

QUARTERLY PUBLICATION OF THE EUROPEAN ASSOCIATION OF ZOOS AND AQUARIA

ZOOQUARIA

AUTUMN 2021

ISSUE 113



PENGUIN PRIORITIES

HOW FUNDRAISING AND EDUCATION WILL HELP TO PROTECT THESE BIRDS



THE HARGILA ARMY

HOW ONE COMMUNITY LEARNED TO LOVE ITS STORKS

THIS CHANGES EVERYTHING

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KEY: a quick guide to frequently used acronyms

- EEP:** EAZA Ex situ Programme
- LTMP:** Long-term Management Plan
- RCP:** Regional Collection Plan
- TAG:** Taxon Advisory Group
- ZIMS:** Zoological Information Management System

Zooquaria

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FROM THE DIRECTOR'S CHAIR

Wow, where did 2021 go? I remember at the start of the year thinking that Covid-19 restrictions were easing, Members could open for Easter, and that things would be settling back into a more normal routine. Some might say I am ever the optimist! Many Members did indeed open for Easter, and it is extremely gratifying to hear that people continue to value opportunities to engage with the natural world and have been visiting zoos and aquariums in high numbers. As we end the year by seeing Covid-19 cases rising, a new variant appearing and restrictions coming in again, it is hard not to be disheartened. I don't mind admitting that I faced sitting down to write this 'From the Director's Chair' with a little trepidation. What was I going to write about that was different to before, how was I going to find positive things to say, what is the ever-changing situation going to mean for EAZA and our Members? Part of my procrastination resulted in me proofreading the draft edition of this *Zooquaria*. This proved to be exactly the medicine I needed to feel inspired and proud of what we have achieved and where we are going. This issue is packed full of examples of our community bringing our vision of *progressive zoos and aquariums saving species together with you* to life. From programme management and planning to veterinary activities, conservation of species to 24-hour conservation education conferences, regional and global conservation policy work to research opportunities, this issue shows the full breath and depth of EAZA activities.

Conferences have been a feature of the past few months and, whether online or the few that took place in-person, they continue to be a great opportunity for us to demonstrate our expertise and learn from each other. As I mentioned in my opening presentation at our Annual Conference, we need to view this time of change as a time for chance; the chance to meet colleagues from near and far in virtual environments that we might never get to attend in person, the chance for greater collaboration and innovation, the chance to further demonstrate the importance of progressive zoos and aquariums in combatting the challenges of climate change and biodiversity loss. This last point is especially relevant given the strong representation of EAZA and zoos and aquariums at the IUCN World Conservation Congress in Marseille in September. The article on page 24 goes into detail; I want to take the opportunity here to thank all Members who attended and took part in the many high-profile presentations and panels, supported the Reverse the Red Pavilion, and contributed to key votes on positions within IUCN and the motions that will be driving the workplan for the Union into the future. I can confidently say that our representation built massively on what we were able to achieve at the previous Congress. We have really set the stage for EAZA and zoos and aquariums to be part of the

integrated conservation solutions that are required to save species.

So, having faced writing this piece with a heavy heart, I find that in doing so my heart is lightened. Changes and challenges will continue, and 2021 has certainly brought some challenges! However, I hope you join me in finding inspiration in this issue of *Zooquaria* and look forward to the chances and opportunities that the future will bring .

Myfanwy Griffith
Executive Director, EAZA





NOTICEBOARD

EAZA Council met on 23 September as part of the online EAZA Conference. Following the recommendations of the Membership and Ethics Committees, Council confirmed the membership status of several Members:

TEMPORARY TO FULL MEMBER

- Slottsskogens Djurpark, Sweden

TEMPORARY MEMBER UNDER CONSTRUCTION TO FULL MEMBER

- Parrot World, France

TEMPORARY MEMBER UNDER CONSTRUCTION TO TEMPORARY MEMBER

- Parc d'Isle, France

TEMPORARY MEMBER UNDER CONSTRUCTION

- Les Terres de Nataé, France*
- Bark-Biopark Barquinha, Portugal

*Les Terres de Nataé is the new name for the zoo at Pont Scorff in Morbihan, France, following a judicial decision. The zoo was previously run by an animal rights consortium (Rewild) that disintegrated after factional infighting, bankruptcy and several investigations by local authorities. Council has made an exception to the rule preventing any terminated or withdrawn Member from applying for five years because the ownership and leadership team have no association with the Rewild ownership and thus had no association with the decision to withdraw.

EAZA COUNCIL AND CHAIR ELECTIONS

The terms of office of EAZA's Chair and Council will come to an end in April 2022. The EAZA Office will contact all National Associations and Members (where there is no National Association affiliated with EAZA) to arrange the nominations and elections of Council Members, who must be Directors of Full EAZA Members. Council elections will take place early in 2022 with National Associations or the EAZA Executive Office coordinating. All Members will be asked for nominations (Members

may self-nominate), and a confidential ballot of Members will take place after the nomination process.

Nominations for the election of a new EAZA Chair will be collected by the EAZA Executive Office in the new year. Anyone wishing to stand for EAZA Chair must be elected to the new Council before submitting a bid, which should include a short manifesto outlining their plans for the strategic direction of the Association during the term of office. Members will be contacted by the EAZA Office in the new year to arrange this and the subsequent election; the Chair is elected by the new Council at the Directors' Day conference in April.

AWARDS AND ELECTIONS

In October, former EAZA Chair Simon Tonge received the prestigious Heini Hediger Award from the World Association of Zoos and Aquariums (WAZA). The award was presented in a surprise ceremony by Royal Zoological Society of Scotland (RZSS) CEO, David Field, and Simon's son, who works for RZSS. WAZA president, Theo Pagel, and EAZA Deputy Executive Director, Danny de Man, joined the celebrations online.

Also in October, at the end of the Conservation Planning Specialist Group (CPSG) annual meeting, the Ulysses S. Seal award for innovation in conservation was presented to Bengt Holst, former EAZA EEP Committee Chair and recently retired Director of Research and Conservation at Copenhagen Zoo. According to the citation:

"Bengt believes CPSG's spirit – which keeps us focused, energised, and united – is in large part the reason for our success. His credibility and standing in the international conservation community caused others to believe it and value it as well. This is one of Bengt's greatest gifts to CPSG."

Both of these awards are recognition for the extraordinary contribution that these giants

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- Aqua-Sander
- Arie Blok Animal Nutrition
- Billings Productions Inc
- BioZoo Information
- Brogaarden ApS
- Bureau d'études AKONGO
- Bureau d'études Bioparc
- Carl Stahl Architecture
- China Light Festival
- Convivus
- Crossborder Animal Services B.V.
- Dino Don
- Dinosauriosmexico
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- Fox Consulting
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- HMJ Design
- Imagine Exhibition Inc
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- Kiezebrink International
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- Worldwide Zoo Consultants
- Zoological Adviser
- Zoologistics
- Zooprofis

of our community have made to the advancement of zoo-based conservation. Congratulations and happy retirement to both, from the whole EAZA Community.

The WAZA Council elections also took place in October. The EAZA region's representatives are:

- Thomas Kauffels, Opel Zoo, Germany
- Sanna Hellström, Helsinki Zoo, Finland
- André Stadler, Alpenzoo, Austria
- Myfanwy Griffith, EAZA (Association seat)
- David Field, RZSS, UK, (non-voting position as Chair of WAZA Committee on Population Management)

NEW ARRIVALS

FIRST KOMODO HATCHING FOR LEIPZIG ZOO



ON 18 JULY THE FIRST KOMODO DRAGON (*Varanus komodoensis*) to be bred in Germany hatched at Leipzig Zoo. By happy coincidence, this crowning achievement took place in the same month as the 10th anniversary of the opening of Leipzig's Gondwanaland exhibit, where visitors to the zoo can see more than 100 species of vertebrate, including Malayan tapir, giant otter, Madagascar crested ibis, tomistoma and many amphibian and fish species from tropical forest habitats around the globe.

Endemic to Flores and adjacent islands, including Komodo, this species is listed as Endangered on the IUCN Red List. The male Komodo dragon, Kampung, was the first animal to be moved to Gondwanaland in 2011 before the exhibit's opening. One year later, in April 2012, Leipzig Zoo increased the EEP population by

importing 10 Komodo dragons from Los Angeles Zoo and Denver Zoo. Most of them have since been distributed to other holders in the Czech Republic, Germany, Italy, the Netherlands, Poland and the UK, and some have reproduced since their arrival. One female, Pantai, remained at Leipzig and has become the mother of a single offspring.

In the autumn of 2020, repeated mating activities between Pantai and Thor, a male that arrived at Leipzig from Colchester in 2016, were recorded by the video surveillance system. A clutch of eggs was laid just before Christmas. After the incubation period of almost seven months, one out of four eggs in the incubator hatched. The eggshell was pierced in the morning and just a few hours later the brightly coloured red and yellow dragon made its way out. At nine days old, the dragon was observed feeding on baby mice and has grown rapidly since then. In contrast to its wild cousins, the dragon has not shown any interest so far in locusts and other large insects.

When fully grown, Komodo dragons can reach a length of up to 3m and weigh up to 80kg. Just like its wild conspecifics, the young dragon spends its first years almost exclusively in trees. As the body length reaches 1–1.5m, the dragon spends more time on the ground, as climbing becomes more difficult, and the danger of falling prey to predators, including larger conspecifics, is strongly reduced. Visitors are now able to see Leipzig's little dragon in Gondwanaland in its specially built terrarium.

BLUE-THROATED MACAW CHICK HATCHES AT ARTIS

THERE HAVE BEEN BLUE-THROATED MACAWS (*Ara glaucogularis*) at ARTIS in the Netherlands since 2009. When the birds first arrived, they were all quite young, and there was little breeding behaviour in the macaws' aviary for the first few years; it wasn't until 2015 that the first eggs were laid, by which time the macaws were all seven or eight years old.

