Retail. Jeremy Ensor, Managing Director, told us about who they are and what they do.

Wild Republic Retail have been operating Zoo and Aquarium shops for over 20 years. Over this time, we have established a reputation for delivering a high-quality visitor experience and offering product ranges that meet high standards.

### Consultancy

Wild Republic Retail also offers consultancy services to zoos, aquariums and visitor attractions. We bring our vast knowledge and experience of successfully operating shops to review existing operations and make recommendations as to how we believe you can increase revenue generation and make the offer more visitor focused. Having designed and fitted out over twenty stores, we are also able to guide attractions through the process of refurbishments and design from an operator's perspective.

Alternatively, if you are planning a new shop, we are able to design and fit out the shop in addition to designing and sourcing the product ranges to fill the shop space with a high-quality relevant offer.

Consultancy services are provided by senior managers who have huge amounts of experience in the sector, enabling our partners to maximise income generating opportunities.



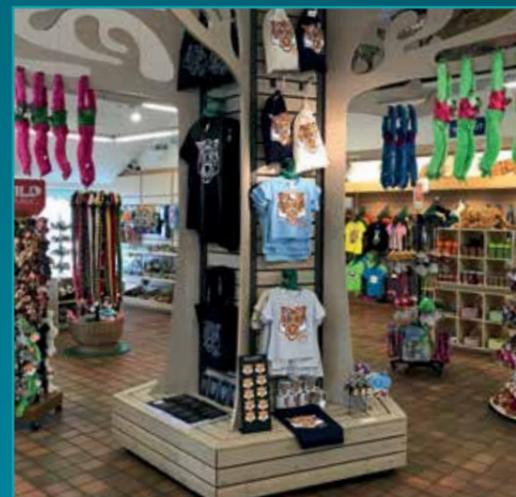
Working closely with our partners, we ensure that our product offer and customer service standards achieve exemplary levels and reflect the attraction's brand values.

### Operations

We have operated the shops at Knowsley Safari in Merseyside for the last five years and have built a strong working relationship with the senior management team with regular clear communication, ensuring that the offer remains relevant. Our retail team are integrated into the Knowsley team and deliver a very high standard of customer service, to give visitors a satisfying end to their journey.

We also operate the shops in Zoo Vienna, Zoo Berlin, the Tierpark in Germany, Al Ain Zoo and Safari in the UAE, Oman Aquarium, Mysore Zoo and Nandankanan Zoo in India.

We want to deliver quality memorable experiences for all visitors, through gaining the knowledge of what your visitors need. Unique product ranges would be developed and sourced, with access to our parent company's design teams in the USA, India and China.



If you are interested in discussing your retail needs with us, please do not hesitate to contact us:  
email: [jeremy.ensor@wr-retail.com](mailto:jeremy.ensor@wr-retail.com)  
Website : [www.wr-retail.eu](http://www.wr-retail.eu)



"Our working relationship with Fordingbridge was more a partnership than client-contractor which led to fantastic final collaborative design. The building has fulfilled all our objectives and we have very happy staff and visitors alike. The working approach that Fordingbridge have and the versatility of their buildings will certainly make us consider them for future developments at Whipsnade."

Robin Fitzgerald

ZSL London Zoo



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# RESEARCH SPOTLIGHT



Photo: Stan Addison



Photo: Stan Addison

## Celebrating 20 years of zoo research outputs: BIAZA Research Committee JZAR Special Issue

By Dr Paul Rose, Vice-Chair BIAZA Research Committee

**The BIAZA Research Committee works hard to promote science and scientific enquiry wherever it is happening in zoos and aquariums, disseminating research as widely as possible, supporting researchers to complete projects that help advance zoo aims, and making science accessible to all of those involved with zoos and zoo animals. The Research Committee (then the Research Group) was created at Paignton Zoo and held its first ever meeting of zoo researchers in 1999. To celebrate 20 years of BIAZA research outputs and the Research Conference, a group of Research Committee members (spearheaded by Professor Geoff Hosey) put together a special edition of EAZA's open access scientific publication JZAR (Journal of Zoo & Aquarium Research) [www.jzar.org](http://www.jzar.org) volume 7, edition 4, 2019.**