Macaws can live for many years, and they have a lot to learn during their early life. That is why we at ARTIS believe that as long as the macaws keep making progress in their breeding behaviour, the keepers should not intervene. We had three regularly used macaw nesting blocks about 1.5m above the ground. These were all placed against the building, out of the rain, further away from the visitors but closer to the doors used by the keepers. There are two macaw couples in the aviary, both of which laid eggs, which at first were unfertilised, but subsequently fertilised. These eggs kept disappearing or were damaged. Later, the eggs were always fertilised, but the chicks died during the breeding process or just before hatching.

Just before spring 2021 we added five new nest boxes. ARTIS supports the blue-throated macaw project run by Armonía in Bolivia by financing the construction of nesting blocks, which give the wild birds more opportunities to breed and raise young and thus increase the population. The new nesting blocks in the aviary at ARTIS are based on the ones used in Bolivia. These blocks are popular with the wild birds and have been successful. Made of thin, soft wood, two of the blocks are mounted on poles at a height of about 3m. Another three blocks are mounted against the mesh of the aviary, about 2m high. The macaws have



made the entrance bigger as well as making an extra opening at the top; in the wild they often use nest cavities where they can sit on top and where there is an opening at the top.

Our two macaw couples were immediately interested in these new nest sites, especially in the ones that are mounted extra high on poles, as they are in Bolivia. In March, a couple was breeding in one of the high nesting blocks. Nest site control at this height is a bit more difficult, but with a GoPro on a telescopic pole it is possible, and our keepers saw the first eggs.

After almost a month, a chick was heard calling very softly. After some time, the keepers carefully checked again with the camera and saw one small chick. The keepers were careful not to disturb them too much, checking the nest only occasionally. The chick grew well, and at the beginning of June, keepers saw that it was already fully feathered. On 20 June, a blue-throated macaw fledged at ARTIS for the first time.

SWEDISH SUPPORT FOR AUSTRIAN ALPINE BEETLES



THE BEAUTIFUL ALPINE BEETLE (*Rosalia alpina*), with its striking blue coloration and black tufts on its long antennae, is probably one of the most charismatic of European beetles. Sadly, this species has suffered a dramatic decline in several countries in recent decades and is now listed as Vulnerable on the IUCN Red List. The main reason is habitat loss due to the intensive use of beech forests to produce firewood and wood for furniture, but also because of a large-scale removal of dead wood.

In 2019, a joint conservation project between Alpenzoo Innsbruck in Austria and Nordens Ark in Sweden was launched in an effort to save the alpine beetle. The project's aim is to develop an effective breeding method for the species, which can be used to produce beetles on a large scale for future releases in areas in Tyrol where the species historically existed.

Together with several Austrian partners – Karwendel Nature Park, Tyrolean State Museum and the Austrian Forestry department – Alpenzoo collected wild specimens for the first time in 2019 and delivered them to Nordens Ark, which has prior experience of working with other long-horned beetles, such as the greater capricorn beetle (*Cerambyx cerdo*). In the breeding centre at Nordens Ark, the beetles are held in terrariums furnished with pieces of beech wood (*F. sylvatica*), provided mainly for the females to lay their eggs

in. The beetles instinctively find a piece of wood at the right stage of decay and lay their eggs inside its cracks. In this trial, different types of beech wood were tested to see which best met the beetle's requirements.

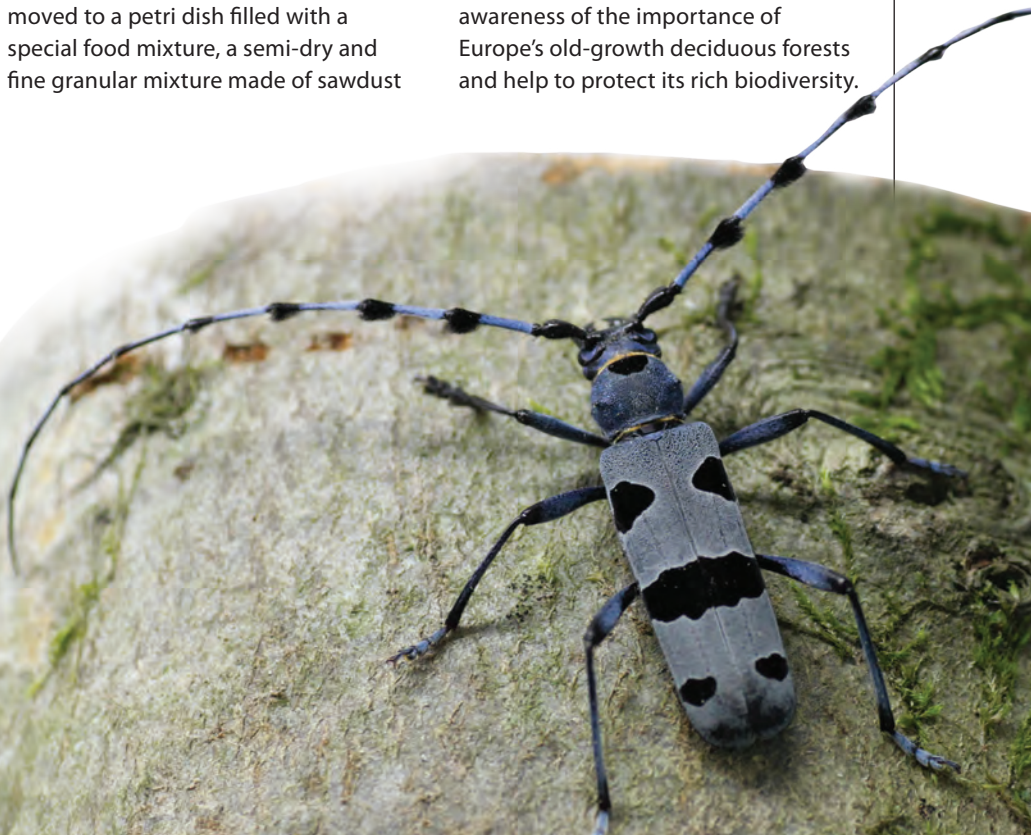
The eggs of the alpine beetle differ from other *Cerambycidae* eggs, in that they are less robust; the round eggs of the greater capricorn beetle are relatively strong, while the eggs from the alpine beetle are more elongated and the shell of the egg never hardens during development. This makes the eggs fragile and they need to be handled with great care.

When the larvae hatch, they are moved to a petri dish filled with a special food mixture, a semi-dry and fine granular mixture made of sawdust

from beech wood and a nutrient-enriched powder. The larvae eats its way through the food and slowly increases in size. By giving the larvae a more nutritious diet and a shorter winter period than in the wild, the trial has so far been able to produce adult beetles after just two years instead of the more usual three to four years.

In 2021, Nordens Ark successfully hatched its first four alpine beetles. As far as we know, the full life cycle of this species has never been achieved in human care. This is a big step forward for the project, which will continue to modify the method to find the best way to produce larger numbers of beetles for release into the wild. In the meantime, several areas in Tyrol in Austria have been identified as suitable as release sites, and are being restored to meet the species' requirements before any reintroduction is carried out. Alpenzoo Innsbruck has also built an alpine beetle station to help spread awareness about the species.

The alpine beetle is a great ambassador for a unique habitat – the old-growth deciduous forests. This habitat is vital for a large range of other taxonomic groups, including fungi, lichens and birds as well as other invertebrates. Therefore, by saving the alpine beetle we can also spread awareness of the importance of Europe's old-growth deciduous forests and help to protect its rich biodiversity.



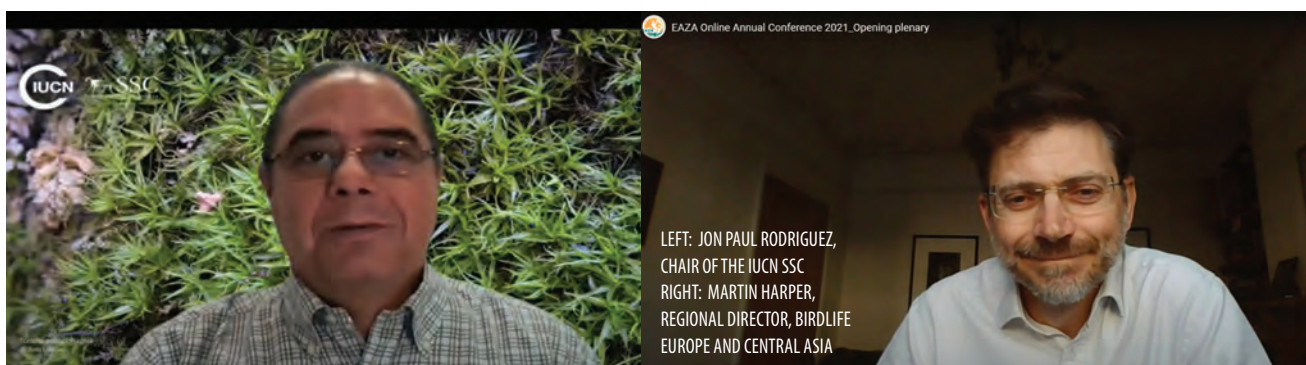
eaza'21

ONLINE ANNUAL CONFERENCE

A meeting of minds

DESPITE BEING MOVED ONLINE, EAZA'S ANNUAL CONFERENCE 2021 WAS FULL OF INSPIRATION AND OPTIMISM ABOUT THE FUTURE OF ZOO CONSERVATION

David Williams-Mitchell, EAZA Director of Communications and Membership



It is traditional by now for the EAZA Executive Office to provide a summary of the EAZA Annual Conference, and it is usually an account that reflects the energy released when the committed and expert members of our community get together and spark off each other's ideas. In past issues, we have tried to give an accurate reflection of the conversations and plenaries inspired by chance meetings, a spectacular backdrop and the local alcoholic specialities, but most of all by the urgency that five days together with colleagues always seems to bring. It's no easy task then to capture the experience of a second Annual Conference held online. There has been no real sense of the Association 'treading water', and indeed one of the heartening observations of the pandemic has been that EAZA Members have been as committed to the mission as ever. It is because of this continued activity that the online event was designed to provide as full a Conference experience as possible, but it is clear that this level of ambition was hard to reflect in the technological execution. Technical issues were a central part of this

year's Conference experience, and we look forward to placing the parallel sessions back into an environment that is better suited to them; in the meantime, as a colleague pointed out, at least everyone enjoyed the food.

The content of this year's Conference was, however, entirely reflective of the community's desire to get back to its important work across the mission areas, and most especially to the task of influencing the post-2020 biodiversity frameworks. Keynote speaker Martin Harper, Regional Director of BirdLife International for Europe and Central Asia, set the scene for this aspect of conservation NGO work with an interesting exposition of how his organisation views the challenges of getting the world's governments to treat the biodiversity and climate crisis with the necessary urgency. Harper laid down a challenge to the community to use its public influence to maintain pressure on governments – pressure to agree ambitious and unavoidable goals, and to live up to their promises.

In this spirit, the Conservation Committee launched the next EAZA

Conservation Campaign, entitled EAZA21+, to encourage Members to learn more about the frameworks and how to influence them through concerted and individual action (see page 12). Session keynote speaker Jon Paul Rodríguez, Chair of the IUCN Species Survival Commission, underlined the importance of such a campaign and the unique potential of zoos and aquariums to combine expertise on animal species conservation with unrivalled public access and engagement.

This potential was further reinforced at a Communications Roundtable discussion held on day two, where Gilles Doignon of the European Commission's DG Environment confirmed that there is potentially no limit to the effectiveness of zoo and aquarium communications to inform and shape public opinion. Indeed, the panel felt that the only significant barrier for zoos and aquariums to reach their potential in this area was a lack of understanding of the level and variety of expertise present in the staff employed by EAZA Members. A new communications strategy presented the following day reinforced the need

for every EAZA Member to contribute to greater public and legislative understanding of the power of zoos and aquariums through transparent demonstration of the work being carried out by individuals, institutions and the wider EAZA network on all available channels.

Education is clearly an important aspect of zoo and aquarium work for external stakeholders, and there has been a lot of activity in this area over the past few years. This was reflected in a plenary session that took in the new WAZA Conservation Education Strategy, internal communications and education at EAZA Member institutions, international cooperation between zoos and a look at the Ocean Literacy Framework and its application to aquarium engagement.

The opening plenary also set the scene for a full programme of thematically programmed sessions looking at aspects of EAZA work. Executive Director Myfanwy Griffith combined a summary of the work of the Association over the past 12 months with an in-depth look at the EAZA Strategy 2021–2025, which provides a detailed road map of the ambitions of EAZA Members and their fulfilment. With five focal areas covering animal care, conservation, representation, communications and sustainability, the Strategy provided a perfect framework for the live-streamed sessions.

The first of these sessions looked at sustainability and how zoos and aquariums are reducing their resource footprint and combining efficiency-saving measures with UN Sustainable Development Goal compliance and promotion. The presenters showed that zoos and aquariums that are working to reduce their footprint exist all over Europe, and indeed the world, and that no institution is purely focusing on one aspect of sustainability – rather that each element comes as part of a bigger package of commitments.

Population management was also a key theme explored in the sessions, the first of which was a series of presentations given by Taxon Advisory Groups on the RCP process, ranging from the initial discussions through to the evaluation of the plan. Covering taxa from crocodylians

to callitrichids, the case studies showed clearly the challenges and opportunities presented by the new population management structure, from a focus on the TAG itself and its future roles to the enrolment of a stakeholder base including IUCN Specialist Groups and other interest groups.

In the second of the population management sessions, coordinators for some of the most endangered species in EAZA care shared their experiences and showed how the unique conservation circumstances of each species have shaped the management strategies of the EEPs. These species were as varied as the conservation needs themselves, ranging from radiated tortoise to Montseny brook newt, from European mink to Partula snails. The session deftly captured the idea that RCPs collect data from the holistic analysis of trends of the metapopulation and apply them directly to the Long-term Management Plans that drive the EEPs.

A further session showed how zoo and aquarium staff can use the expertise and resources of their institution to design and execute effective conservation strategies, effectively closing the loop between the disparate elements of network population management, institutional collection planning and species-focused *in situ* support.

Another key ingredient of the new EAZA Strategy was covered in a thematic session dedicated to animal welfare practice in zoos and aquariums, led by the Animal Welfare Working Group. This session examined in detail the use of ethological observation in designing better welfare outcomes from population management – and how more tailored approaches to management can in turn affect behavioural and welfare outcomes. A thematic session on Friday explicitly linked welfare to good animal training and suggested that training and welfare are both key elements of better management and public perception.

The Research Committee's thematic session pointed to how data collection and record-keeping can help improve outcomes across the board from *in situ* conservation to public engagement

in our communities – and reinforced the overall message that information, and transparency of information, are central to the ongoing success of the progressive zoo and aquarium mission.

Management of populations of aquatic species is a comparatively recent addition to the EAZA portfolio, but these species are among the most affected by climate change and other adversity caused by human activity. A dedicated thematic session covered topics from the parlous state of freshwater fish species and the urgent need for conservation measures to the unique challenges posed by the care of ocean sunfish, taking in jellyfish husbandry and biobanking strategies for aquatic species along the way. It was clear that, despite the relatively short history of conservation and management of aquatic species in EAZA, progress in both conservation and husbandry has been remarkable.

A thematic session on the final day of the Conference introduced pathways to EAZA involvement for potential Members, staff at existing Members and students aiming to enter the community. With the ambition of the new Strategy, it is clear that EAZA is looking for more zoos and aquariums to join their expertise to ours, managing programmes, joining committees and so on – and the session's address to students, from Dr Okka Bangma of Van Hall Larenstein University in the Netherlands, reinforced the need for new highly qualified staff at EAZA Members to ensure that the mission of progressive zoos is continued into the future.

The veterinary advisors' thematic session provided a number of case studies on how input from a vet can shape husbandry and management of species and taxa of all shapes and sizes and demonstrating in the process how cross-disciplinary every aspect of our work has become.

EAZA Chair Thomas Kauffels wrapped up the conference with a pointed call for all Members to participate in collaborative work, and with the observation that zoos and aquariums are immeasurably stronger together than separately, a message that had additional poignancy in the online environment; we look forward to meeting colleagues in person in 2022 in Portugal.

Learning together

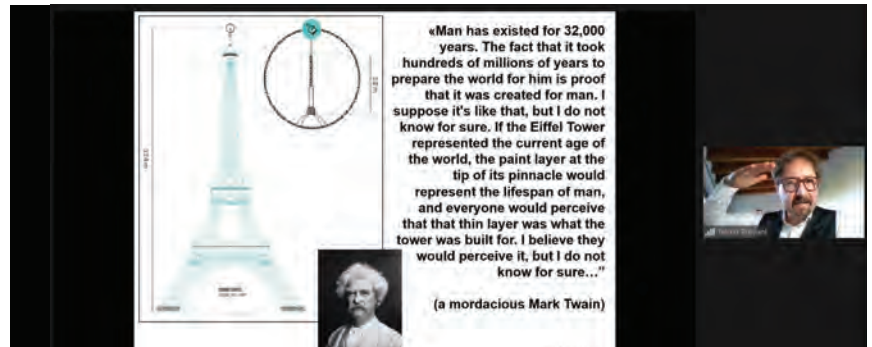
THE 2021 INTERNATIONAL CONSERVATION EDUCATION CONFERENCE BROUGHT TOGETHER EDUCATORS FROM ALL OVER THE WORLD TO EXCHANGE IDEAS, FORGE CONNECTIONS AND INSPIRE EACH OTHER'S WORK

Laura Myers, EAZA Academy Manager

From 8–10 October, 294 delegates from 55 countries gathered online to participate in the International Conservation Education Conference. The conference was jointly organised by EAZA, the International Zoo Educators Association (IZE) and ZOO Wrocław, with support from San Diego Zoo Wildlife Alliance, and replaced the EAZA Education Conference that had been scheduled to take place in Wrocław. The online event helped to develop the connections with IZE that have long been prioritised by the EAZA Conservation Education Committee, and the cooperation allowed us to create a truly global event for educators.

The overall theme of the conference was 'Building conservation education success', and the majority of the different conference tracks were linked to the WAZA Conservation Education Strategy 'Social Change for Conservation', which was published in 2020. This strategy lays out a series of recommendations for effective conservation education, and is already familiar to EAZA Members, as it is broadly similar to the EAZA Conservation Education Standards that were published in 2016. Delegates shared their experiences of working with these strategic frameworks, and the consensus was that these documents can be beneficial not only by guiding educators' work within their own departments, but also by cementing conservation education as a fundamental part of zoo and aquarium work.

EAZA was well represented at the event; 139 of the conference delegates were EAZA-affiliated and 39 of the accepted presentations were delivered or led by EAZA Members. The conference also attracted zoo and aquarium educators from the rest of the world, as well as educators working in *in situ* contexts and academics working in the field of social research and visitor studies. Although we missed the experience of gathering together in person, we would not have been able to achieve such a diverse range of participants or the same



KEYNOTE SPEAKER TELMO PIEVANI SUMS UP ANTHROPOCENTRISM WITH A MARK TWAIN QUOTE © LAURA MYERS

depth of programming with a face-to-face event. The conference featured two keynote speakers; the first keynote was delivered by Telmo Pievani, an evolutionist and philosopher of science from the University of Padua. His talk challenged educators to contextualise the Covid-19 pandemic within the broader problem of humanity's destructive relationships with the natural world, and to champion science beyond the boundaries of our own institutions. The second keynote was given by Carmel Croukamp Davies, CEO of Parque das Aves in Brazil, who inspired delegates by sharing her experience of shifting her institution to a holistic philosophy focused on conservation engagement with the goal of connecting people with nature and local biodiversity.