From humble beginnings back in 1999, where the research symposium was a one-day event, the Conference now covers three days and research topics are a mixture of applied and pure science, empirical and social sciences. The topics of papers presented in the JZAR special edition illustrate the diversity of research areas that can be investigated using zoo-housed populations: from analysis of stingray social networks and the influence of husbandry events by researchers at Living Coasts, to evaluating how zoo enclosure design affects visitor engagement with and attitude towards a conservation message (Chester Zoo), and how zoo animals are affected by the construction and implementation of public events (Tayto Park). A whole range of husbandry, welfare, behaviour, nutrition, education, conservation, health care and animal management topics are covered.

We have come a long way on our journey of making zoo science a credible and valid field of scientific investigation. Papers featuring zoo-housed populations appear in a wealth of publications, from those with a specialist zoo focus to those covering broader areas

of biological and social sciences. The world-famous International Zoo Yearbook, launched in 1960, is defined on its publisher's website as "a service to zoos around the world". What a fitting statement that now, nearly 60 years later, this service means we have our very own journal for the European region and beyond, which is freely available to all.

The BIAZA Research Committee is also a service to zoos, not only within BIAZA but globally. We collaborate with colleagues around the world to advance research practices and to bring research output to wider audiences. The annual Research Conference attracts international delegates, taking the influence of BIAZA science well beyond the region's boundaries.



Photo: Ollie Reed

We are proud of the diversity of the delegates that are attracted to the Research Conference. We have provided a platform for students (college-level, undergraduate, postgraduate and doctoral) to present at their first scientific meeting. Established zoo professionals, many represented as authors in the special edition of JZAR, also turn up year-on-year to share their own science, learn from others and mentor future zoo researchers. Professor Hosey's review of research output for BIAZA zoos, published in the special edition, shows that 246 institutions, from 18 different countries, have conducted research in BIAZA zoos and it is heartening to see this appetite for evidence, which ultimately underpins the success of all we do in the zoo world. As Professor Hosey states in his introduction to our 20th Anniversary special: "Zoo-based research is buoyant at the moment... Now, it is becoming a major undertaking just to keep up with advances in the zoo research world". What a nice challenge to have.

**Here are some highlights of research projects included in the special issue of JZAR.**

### An investigation into keeper opinions of great ape diets and abnormal behaviour

Rebecca Hammerton, Kerry A. Hunt and Lisa M. Riley  
Diet has previously been linked to the performance of stereotypy and other abnormal behaviour in great apes. The authors of this presentation asked great ape keepers in the British Isles to complete a questionnaire about the behaviour and diet of their great apes. Keepers reported that abnormal behaviours were present in the great ape groups they looked after regardless of diet type or presentation. Keeper reports suggested very few differences in abnormal behavioural expression between apes fed cultivated fruit and those on a cultivated-fruit-free diet, suggesting the current industry trend of removing cultivated fruit from great ape diets requires more research before this can be considered evidence-based practice. Based on keeper reports, more gorilla groups perform abnormal behaviour compared to orangutans and chimpanzees.

### The use of Qualitative Behavioural Assessment in zoo welfare measurement and animal husbandry change

Paul E. Rose and Lisa M. Riley

The authors advocate the use of Qualitative Behavioural Assessment (QBA) to assess the welfare of individual animals at the zoo. QBA is designed to assess the emotional state of an animal by describing and grading

the individual's body language or demeanour. While this may not sound scientific or very reliable, QBA allows two animals performing the same abnormal behaviour in very different ways – like a bear frantically swaying with intense focus, and a bear swaying slowly and vacantly – to be differentiated in a meaningful way. Potential uses of QBA in zoos are discussed, particularly using QBA to guide use of targeted environmental enrichment – designing biologically relevant and individual-specific environmental enrichment for maximum improvement in welfare. The authors suggest using QBA could help zoos achieve better welfare and conservation milestones one animal at a time.