The rest of the conference programme was largely made up of delegate submissions, and was a mixture of oral presentations, short 'poster' presentations, discussion panels and workshops. Programming ran around the clock to account for differences in time zones, and delegates were able to draw on their recent experiences with digital delivery to create meaningful opportunities for knowledge exchange and networking with peers. The conference also had several social events, which allowed delegates to build some more personal connections.

There were three major threads of discussion that emerged from the conference. The first centred on collaboration and cooperation: within our own institutions, with peers from

other zoos and aquariums, within the wider zoo community and with external organisations ranging from *in situ* conservation organisations to local community groups and academic institutions.

The second thread was inclusivity: discussing diversity within our own community, improving accessibility for visitors and learners with additional needs, and engaging with new audiences we have not always been able to reach.

The third thread was the exploration of how to prove the impact of our education work. Many educators still find it challenging to incorporate evaluation into their day-to-day workloads, but this evidence is a key part of demonstrating the real contribution that zoos and aquariums can make to biodiversity conservation. Several examples of good practice were showcased to cover a range of scenarios, from smaller evaluations of specific projects and activities done wholly 'in house' to large-scale multi-institution projects led by academic researchers.

Thank you to everyone from the organising institutions who helped to make the event a huge success; meetings of this kind provide important opportunities for professional development and networking for educators. We all find ourselves facing an uncertain future, and as well as providing inspiration and practical ideas to improve our education work, this conference helped to build a strong sense of community and hope that together we can create the change we need.

Covid, carbon and conservation

NO TOPIC WAS LEFT UNCOVERED AT THE 76TH WAZA ANNUAL CONFERENCE, AS THE SESSIONS RANGED FROM PANDEMIC SURVIVAL AND CARBON UPDATES TO ANIMAL WELFARE AND SUSTAINABLE PALM OIL

Gavrielle Kirk-Cohen, WAZA Director of Communications

For the second year in a row, the World Association of Zoos and Aquariums (WAZA) took its annual conference online. The 76th WAZA Annual Conference took place from 11–14 October 2021, drawing the highest number of participants for a WAZA conference yet, with nearly 1,000 people from more than 30 countries registered.

The conference took place on Zoom and was simultaneously translated into Japanese, Mandarin and Spanish; thanks are due to the generous support of the Japanese Association of Zoos and Aquariums (JAZA), Chimelong Safari Park, Chile National Zoo and Fundación Temaikèn.

Opening the conference as the keynote speaker was Her Excellency Razan Al Mubarak, IUCN President and Managing Director of Environment Agency Abu Dhabi (EAD), the Mohamed bin Zayed Species Conservation Fund and Emirates Nature WWF. Ms Al Mubarak called on everyone to scale up their efforts to protect biodiversity, and highlighted the valuable role that WAZA members played in the IUCN's mission, pledging to work closely with WAZA.

This was then followed by a panel discussion on Covid-19, where panellists from zoos and aquariums around the world shared their experiences of handling the pandemic in their institutions, the financial impact and solutions for recovery. The first day of the conference came to an end with a presentation by Dr Paul Smith, Secretary General of Botanic Gardens Conservation International (BGCI), who spoke about conservation, the challenges that are common to botanic gardens, zoos and aquariums, and shared opportunities for collaboration between WAZA and BGCI.

On 12 October, Elizabeth Maruma Mrema, the Executive Secretary of the UN Convention on Biological Diversity (CBD), delivered a video message keynote address; she could not join the conference in person as she was attending the first part of CoP15

in Kunming, China. She stressed the critical role of zoos and aquariums in conservation and in supporting the post-2020 Global Biodiversity Framework.

Following Ms Maruma Mrema's address was a brief update on WAZA's work on its latest short guide on carbon, which will be launched in 2022. An exciting update was also given on the Reverse the Red movement, in which WAZA is a leading partner alongside the IUCN Species Survival Commission, as well as what WAZA accomplished at the recent IUCN World Conservation Congress in Marseille.

EAZA's Danny de Man provided a detailed update on EAZA's new population management model; and WAZA launched a new *WAZA Short Guide: Sourcing Sustainable Palm Oil at Your Zoo or Aquarium*, which is available on the WAZA website.

Professor Mauro Guillen, author and Dean of the Cambridge Judge Business School, looked to the future in his keynote address on Wednesday 13 October, and shared trends for the next decade, encouraging zoos and aquariums to embrace technology.

This was followed by a panel discussion – featuring EAZA's Myfanwy Griffith as Chair of the WAZA Associations Committee – on the progress being made on the WAZA 2023 Animal Welfare Goal.

The third day of the WAZA conference came to an end with presentations by Dr Clément Lanthier and Dr Andrew Moss. Dr Lanthier, CEO of Calgary Zoo, discussed various regulatory matters that are impacting zoos and aquariums around the world, looking at the topics of cetaceans, *habeus corpus* and the so-called 'Jane Goodall Act' in Canada. Dr Moss shared the results of the WAZA Nature Connect Grants programme and what has been achieved over the past few years of the programme, which saw WAZA members around the world implement projects connecting families to nature.

The final keynote address was delivered by Dr Brian Davis, President and CEO of Georgia Aquarium and Chair of the Board of Directors for the Association of Zoos and Aquariums (AZA) on AZA's Fifth Promise: Diversity, Equity, Access and Inclusion (DEAI). Dr Davis gave an inspiring talk on the DEAI journey and how zoos and aquariums can work to ensure everyone has a seat at the table.

The final day of the conference included updates from several WAZA committees and WAZA partners and what they have been working on in the past year, as well as upcoming plans.

Throughout the conference, WAZA announced the winners of the 2021 WAZA Awards. The top honour of the year, the Heini Hediger Award, was presented to Dr Simon Tonge, former CEO of Paignton Zoo/Wild Planet Trust and EAZA Chair, in recognition of his outstanding service and lifelong commitment to the global zoo community.

Prague Zoo, in the Czech Republic, was awarded the WAZA Conservation Award for its 'Return of the Wild Horses' conservation programme to reintroduce the Przewalski's horse into Mongolia's Great Gobi Desert. In addition, North Carolina Zoo in the US was awarded the WAZA Environmental Sustainability Award for the zoo's long-term commitment to sustainability; the zoo has been integrating sustainable practices into all zoo operations since 1989.

The conference came to a close on 14 October and was followed by the Annual General Meeting, which saw the official handing over of the WAZA presidency from Professor Theo Pagel, Cologne Zoo, to Dr Clément Lanthier.

EAZA Members are still able to register to watch the recordings of the WAZA Annual Conference. Please write to conference@waza.org for more information.

The 77th WAZA Annual Conference will take place at Loro Parque, Tenerife from 23–27 October 2022.

Maximum impact

EAZA21+ IS THE NEW CAMPAIGN THAT WILL HELP US TO BRING TRANSFORMATIVE CHANGE TO THE BATTLE TO PROTECT BIODIVERSITY

Eric Bairrão Ruivo, Chair, and Bengt Holst, Vice-Chair, of the EAZA Conservation Committee, and Tomasz Rusek, EAZA EU Policy Manager



AMONG THE 400 EEPs, THE EEP FOR THE BEARDED VULTURE (*GYPÆTUS BARBATUS*) IS ONE OF THE ICONIC EXAMPLES OF EAZA'S CONTRIBUTION TO EUROPEAN ACTION PLANS FOR THREATENED SPECIES, SUPPORTED BY THE LIFE FUNDS.
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The previous 14 EAZA Conservation Campaigns engaged our audiences in support of various causes from bushmeat to songbirds to fish. We have communicated important messages to millions of people, raised crucial funds and invested them in hundreds of conservation projects, and have successfully lobbied national and European politicians.

We will return to this public-facing campaigning in the future, but for the next two years we are inviting EAZA Members to join a different, internal campaign. We have named it EAZA21+ because it begins in 2021, it follows 20 years of EAZA campaigns, and importantly, it should give us the tools and ideas we need to address the

challenges of the 21st century. It was launched in September during the virtual Annual Conference, with a keynote talk by Jon Paul Rodríguez, Chair of the IUCN Species Survival Commission.

ADDING OUR PIECE TO THE PUZZLE

Earlier this year, EAZA Members adopted the new vision statement for our Association: *Progressive zoos and aquariums saving species together with you*. *Progressive* means that we want to continue setting the standard for modern zoos and aquariums; through *saving species* we aspire to strengthen wild animal populations via *in situ* and *ex situ* efforts; and *together with you* refers to our unique ability to build

'You work at the nexus of conservation, knowledge development and public awareness. In all these modes, your contribution will be key to the implementation of the upcoming post-2020 global biodiversity framework. The success we all need, we all strive for, demands transformational change. It demands new pro-environmental behaviours. It demands partnerships and information exchange. It demands financial resources and capacity development and enhancement.

It can only be built and strengthened if the whole of society works together. Zoos and aquariums stand poised to be an important part of the post-2020 global biodiversity framework over the next 10 years... You can bring us all together to connect with nature in all its splendour.'

Elizabeth Maruma Mrema, Executive Secretary, UN Convention on Biological Diversity in her keynote address at the WAZA Annual Conference 2020

partnerships and reconnect people with nature.

Our vision places us inside the big jigsaw puzzle of biodiversity conservation. Not only is it big and complex, but also its pieces are currently being reshuffled and new ones are being added, as the global conservation community prepares the new post-2020 global biodiversity framework for the benefit of everyone. Governments from 195 countries will adopt it next spring at the delayed summit of the United Nations Convention on Biological Diversity (CBD) in Kunming, China.

This framework will include a list of targets and milestones that must be met to halt the decline of species and their habitats and restore harmony between humans and nature by 2050. After decades of failed attempts, this new framework should mobilise all the resources that are needed to address the needs of nature and people while also supporting all other goals of sustainable development.

CALLING ON THE EAZA COMMUNITY

Making such an ambitious international project a success will only be possible if the whole of society plays an active part: governments, companies in all sectors of the economy, NGOs and all citizens. This also includes the EAZA community. All biodiversity-related conventions (CITES, CMS, Ramsar etc.) will contribute, as will regional endeavours such as the EU Biodiversity Strategy for 2030, with which EAZA has already been actively engaging. The task will require a lot of political will and determination, funding and technical know-how, but also a true transformative change in how people think about the environment.

Zoos and aquariums that define themselves as *progressive* must naturally play an active role here. Getting involved doesn't require inventing completely new ways of working; we need to assess what we already do, determine what we may need to scale up and what we should align with the framework's priorities. To begin with, like all other biodiversity-related organisations, we must learn what the framework actually is and what it means for us and how we can best contribute as a diverse community from local to global and when needed with a single

voice. This is what the campaign should help us determine.

‘To be successful, we need the engagement of key stakeholders and that is why we need you. By supporting research and training for conservation, you play a vital role in safeguarding endangered species. Your role as educators is just as important. With trade-related conservation campaigns, you can help address the illegal wildlife trade. Your activities with schools help build a new generation of nature lovers. [...] By opening our eyes, you reconnect us with nature!’
Virginijus Sinkevičius, EU Commissioner for the Environment in his keynote address at the EAZA Annual Conference 2020

THE THREE CENTRAL THEMES

We have chosen three themes for the campaign, based on conversations with partners and officials involved in the creation of the CBD framework, and on the draft versions of the framework itself. The topics won’t be new to you; you have seen them often in the past years in EAZA policy work and position statements.

1. **Conservation education** – Public participation in the saving of biodiversity begins with helping people understand what biodiversity is, why it matters, and how they can be more mindful about it in their daily life choices. Thanks to the strong and effective network of zoo and aquarium educators, and the more than 140 million visits annually, EAZA Member zoos and aquariums can play an important role here and amplify our voice even more.
2. **Species conservation** – Already, global and European species action plans are taken into account in the EAZA Ex Situ Programmes (EEPs) and the Regional Collection Plans (RCPs). With species conservation as our unique focus, and with the IUCN One Plan Approach as one of our guiding principles, we have rich expertise to add to the success of the post-2020 framework.
3. **Wildlife trade** – The global community is dedicated to fighting illegal, unsafe, unsustainable and unethical wildlife trade, which



LITHUANIAN ARTIST GATIS ŠLŪKA CREATED THIS JIGSAW CARTOON FOR THE EUROPEAN COMMISSION'S UNITED FOR BIODIVERSITY COALITION; IT HAS BEEN ADAPTED FOR EAZA21+ WITH HIS PERMISSION

EAZA has addressed regularly via our campaigns, our work with CITES and the EU, via the IUCN motions etc. We are expected to contribute further to this goal through education and campaigning as well as through rigorous policies for animal acquisition and disposition.

WHAT DOES AN INTERNAL CAMPAIGN LOOK LIKE?

EAZA21+ is a campaign for all staff in EAZA Members, working in all zoo professions: management, education, conservation, research, zoology, animal care, communications, public relations, marketing, human resources and so on.

The main activities will run from January 2022 to September 2023 as workshops and webinars. In addition to online discussions with invited experts, we will host face-to-face workshops at EAZA events such as the Conservation Forum, Directors’ Days and the Annual Conferences. These events will first set the scene for each theme, and then will gradually add details and practical ideas. These ideas will afterwards be published as tutorials and toolkits that each EAZA Member will be able to apply in their daily work.

With EAZA21+ we want to create a forum for discussing how we can

become valued partners in the post-2020 framework while strengthening EAZA as our representative in conservation policy. We trust that all of the 32,000 employees of EAZA Member institutions recognise themselves in the end goal, which is maximising our impact in reversing the damage to and decline of biodiversity. We are convinced that every Member, no matter how big or small, in every corner of the EAZA region, will find something relevant, interesting and inspiring in the campaign.

We want it to be an inclusive campaign. We will not only learn from experts from the outside but also share and discuss our own experiences, success stories and best practices. But before we begin, we need your help to find the best focus. Over the coming months we will circulate a campaign survey addressing this, and we look forward to hearing your answers. You will also find it linked on the campaign website, www.eaza.net/eaza21plus. This is also where you can register so that you receive all campaign updates and resources straight into your inbox. Don’t hesitate to contact us at eaza21plus@eaza.net if you have any questions or suggestions.

We look very much forward to seeing you during the campaign activities!

In the shadow of Covid-19

ONE OF THE MANY OUTCOMES OF THE PANDEMIC WAS THAT THE SPOTLIGHT FELL ON WILDLIFE TRADE – BUT HASTY ACTION IN THIS AREA COULD MAKE THINGS MUCH WORSE FOR BIODIVERSITY

Carl Traeholt, Rosie Cooney and Sam Ferreira, EAZA Wildlife Trade Working Group

The emergence of Covid-19 has caused global human suffering and exposed societal and systemic economic weaknesses. Considered the most acute global public health emergency since the Spanish flu pandemic in the early 20th century, Covid-19 has ravaged economies across the world and challenged the international resolve to collaborate as a unified ‘species entity’. The scale and seriousness of the current pandemic demonstrates that it is the response of governments globally that impacts economies and the wellbeing of people, rather than the pandemic itself. The source of many of the resulting problems is simple – the belief that the world’s natural systems must be managed for maximum production to keep us ‘safe’ from life itself.

For too long the world’s governments have ignored the scientific evidence of the consequences of overexploitation at the expense of biodiversity and ecosystem services. Where life diversifies to avoid competition and collaborates to reduce costs, modern policies do the opposite – they are structured to comply with corporate bodies that insist on standardisation and excessive competition. Artificially imposed simplicity, such as industrial scale monocrop plantations and single-species cattle and goat farms, damages diversity of every kind and will in its pure essence never be sustainable. The continued pursuance of extraction-based growth economies has led to an unprecedented destruction of natural resources and loss of biodiversity, often at the expense of local communities’ livelihoods, has weakened important biological processes and, inevitably, has contributed to the emergence of Covid-19 and other serious diseases. In addition, Covid-19 has pried open systemic weaknesses that we are already familiar with, especially those concerning social inequity, access to health care and lack of social cohesion at both global and local levels. It is already well known that transmission modes in pathogens are mostly linked to levels of prosperity and

poverty in human populations as well as pristine/degraded wildlife communities; and yet it is well within the capability of governments to manage these components.

The highest demand for luxurious lifestyles rests primarily in developed and large developing nations, such as the USA, the EU and, more recently, China. The demand is a major component in driving overexploitation of natural resources in faraway and less developed nations who, in turn, often push local communities to deplete their already shrinking natural resources.

Nowhere else is this effect reflected more clearly than in the loss of biodiversity. Across the world, species are being wiped out at a rate far greater than ever before in the Earth’s history. Dating back to 125,000 years ago, humans have been the main cause of species extinction and ecosystem disruption, and this continues with unabated speed in the 21st century, despite our being fully aware of the negative consequences that a ‘business as usual’ approach will have on livelihood and society. The extinction of specifically the Earth’s megafauna has had a disproportionate influence on ecosystem structure and function, and the loss of these species is reshaping the Earth’s biosphere. At the same time, the human population has increased from 1 billion to 7.7 billion in the past 200 years and has managed to colonise every continent on the earth.

COVID AND WILDLIFE

There is clear evidence that Covid-19 emerged from a wildlife source, even if the specific host species remains uncertain. While finding the origin of the spread is important, it is far more important to acknowledge that zoonotic disease transfers between animals and humans are natural, are part of our biological history and will continue to be inherent in our future. After Covid-19 has been brought under control, there will be future pandemics of new zoonotic

diseases continuing the evolutionary process. The main challenge is the ever-increasing risk of transmission from animal to human, because this is linked to excessive human population growth, habitat destruction, our increased global mobility and our closer and more intensive relationship with other species as food, pets and production animals. Bringing wildlife, domestic animals and humans into intense contact with each other statistically increases the risk of disease transmission. With millions of people travelling across the world every day, any disease can spread to all corners of the world in a matter of days.

WHY TRADE BANS DON’T WORK

With the emergence of Covid-19, a wide sector of society has called for a ban on wildlife trade and consumption. Yet there is no conclusive evidence about the positive impact of banning all wildlife trade in preventing future emergence of zoonotic diseases. History illustrates that such indiscriminate bans are seldom effective, as they fail to consider the centrality of wildlife in human livelihoods, the complexity of the trade, and the political, economic and social contexts in which they are implemented. In effect, such bans would have negative consequences on many Indigenous Peoples and Local Communities (IPLC) in various regions of the world, whose livelihoods rely on ‘bushmeat’. In general, the problems with bans on wildlife trade are:

- i. They generally don’t work, because the capacity and resources required for the kind of intensive enforcement that would be needed to make such a massive cultural change happen are not available. If demand persists, and all indications are that it will, the trade will persist to some extent, with no monitoring or management.
- ii. It will criminalise basic livelihood strategies of IPLCs.
- iii. It is likely that enforcement efforts will fall most heavily on IPLCs,

because they are easy targets (i.e. they have no power), likely leading to human rights abuses, loss of assets (i.e. land) and potential incarceration.

THE BIGGER PICTURE

It is essential to understand and acknowledge that it is *not* wildlife and fish markets *per se* that have caused the pandemic. Rather, the industrial scale of wildlife production and consumption combined with the lack of husbandry standards at production sites and poor hygiene at many large wet markets cause far bigger risks than local IPLC markets and/or use. A Chinese wildlife market selling hundreds of species under strict hygiene standards is no worse than a Canadian livestock market with the same strict hygiene standards.