### Goodbye to Geoff Hosey

By Kirsten Pullen

The Research Committee has recently had to say goodbye to Geoff Hosey who has stepped down after many years of dedicated support. When I first moved to Paignton to take on the role of a Research Officer, I kept coming across papers by Geoff, so it was as a nervous newbie researcher that I met Geoff at my first BIAZA Research Conference. I need not have worried. Geoff has always been one of the most approachable members of our zoo and aquarium family, willing to share knowledge and discuss issues.

Many of the staff in our zoos and aquariums will know Geoff as an author of the zoo management bible Zoo Animals, which I have been told by numerous people is a book that stays close to hand. Geoff is one of the very small number of people who have transitioned that space between academia and practice with such success; it speaks to his dedication to encouraging those around him to share knowledge from research no matter how big or small.

A measure of an inspirational person is someone who will never turn away from a junior colleague and will always support those willing to learn. This is an attitude unfortunately rare in our profession, so it is sad to see someone of that calibre step away from our committee. However, there are so many of us who have benefitted from his experiences and support, and I am sure that will continue through the BIAZA Research Conference and other methods. I am told he still has an excel sheet (well he is a researcher!) of zoos to visit and a penchant for tea and cake! If you have a good café at your zoo, he is bound to be there!



Photo: Heather Fickweiler

# EDUCATION

## Knowsley Safari wellbeing programme

By Nikki Burton Mallott and Nicola Watson, Knowsley Safari

## A participatory experience at Bristol Zoo Gardens

By Polly Doodson, Bristol Zoo Gardens

**The Community Education provision at Knowsley Safari aims to have a positive impact on the lives of people in the local area. We want to make a contribution beyond that of being an animal organisation and support residents with some of the social challenges they face. To fulfil this aspiration, one of our focuses is to deliver programmes which support health and wellbeing: that is feeling good and functioning well.**

After a pilot in January 2019, we ran a five-week wellbeing programme in conjunction with MIND and Chrysalis – two organisations supporting individuals with mental health challenges.

The positive effects of being in green spaces and connecting with nature on personal wellbeing are well documented but the contribution of zoological collections to this 'Green Health' movement are limited. The sessions therefore included activities which were unique to zoos such as providing enrichment for the animals, close encounters and watching the displays. Much time was also spent outdoors, exploring the animal enclosures and experiencing the green spaces around the park. The programme also ensured activities facilitated social interaction by giving the participants time to talk and chat with one another, in order to build up friendships and share their experiences.

At the start of the programme most of the women were quite reserved and withdrawn, clearly out of their comfort zones, and sat with those they knew previously.



By the end of the programme there was a marked difference in their interactions, the group were mixing more readily with each other and some women even exchanged contact details with one another.

The programme was evaluated using University College London's Wellbeing tool. Whilst analysis of this data is still ongoing – we have received great verbal feedback:

**"Amazing week, an amazing end to the programme"**

**"Feeling less anxious and a lot more relaxed"**

**"Relaxing and calming – learned loads"**

**"Feel very settled mentally. Loved every bit of the enrichment"**

**"The five weeks have passed so quickly; it has been fantastic. Very informative"**

**"Loved the whole rhino experience, just relaxed... calmed the irritableness away"**

**"Had a restless week but looking forward to being 'lifted' with today's activities"**

**"The feeling of irritability left me when I walked into the Bat Cave"**

**"Found it relaxing watching the Giraffes"**

A second programme will be run with a new set of participants and a longer programme is in development for the first graduates. 2020 will also see the delivery of a junior programme for those aged 10-18. With the health service under increasing pressure, longer term we hope to be a significant contributor to the local social prescribing arena.

Although zoo involvement in community health is a little outside the box, it is clear we have the assets to support our locality and furthermore we have a responsibility to do so. Conservation of the environment is no longer a conversation just about animals: it is about societal habitats and our culture. At Knowsley Safari we have recognised that to engage audiences better with global challenges we first have to address the more local obstacles. The UN Sustainable Development Goals tell us that the environment is not a stand-alone topic but rather part of a complex tapestry of issues facing the modern world; this is why mental health and wellbeing can go hand in hand with a zoo-based education programme.

**In the summer of 2017, Bristol Zoo's Learning Department transformed the underwater viewing area of the Seal & Penguin Coasts exhibit into an immersive Participatory Zoo Experience (PZE). This involved a range of interactive interpretation elements themed around healthy oceans, including self-led and staff-led activities suitable for a range of ages. The activities were facilitated by Ranger staff, who supervised the area at all times.**

**Eleven activities were developed:**

- Sound boxes with noises made by a range of marine animals.
- Giant Jenga, with fish and other ocean animals painted on the ends of the blocks to demonstrate the effects of overfishing.
- A magnetic board with ocean animal magnets and arrows to create a food chain that may be affected by plastics and overfishing.
- Microscopes with different life stages of brine shrimp.
- A giant plush turtle with 'parasites' stuck to its shell that needed to be removed.
- Giant toy shark surgery with removable organs and a plastic-filled stomach.
- Krill Eating Contest game, where players raced to feed krill (pink rice) to a minke whale while the other player fed fish to an orca. The fish were then swapped for krill (because the fish eat krill) to see who had eaten the most krill and was the winner.
- A blackboard with chalk to draw something that can be found in the ocean.
- A photo frame with ocean-themed props.
- A touch table with marine biofacts.
- A number of different water-themed science experiments including:
  - Blubber gloves: using lard-lined gloves and ice water to show the effect of blubber.
  - Sink or swim: comparing how well an egg floats in fresh water and in salt water to show why sea creatures can grow so large.
  - Make seawater: making seawater in a beaker, referencing the periodic table.
  - Test seawater pH: adding acids and alkalis to water samples to understand ocean acidification.

The aim of the project was to provide an enjoyable, imaginative, interactive space to act as a learning platform for visitors to discover the importance of oceans and how to join in protecting them. A huge number of people participated in the activities, which ran from April to October, with more than half of the

zoo's total visitors estimated to have got involved. The project was evaluated using two different questionnaires, one at the exhibit exit and one at the zoo exit. A comment box was also used at the exhibit exit, where visitors could leave responses to 'tell us one thing you learned in Seal & Penguin Coasts today'.



Results from the evaluation showed that the activities increased visitor enjoyment and that people were more likely to report learning information from the activities than from any other sources of information available to them in the rest of the exhibit. There was also a significant link found between engaging with staff and overall visit experience, suggesting that increasing opportunities for staff-visitor interactions had a positive impact on visitor satisfaction.

The success of the project led to an increase in Seasonal Ranger staff for the 2018 summer season, providing an increased staff presence around the entire zoo. The PZE approach was also used to develop Ranger-led activities about sustainable palm oil for the zoo's 2018 behaviour change campaign.

The project won a BIAZA silver award in the Education category in 2018 and the results from the evaluation have been published in the 2019 International Zoo Educators' Association Journal, titled 'Investigating the impact of staff-facilitated educational activities on visitor experience and self-reported learning at Bristol Zoo Gardens, UK'.

**For more information on the PZE project please contact [pdoodson@bristolzoo.org.uk](mailto:pdoodson@bristolzoo.org.uk).**



# Cold-stunned turtle rescue and rehabilitation

By Becky Leach, The Deep



Photos: The Deep

**The Deep aquarium in Hull has been working with the New England Aquarium in Boston, Massachusetts to help save injured sea turtles that get stranded on the shores near the American attraction every year.**

New England Aquarium makes an invaluable contribution to the health of the turtles and the wider ecosystem by taking stranded turtles from the beach back to their Rescue Centre at the aquarium, giving them health checks and treating their injuries, before releasing them back into the sea so they can continue on their journey.