The launch of the EU's Biodiversity Strategy for 2030 includes a vital component on wildlife trade. This provides an important framework to regulate wildlife trade inside as well as outside the EU. This offers a key opportunity for EAZA to engage with the EU in addressing wildlife trade as well as evaluate the strengths and weaknesses of existing trade regulations – or lack thereof. The EU Biodiversity Strategy also complements ongoing efforts that are being undertaken globally as part of the UN Sustainable Development Goals (SDGs), including food and health security.

Covid-19 sparked nations across the world to retreat into ultra-national and protectionist shells. Despite the need for containment based on infection rates, nations chose to address it as isolated national efforts – certainly to the 'advantage' of the Covid-19 virus – and haphazard calls to ban and/or end wildlife trade were raised, although with no corresponding mention of the impact of industrial-scale agriculture. Whereas developing sustainable and equitable global wildlife trade is incredibly complex, there are many important points that should be considered, which are detailed in the following paragraphs:

Policy development and conservation intervention should rely on sound evidence based on information-gathering that follows standard scientific methods and processes. This includes socio-economic information and analysis

of likely responses to regulatory or other interventions that are all crucial questions aimed at determining the actual impacts in practice of wildlife trade regulation. Poorly considered and hurried interventions void of robust data often result in unintended negative consequences for people and wildlife.

We must strive to prevent any form of unsustainable use and trade of animal species, where this undermines the preservation of in situ populations, natural ecosystems and natural resources in range countries. Neither local demand nor demand from faraway countries should justify cultural, religious or financial habits that undermine the *in situ* population(s) in the species' distribution range. Where local communities are driven to depend on unsustainable practices, efforts to improve management to make it sustainable, or (where this is unlikely or impossible) support for alternative livelihoods must be offered.

It is essential to recognise that 'sustainable use' is a key pillar of the UN's Convention on Biological Diversity and that using biodiversity in a sustainable way, which does not lead to a long-term decline in any of its components, is consistent with biodiversity conservation.

In this context, it is important to understand that trade in wildlife is multifaceted and diverse, and that sustainable use also includes, for example, game-ranching and certain forms of fish-farming or other forms of *production-for-use* business activities that follow good husbandry and healthcare standards and otherwise use natural production methods without the use of such things as growth hormones and other similar boosters.

We must be mindful that the use of wildlife forms part of the culture and tradition of numerous IPLCs, as well as many rural communities in developed countries, and contributes to a multitude of support mechanisms (e.g. food security, health and cultural identity). Policies should be developed with prior active involvement of the communities affected, who are often the voiceless party despite being most affected by local policies as well as policies in faraway jurisdictions.

It is necessary to be aware that what constitutes an 'exotic' species in the EU may be a daily and necessary commodity for communities in the species' country of

origin. It is essential that development of sustainable trade policies reflects a high degree of understanding and acceptance of cultural diversity and fairness in trade.

To date, most of the policies and decisions made in the Covid-19 era are reactive and entrenched within existing world-order frameworks. Instead, a new approach that rediscovers dependence on locally produced products could greatly boost developing country initiatives to restore and grow domestic economic structures. We must avoid reverting to a growth-based economic model.

Zoonotic diseases cannot be managed through a narrow focus on wildlife trade alone. Policies and actions must address the underlying *causes* of emerging diseases through *proactive* intervention that focuses on reducing risk factors for zoonotic disease outbreaks, particularly maintenance and restoration of healthy resilient ecosystems, and addressing key anthropogenic drivers, such as industrialised livestock farming, intense large-scale agricultural monocrop production systems and industrial-scale wet markets without refrigeration/hygiene standards.

We must understand and recognise that the EU constitutes one of the world's biggest markets for illegal wildlife products, including live specimens, and that the EU's legal framework continues to disrespect/disregard national laws in species' range countries. The import of and trade in many exotic species – for example tigers, amphibians and ornamental fish – will continue to take place in the EU as long as mechanisms to de-legitimise importation of species that are not CITES-listed but listed as 'illegal' in its range countries are not put in place.

It is time to realise that an EU demand reduction for a variety of industrially produced commodities may be one of the most effective tools for reducing risks of emerging diseases and that the EU plays a critical role in leading the way on this topic on a global scale. The EU Biodiversity Strategy forms an ideal framework to launch long-term dedicated process to reduce overconsumption of a range of animal-based commodities.

CITES policy development must be guided to ensure sustainability, legality and fairness of trade rather than an arena for clashing cultural values, especially concerning wildlife species and their use.

Pig deal

A NEW REGIONAL COLLECTION PLAN POINTS TO PROGRESS FOR PIGS, PECCARIES, HIPPOS AND TAPIRS AT EAZA ZOOS

Jörg Beckmann, Tapir and Suiform TAG Chair, Nuremberg Zoo, Germany; Jan Pluháček, Tapir and Suiform TAG Vice-Chair, Ostrava Zoo, Czech Republic; Bengt Holst, former Tapir and Suiform TAG Chair, Copenhagen Zoo, Denmark



In November 2020 the EAZA Tapir and Suiform TAG conducted its RCP online workshop, and we are now proud to present a new and comprehensive RCP for tapirs, hippos, pigs and peccaries. During the workshop, a total of 27 taxa were evaluated, despite the fact that the TAG itself unifies just nine of those species from all four families. This represents the entire remit of the TAG and highlights the global and cross-disciplinary alignment of the TAG in the sense of the One Plan Approach, without barriers between *in situ* and *ex situ* conservation. In particular, the cooperation with the IUCN Species Survival Commission Specialist Groups (SSC SGs) must be highlighted, and also the fact that several TAG members are members of these groups, bringing together *in situ* and *ex situ* knowledge and conservation efforts. Furthermore the RCP is closely linked to the RCP of the Cattle and Camelid TAG through the Global Species Management Plan 'Action Indonesia' for banteng, anoa and babirusa. Without the input, hard work and cooperation of all programme coordinators, TAG members, the

IUCN SSC Specialist Groups for tapirs, wild pigs, peccaries and hippos and especially the team at EAZA Executive Office, the RCP workshop would never have been as successful!

MISSION AND THREATS

The mission of the TAG is to ensure diverse populations of wild pig, peccary, tapir and hippo species in EAZA collections that have the required characteristics to respond to the conservation needs of the taxa, as well as the additional roles and needs of the zoo community. Furthermore, the TAG aims to promote and support *in situ* and *ex situ* conservation, research and education efforts as well as any conservation cooperation between relevant *in situ* and *ex situ* actors. As an example, the conservation and protection of many of the South American and Asian species, as well as the African pygmy hippo (*Choeropsis liberiensis*), can be positively impacted by educating EAZA region zoo visitors about the negative impact of imported deforestation and unsustainable agriculture (palm/vegetable oils, soy, cattle) and how their consumer choices matter in mitigating the threats, as they

live in countries that import and trade these commodities in large quantities.

A relatively new but extremely high threat for wild pigs in Asia is the current spread of African Swine Fever (ASF) in the region. Several endemic pig species and subspecies that inhabit islands or only very small ranges are highly threatened by the virus. The TAG is therefore in close professional exchange with the IUCN SSC Wild Pig Specialist Group that is currently focusing on ASF in Asia. In tapirs, tuberculosis and – especially in South American species – man-made bush and forest fires are an ongoing threat. Tuberculosis in zoo populations of tapirs makes the management of both the Lowland tapir (*Tapirus terrestris*) and the Malayan tapir (*Tapirus indicus*) EEPs very difficult and work-intensive. In addition, both hippo species are very sensitive to anthrax outbreaks. In general, all endangered species kept in the TAG are endangered by habitat loss, especially the Chacoan peccary (*Catagonus wagneri*) and pygmy hippo. In addition, the latter inhabits the poorest region of the globe where the human population explosion has reached its highest levels.

POPULATION CHALLENGES

For biological and welfare reasons the TAG considers the breed-and-cull policy as extremely important for sustaining viable long-term populations. A reproduction stop in pigs and peccaries can lead to permanent sterility of females, even if it is for a short time only. Tapirs and pygmy hippos face the same problems if a breeding stop is applied for several seasons. The result of such a decision will become visible after some years in long-lived species, but then it might be too late to start breeding again. Therefore, the TAG would like to keep its eye on the situation to avoid large but sterile populations in the future. We would like to stress that to place additional animals is not easy, as some of the TAG species are large and require heated stables as well as heated water (tapirs and hippos). Thus, the breed-and-cull policy becomes even more important. Zoos interested in participating in EEPs managed within the Tapir and Suiform TAG must be aware of this.

The keeping of all-male groups is another solution for the surplus



Table 1. New style EEPs of Tapir and Suiform EAZA TAG including reasons for their establishment

Species	Direct conservation role	Indirect conservation role	Non-conservation roles	Target population size ↑ increase ≈ maintain ↓ decrease
Malayan tapir <i>Tapirus indicus</i>	Insurance, conservation education (in range)	Research, conservation education		↑
Lowland tapir <i>Tapirus terrestris</i>	Insurance, reintroduction, conservation education (in range)	Research, conservation education		↑ slight
Pygmy hippo <i>Choeropsis liberiensis</i>	Insurance, population restoration, training, research, expertise	Fundraising		↑
Common hippo <i>Hippopotamus amphibius</i>		Expertise, conservation education (in range), research, fundraising	Education, ambassador, exhibit	≈
Chacoan peccary <i>Catagonus wagneri</i>	Insurance, research	Conservation education, fundraising		↑ slow
Visayan warty hog <i>Sus cebifrons</i>	Insurance, source, conservation education	Fundraising (Talarak Foundation), expertise	Education	↑ slight
Sulawesi babirusa <i>Babyrousa celebensis</i>	(In region) Insurance, training	Training, conservation education, fundraising		↑ GSMP
Common warthog <i>Phacochoerus africanus</i>			Exhibit	≈ balance with red river hog
Red river hog <i>Potamochoerus porcus</i>			Exhibit, Education	≈ balance with common warthog

challenge, but not for all species. However, the TAG also urges holders to consider holding all-male groups where appropriate, if a need is highlighted by the various programmes. All-male groups can be immensely helpful for a proper genetic and demographic management, and the mature males allow zoos to show the species specific characteristics, such as tusks in babirusa or warts in warty pigs. They allow the coordinators to replace breeding males periodically with other genetically valuable males and avoid losing reproductive potential in females in the absence of regular breeding. New holders of these species are highly welcome.

SPECIES NO ZOO SHOULD MISS

The final RCP of the Tapir and Suiform TAG identifies nine species for EEP management (see Table 1): four for Mon-T – white-lipped peccary (*Tayassu pecari*), collared peccary (*Pecari tajacu*), bearded pig (*Sus barbatus*) and Javan warty pig (*Sus verrucosus*) – and

12 for Mon-T DNO. Nevertheless, as the situation of the various species might change over time, the TAG will carefully monitor the situation of all species both *in situ* and *ex situ*. And here the TAG can benefit a lot through the very close cooperation with the relevant IUCN SSC Specialist Groups.

Honorary adviser to the Tapir and Suiform TAG

In the name of all Tapir and Suiform TAG members we would like to express our heartfelt thanks to Bengt Holst. Bengt chaired this TAG from 2000 to 2021. He aimed for a high level of cooperation with respective IUCN SSC SGs. In addition, he strongly supported the breed and cull policy as the most important tool for management of all EEPs and ESBs of this TAG. Therefore, we decided that Bengt Holst should become an honorary adviser to the Tapir and Suiform TAG. Thank you very much, Bengt!



A good plan is half the work

HOW THE RECENTLY ESTABLISHED POPULATION MANAGEMENT CENTRE IS MAKING A DIFFERENCE TO EAZA'S LONG-TERM MANAGEMENT PLANS

Elmar Fienieg, EAZA Population Biologist

Everything we do is part of a plan. For an EEP, this plan should be based on its roles, the reason why the population is managed. Two heads (or more) are better than one, so a good plan is ideally informed by the relevant TAG, Species Committees and advisers, in addition to the EEP Coordinator. These advisers may include a wide range of people, such as *in situ* advisers, veterinary advisers and population biologists. A good plan is half the work, but not all the work. It also needs implementation, which means that the holding institutions, the EEP participants, need to take it up. For this to work, it is important that all those involved understand how their actions contribute to the success of the programme. This can be done by communicating the plan in a transparent way.

EEP Coordinators are always planning for their programmes and share these plans in various ways with the EEP participants. Programmes nevertheless also need a long-term plan, for which input from a population biologist is often beneficial and sometimes crucial. This is one of the reasons why the EAZA Population Management Centre

(PMC) was established: to make sure that every EEP has the LTMP it needs, by facilitating the planning process, providing input on population management and analysis and documenting the plan.

HOW MANY?

Since 2013, 43 LTMPs have been published, covering more than 60 species and subspecies. Now it seems possible to increase the rate of development considerably, thanks to the establishment of the PMC in 2018 and the expansion of this team with two external population biologists: Iva Martincová from Prague Zoo since 2020 and Charlotte Desbois from Mulhouse Zoo since 2021. This comes at a time when the number of EEPs is increasing steadily, triggered by the roll-out of the new RCP process, as well as other developments such as the establishment of multiple new aquatic TAGs. At the time of writing, there are already around 450 programmes (EEPs and ESBs), of which many have important conservation roles, or are even crucial to a species' conservation (e.g. Ark populations). Therefore, it is important that the LTMP process is as efficient as possible, to make the best use of the

scarce time of everyone involved, and to ensure that all EEPs have the plan they need as soon as possible.

THE PROCESS

During the pandemic, the EAZA community has had a steep learning curve when it comes to holding larger online meetings, but it is a more efficient way of developing LTMPs together. Rather than holding full-day or multi-day workshops, the LTMP document is now developed over a series of shorter online meetings. These meetings still involve the same attendees – the EEP Coordinator, a population biologist from the PMC, the TAG chairs, Species Committee and advisers. However, not everyone has to attend every meeting, making it more time-efficient for all. Because one size does not fit all, the exact set-up and meeting attendees are adjusted based on the needs of the programme. These needs are assessed during the first meeting, a check-in with the PMC. For some programmes, the development of an LTMP may need to be postponed. For others, it may be very short and straightforward. For others again, it can be an intensive and complex process, involving different partners. Once the

LTMP is finalised and distributed to the EEP participants, it is also made available on the EAZA Member Area. Some of the content of the LTMP is also copied over to the EEP pages on the public EAZA website (www.eaza.net/conservation/programmes/EEP-pages). The PMC generally aims to develop the LTMPs for most EEPs of a TAG in the same period.

TEAM EFFORT

Many zoos and aquariums participate in more than 50 EEPs, but often only a few people from the animal department directly communicate with the relevant EEP Coordinators and understand the needs of the programme. However, to make EEPs a success, actions are needed on many different levels in many different departments. Virtually every position in a zoo or aquarium that relates to animals – and that means a lot of people – can contribute to fulfilling the conservation roles of their EEPs. This goes beyond following up on breeding and transfer recommendations.

To illustrate this, take animal keepers and veterinarians. These people are of course involved in the general care of the animals and executing (non)-breeding and transfer recommendations. However, an inspection of the Calls for Action of each LTMP shows that their involvement extends well beyond that. For example, they may be figuring out the key to get a genetically important pair to breed, trialling new methods, collecting data, leading a research project, biobanking blood samples during routine checks to facilitate taxonomic identification, and so on.

By consistently documenting LTMPs and making these available, the needs of the different EEPs are becoming more transparent, offering an opportunity to better integrate EEP activities into a zoo or aquarium's operations. A large number of LTMPs are already available on the EAZA Member Area, and this number will increase rapidly over the coming years. In addition, 'new style' RCP documents are already available for most TAGs, and already provide an overview of the roles and rough goals of each EEP. Therefore, you are encouraged to go through the following three steps and find the answers:

1. What EEPs your institution participates in

The list of EEPs can be found on the public EAZA website (www.eaza.net/conservation/programmes). An overview can also be made relatively easily in ZIMS by using the Global Studbook search tool, searching on your institution's name in 'Taxonomy held by'. A list will be created with all the studbooks in the world for the species at your institution. Not all of these are relevant for you. In the studbook name, you can see if it is an EEP (some have the scope 'EAZA', others 'WAZA'). You may need to request access to this search tool from your local ZIMS administrator.

2. What the plan is

Check the Population Management webpage or the relevant TAG page, on the EAZA Member Area for the published LTMPs and RCPs. If you do not have access to the EAZA

Member Area, contact Mirko.Marseille@eaza.net for a log in. Meanwhile, you can already check the EEP pages on the public EAZA website for part of the EEPs.

3. How you can contribute

Reach out to EEP Coordinators if you see opportunities or have questions. Reach out to your colleagues to make them aware of this resource and how they fit into the larger EEP team.

UP FOR A CHALLENGE

The challenges that come up during LTMPs vary widely, but there are many overarching topics as well. Not all challenges can be tackled by EAZA alone. Some are not under our control – for instance, they may depend on the political situation in range countries. Nevertheless, most challenges can be tackled by strategically working together; for example, by keepers

closely monitoring blue-eyed black lemur juveniles to improve first year mortality; by curators and directors working with the EEP to merge king or rockhopper penguin colonies to increase breeding; by veterinarians investigating the potential infertility of underperforming black-crested mangabey breeding males; and by implementing a specific educational plan when an education role is linked to one species, by working with the educators of the different participating institutions.

Also, many space issues can be solved at EEP level this way, especially for those that do not need a larger population size *per se* but which have grown too fast and overshot institutional capacity. The EEP Coordinator can help to prevent this by slowing down the growth rate of a population gradually and well before it hits capacity. And EEP participants can build flexible enclosures with quality buffer space to house offspring, communicate well in advance, and be open in general to different management options.

Not all challenges can be tackled at EEP level. For some, wider cooperation is necessary, such as for fulfilling broader education roles, planning for cryopreservation and tackling structural space issues.

Many education roles of EEPs link to related themes, such as wildlife trade, climate change and overfishing. Rather than every EEP reinventing the wheel, the most efficient way to implement these roles therefore seems to require

a broader cooperation between EEPs/ TAGs and educators. The best way to do this needs to be further investigated, which of course should involve the Conservation Education Committee.

Similarly, cryopreservation of gametes or gonads is a priority for many different species, because it provides a chance to maintain a high level of genetic diversity for decades or even centuries, despite a small population size. Currently, there is established infrastructure to guide this. To set this up, a broader cooperation seems to be needed between external labs, reproductive scientists, veterinarians and EEPs and TAGs. This is currently being coordinated by the EAZA Biobank, with support from others, starting with establishing links to relevant labs and developing guidance.

A broader change in EAZA is also needed to solve the institutional space issues of EEPs, for which this is really crucial. Of particular importance in this respect are the insurance or Ark populations that are crucial to the survival of a species, for which failing should not be an option.

For some species, this is solved on TAG level, by strategically phasing out or decreasing populations of species, as for the Gibbon TAG, Callitrichid TAG and Loris EEPs, to free up space for recommended species. However, this is not possible for all EEPs, including the following:

- The Charco (*Cyprinodon veronicae*) and Potosi (*C. alvarezii*) pupfish, both extinct in the wild and with fewer

than 200 individuals and a very short generation time, vulnerable to being lost.