The winter season is a difficult time for sea turtles, as they make their way south to warmer tropical waters when the waters around Cape Cod Bay become too cold. Each year between November and December as many as 800 turtles are found washed up on the beach. Trapped by the hook shape of the bay, they can become disorientated. When the water reaches about 10°C by mid-November, the turtles are too cold to eat, drink or swim and become cold-stunned, stranding themselves on the beach. Often they are suffering from life-threatening hypothermia, emaciation, dehydration or external injuries.



One of The Deep's aquarists, Shoshana has spent time working within the facility helping them rehabilitate turtles, administering immediate and vital care to get them on the road to recovery. She told us: "As soon as the turtles arrive at the centre, it is all hands on deck to get them into a stable condition as quickly as possible. Their body temperature is taken and heart rate checked; because of their solid shell this has to be taken through the shoulder. It is important to warm the turtles slowly as increasing their temperature too quickly could be harmful. When they come in they are placed in pools at 12.5°C; this is then increased by five degrees each day until they are well enough to go into the highest pool, which is maintained at 22°C. The coldest turtle I held was a Kemp's Ridley whose internal temperature was 7.4°C. It was so cold in my hands, I couldn't believe it was still alive". Each turtle is continually assessed until they are deemed strong enough to return to the ocean and complete their migration down to warmer waters. One memorable admission to the Rescue Centre was turtle number 266, ironically dubbed 'Munchkin' by rescue staff because of her huge size. At that time, she was the largest loggerhead to ever come through the centre, weighing 137kg on arrival (increasing to 151kg as she was cared for by staff). Munchkin was found off Great Island, Massachusetts, with significant wounds to her right flipper and left hind flipper thought to have been a result of entanglement in nets. She was nearly unconscious, sick and hypothermic. After months of intensive care, she was released back into the ocean, a moment that was treasured by Shoshana. She told us: "It is these moments that overwhelm you with emotion and show us the types of things we can accomplish by working together".

Before her release, Munchkin was fitted with a satellite tag so the care team can watch her progress and see where she goes. Loggerheads migrate for thousands of miles, but gaining data on a turtle at this stage of life is extremely rare. The ocean and sea turtles like Munchkin are facing accelerating threats like rapidly rising water temperatures from climate change, islands of floating plastic and ocean industrialisation. It is hoped by telling Munchkin's story, we will help to inspire everyone to take action. If you'd like to see how far Munchkin has travelled since her release, head to <https://tinyurl.com/tut2fa3>.



# Thermal imaging elephants

By Alasdair Davies, ZSL



**ZSL Whipsnade Zoo's herd of Asian elephants have enabled technical specialists to research, develop and trial cutting-edge technologies for wild elephant conservation.**

The project is an early alert system which uses small thermal cameras fitted with radios to alert local communities to the presence of nearby elephants 24 hours a day, in an effort to significantly reduce human-elephant conflict, thereby protecting wild elephants from harm. The success of the system hangs on the ability of the cameras to distinguish, with a high degree of accuracy, elephants from other animals that may live near the communities. For this reason, before it can be developed any further, the project requires tens of thousands of thermal camera photographs to train an image recognition model, to 'teach' the computer to detect an elephant, human, or other animal. Building a recognition algorithm like this requires thousands of photographs at various angles, distances and temperatures, and there are not many thermal images of elephants on the internet to help. Trying to capture thousands of elephant images in the wild would take years and elephant sightings cannot be guaranteed. Enter ZSL Whipsnade Zoo's herd of Asian elephants.

The herd's enclosure provides the perfect opportunity to gather the thousands of thermal photos of elephants needed for good image recognition. Elephants can be seen walking, eating and playing at their many enrichment and feeding stations, displaying the same behaviours that would be seen in the wild. The cameras do not affect the elephants in any way; they continue to go about their normal daily activities. The Zoo's large outdoor paddocks and indoor Elephant Care Centre allow elephant images to be taken at multiple distances, from any angle, in groups, pairs or alone. The ease of access to the Zoo as well as support from zookeepers makes the image-gathering efficient, accurate and fast.

Thermal Imaging intern, Sophie Vines, said: "It definitely needs mentioning how fantastic the keepers at Whipsnade Zoo have been with assisting with the data collection. As the algorithm also needs human images to be run through it in order for it to be able to differentiate us from the elephants, the keepers have been my models for this as I follow them around on their day-to-day activities trying to get shots of them so it really couldn't be done without them."



Working with the elephants at ZSL Whipsnade Zoo will speed up the development of the early alert system and get it to communities where it is needed to improve the livelihood of both local people and the wild elephants they live alongside.

Some initial testing has been conducted in the field and more is planned. Alerts will initially be delivered to local response teams in Assam, India, via text message or WhatsApp to alert them to the presence of elephants within a human-elephant conflict area. The system will allow false positives (false alerts) to also be noted, helping the system to get better over time.

There are also plans to expand the project to develop a thermal detection model for bears and tigers and it would be advantageous for more BIAZA zoos to get involved.

This project is generously funded by The Arrabada Initiative who funded a research intern to work with a ZSL research team to collect behavioural data on the elephants. The project was seed-funded by WWF Netherlands and WildLabs.net via their Human Wildlife Conflict Challenge award.



# Hoopoes are happening

Photo: Jordan Jones

Trevor Franks, Curator of Birds, Bristol Zoo Gardens

The Eurasian hoopoe (*Upupa epops*) is one of the most distinctive birds found throughout Africa, Asia and Europe. Its striking stripy wings, impressive Mohican crest and slender bill make it an iconic species that has regularly been kept in aviculture. Their unmistakable silhouette and unusual name resonate with people as a bird they recognise and adore. Once regularly seen in zoos there are now only two BIAZA collections keeping them and efforts to rejuvenate the species are afoot.



Photo: Laura Spooner

then regularly seen carrying live food to the nest site, which was a nest box of 23"x 8"x 9" with a 2" diameter hole 19" from the bottom of the box.

Chicks could be heard from the nest box from 8 July, but the first two chicks did not fledge until 20 July, being closely followed by another two. The nest box had a distinct smell which is common for this species during breeding. Once fledged, the juveniles seemed quite content up on higher branches, always on show and in the company of the adults. The diet was again closely monitored but a preference for live food was observed. All young birds were rung, feather sexed, wormed and weighed and all recorded good body condition. By the start of August the pair had laid a second clutch but this was sadly abandoned in wet weather. The family of six are now housed together and are always on show providing great visitor interest.

It is hoped to obtain another unrelated bird for next year's season and have two pairs breeding. Having a small flock looks amazing and them mixing well with other species gives us lots of options for the future. Other collections have expressed a keen interest in the species and so it is hoped that this could be the start of them becoming a familiar sight in UK collections once more. I believe the managed breeding of this species will be required in order to maintain a sustainable captive population and I would recommend this species to other collections due their appeal and husbandry requirements.



Live food was also offered and this consisted of earthworms, mealworms and crickets.

They were moved out into our large round aviary in March and were mixed with crested pigeons (*Ocyphaps lophotes*) and Princess parrots (*Polytelis alexandrae*) with no aggression seen between the species. Again, diets were closely monitored and an increase in weight was recorded, mainly from them now having access to other dietary items such as T16 pellet and vegetables.

The pair were noticed feeding each other on 29 April with the male increasing the amounts of displays. On 10 June the female was not seen in the enclosure all day and so we presumed her to be nest building. She was then only seen very minimally up until chicks were presumed to have hatched which was around 28 June. Both the male and female were

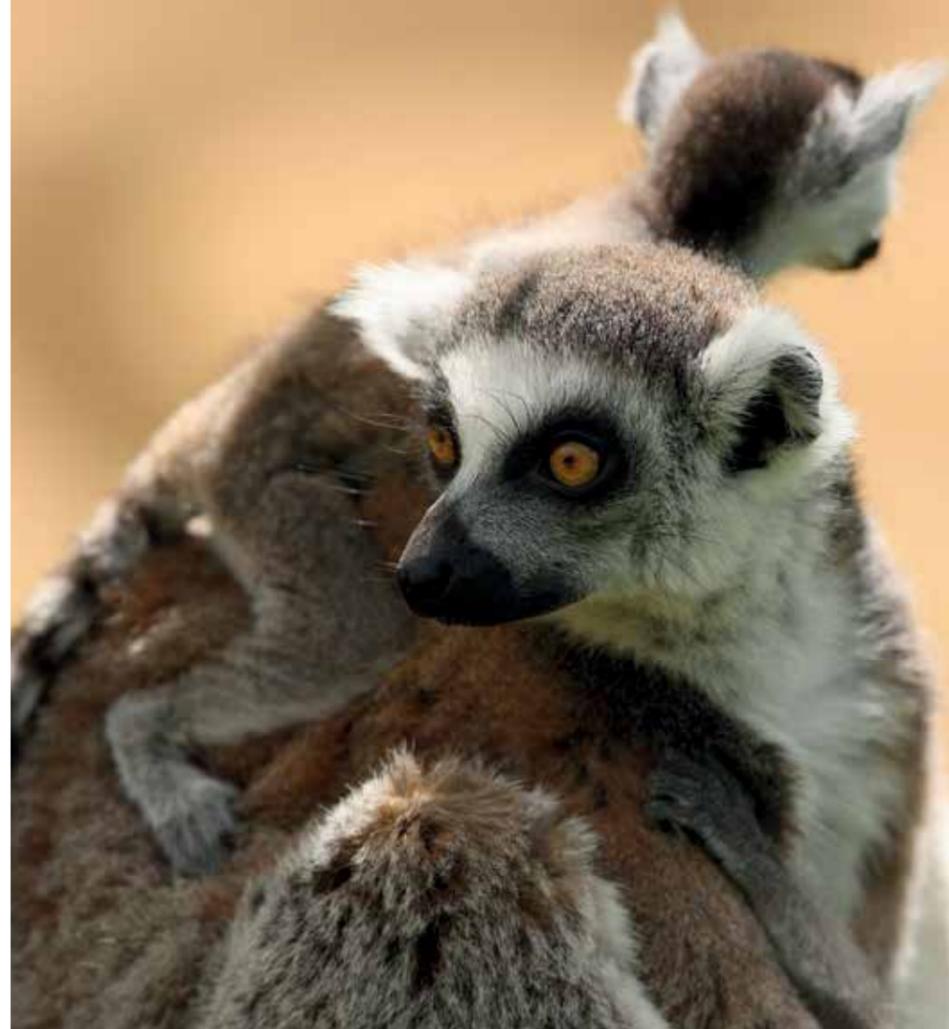


Photo: Laura Spooner

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# WHAT'S ON?

where and when..

## 2020 DIARY

|                   |   |                                  |
|-------------------|---|----------------------------------|
| 23 – 31 May       | Love Your Zoo Week                                      |                                  |
| 8 – 10 June       | BIAZA Annual Conference                                 | Dublin Zoo                       |
| 1 July            | UFAW Animal Welfare Conference                          | University of Birmingham         |
| 7 – 8 July        | BIAZA Research Conference                               | ZSL London Zoo                   |
| 14 – 16 July      | BIAZA Terrestrial Invertebrate Working Group Conference | Wild Planet Trust - Paignton Zoo |
| 20 – 23 September | International Animal Training Conference                | Twycross Zoo                     |
| 6 – 8 October     | BIAZA Mammal Working Group Conference                   | Location TBC                     |
| 15 – 17 October   | Volunteer Managers Working Group Conference             | RZSS Edinburgh Zoo               |
| 18 – 20 November  | BIAZA Educators' and Presenters' Conference             | Dartmoor Zoo                     |

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