- Several turtle species that are functionally Extinct in the wild have a population size below 50 individuals in EAZA (e.g. *Mauremys nigricans* with 22 individuals).
- The Mauritius pink pigeon (*Nesoenas mayeri*), 104 birds. Similar to the Socorro dove, this EAZA population is essential to save the species' survival, but needs to be larger to do this successfully.
- The Endangered Meller's duck (*Anas melleri*), which especially needs institutions that can keep a large group rather than a pair, and in a high enough density to avoid aggression.
- The Lac Alaotra lemur (*Haplemur alaotrensis*), 72 individuals and Critically Endangered. A programme that needs institutions that are also willing to meet the species' specific husbandry needs.

The complete list is longer, but manageable. With 400 EAZA Members, these issues can easily be solved if these EEPs' needs are better integrated into Institutional Collection Plans. With the development of more LTMPs in the coming years, each person in the EAZA community can get a better understanding of these and other needs and their role in solving them and in other challenges. So please watch out for these plans and find out which EEPs need you in their team, and why.



MELLER'S DUCK (*ANAS MELLERI*)

Penguin priorities

A RECENT RCP WORKSHOP CONCLUDED THAT FUNDRAISING AND EDUCATION SHOULD BE PRIORITISED IN THE FIGHT TO CONSERVE ENDANGERED PENGUIN SPECIES

Pierre de Wit, EAZA Penguin TAG Chair, Wildlands, the Netherlands; Jo Elliott, EAZA Penguin TAG Vice-Chair, Edinburgh Zoo, UK; and William van Lint, Manager Animal Programmes and Conservation, EAZA

Worldwide there are 18 penguin species, all falling under the umbrella of the EAZA Penguin TAG. Some still number millions of individuals, such as the Adélie penguin (*Pygoscelis adeliae*) and Macaroni penguin (*Eudyptes chrysolophus*), while others comprise only thousands, such as the African penguin (*Spheniscus demersus*) and Galapagos penguin (*Spheniscus mendiculus*). Ten species are listed either as Vulnerable or Endangered on the IUCN Red List, of which five species are kept within EAZA. After consultation with the IUCN Penguin Specialist Group, it was clear that the key task for the zoo community is to focus on education and fundraising to support conservation projects.

This was confirmed during the RCP workshop that was held online in December 2020, involving TAG members, regional representatives and field experts such as the Southern African Foundation for the Conservation of Coastal Birds (SANCCOB). It was decided to encourage all EAZA penguin holders to contribute through concrete conservation education activities. Holders are encouraged to educate the public in four areas: the threat status of penguins; the threats to specific penguin species and penguins in general (overfishing, climate change, habitat loss, invasive/introduced predators, oil spills, infections, etc.); the need to conserve penguins in the wild and to protect their habitat; and asking the question ‘How can we help?’ In addition to the institutional educators, the TAG is looking for an educator from the EAZA network to assist in this significant component in species conservation.

The EAZA Penguin TAG also encourages all holders to fundraise for any prioritised conservation projects either linked to the penguin species that they keep or for a more threatened species. The TAG will provide a list of

these prioritised projects. The penguins in our collections are ideal ambassadors for their wild conspecifics, including threatened penguin species that are not kept in human care, such as Galapagos penguins and yellow-eyed penguins (*Megadyptes antipodes*).

It was also decided during the workshop that, given their delicate status in the wild, the *ex situ* populations of the African penguin, Humboldt penguin (*Spheniscus humboldti*) and northern rockhopper (*Eudyptes moseleyi*) would be used to fulfil an insurance role. This is one of the few direct conservation roles set for the penguin species in human care within EAZA. Although there is mostly no mandate at this stage to use the *ex situ* population for population restoration or reintroductions in the wild, this can change overnight – for example, in the event of an oil spill. It was also suggested that we develop an oil-spill disaster response plan with the relevant partners.

It was decided that all currently managed species will be transferred to a new-style EEP (see table below) to fulfil the agreed roles. The consensus was to keep as many sustainable penguin populations as possible when we have reasonable numbers in our collections. The decision was also made to establish an EEP for the Magellanic penguin (*Spheniscus magellanicus*), as it is not competing for space with another priority species.

Due to the concerns of the IUCN Penguin Specialist Group over worrying levels of trade of wild penguins, the EAZA Penguin TAG focuses on carefully managing the penguin populations in EAZA, and discourages the acquisition of penguins and eggs of species that are not in our collections. All these species received a MON-T Do Not Obtain (DNO) recommendation. The little penguin (*Eudyptula minor*) is potentially the only exemption, given that they would come from a carefully managed population in another region.

To further improve the way we keep our penguins, the EAZA Penguin TAG is compiling BPG for the species kept in EAZA, which should be available in spring 2022.

If you have any questions, please get in touch with Pierre de Wit, EAZA Penguin TAG Chair.

Common name	Scientific name	IUCN Status	EAZA population	RCP category
King penguin	<i>Aptenodytes patagonicus</i>	LC	172.139.15 (326)	EEP
Gentoo penguin	<i>Pygoscelis papua</i>	LC	159.184.19 (362)	EEP
Adélie penguin	<i>Pygoscelis adeliae</i>	LC	1.3.0 (4)	Mon-T Phase out
Chinstrap penguin	<i>Pygoscelis antarcticus</i>	LC	8.13.0 (21)	Mon-T Phase out
Macaroni penguin	<i>Eudyptes chrysolophus</i>	VU	16.15.1 (32)	Mon-T
Northern rockhopper penguin	<i>Eudyptes moseleyi</i>	EN	60.58.2 (120)	EEP both species will be managed together
Southern rockhopper penguin	<i>Eudyptes chrysocome</i>	VU	40.37.16 (93)	
Little penguin	<i>Eudyptula minor</i>	LC	7.4.0 (13)	Mon-T
African penguin	<i>Spheniscus demersus</i>	EN	1004.918.139 (2061)	EEP
Magellanic penguin	<i>Spheniscus magellanicus</i>	NT	44.49.4 (97)	EEP
Humboldt penguin	<i>Spheniscus humboldti</i>	VU	1162.1095.249 (2506)	EEP
Galapagos penguin	<i>Spheniscus mendiculus</i>	EN		Mon-T Further discussion with IUCN SG required



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Viral load

KOALA AT DUISBURG ZOO, GERMANY

WHY THE KOALA RETROVIRUS IS A SERIOUS CHALLENGE FOR THE KOALA EEP

Dr Kerstin Ternes, Zoo Veterinarian, Koala EEP Coordinator, Pinniped Veterinary Adviser and Curator, Zoo Duisburg, Germany; and Dr Baptiste Mulot, Head Veterinarian, Director of Research, European Koala Population Vet Adviser, ZooParc de Beauval, France

The koala (*Phascolarctos cinereus*) is an iconic Australian marsupial that entered the European zoo population in 1991. In the last few decades, koalas have been established at a number of European zoos, with regular breeding success. In recent years the popularity of koalas has increased, and more and more zoos are expressing an interest in keeping them. As most of the European koalas came from San Diego, imports from Australia are needed to provide a valuable genetic boost to the European population. In the past, koalas destined for European zoos were tested for infectious diseases such as chlamydia and cryptococcus, but now a viral disease is challenging the health of the European population.

Koala retrovirus (KoRV) is a gamma retrovirus of koalas. Retroviruses are RNA viruses that insert a DNA copy of themselves into the host's genome. If this copy becomes inserted into germ line cells, it is inherited as a mendelian allele. It is transmitted at conception and the koala is born with it in every cell. These inherited versions are known as endogenous retroviruses. The subtype KoRV-A is endogenous in all animals in the northern part of the country and in parts of the southern population. In the south, koalas were completely extinct at some point and the population was restocked from small island populations. Some of these southern animals remain unaffected, but their genetically restricted status needs to be considered. All of the European animals are considered to be KoRV-A positive.

Recently exogenous KoRV counterparts (KoRV-B-KoRV-I) were discovered. Exogenous retroviruses are horizontally transmitted viruses. They are usually transmitted at any time after birth and are not in every cell. The most probable route of transmission is from the dam to the joey, as the joey's KoRV sequence is most similar to the dam's KoRV sequence. It chiefly occurs through close contact, milk or pap ingestion. Even if it does not account for all of the joey's KoRV subtypes, as the sire or koala-to-koala-contact might play a role in transmission, the most common route appears to be from dam to joey, as the transmission requires very close interactions.

It is likely that the endogenisation of KoRV began less than 50,000 years ago; this is considered young in evolutionary terms, leaving endogenous KoRV-A still infectious and associated with active disease. KoRV infections have been related to the presence of diseases such as lymphoma and leukaemia and to some immunosuppression. Treatment for KoRV-associated diseases such as cancer of the blood or bone marrow has so far been unsuccessful. A high viral load as well as the percentage of non-KoRV-A is assumed to present a higher risk of disease.

Next to the subtypes and the viral load, the insertions sites (IS) of the virus might play a role in the development of certain neoplastic diseases. Research has shown that the integration sites of KoRV can affect the expression of nearby genes, leading, for example, to

certain neoplasias. This was shown in closely related koalas developing similar neoplasias.

A great deal of research has been carried out and is continuing, but tests differ between experts. Non-KoRV-A subtypes are not present in every cell and are therefore not always detected easily. The choice of material (preferably whole blood, buffy coat and lymphoid tissue) is as important as a quick transfer for storage. Deep gene sequencing is considered the gold standard of testing, as it shows the prevalence of all KoRV subtypes. Despite being an extensive and expensive procedure, it is currently being carried out on koalas at the University of Queensland, Australia.

Following a symposium in San Diego in 2013, a second symposium was held online in 2021, involving researchers from the Leibniz Institute for Zoo & Wildlife Research, the universities of Australia, Sydney, Queensland, Sunshine Coast and Nottingham, EAZA and AZA vet advisers and representatives for the population in human care and in the wild. Using the outcomes of these meetings, the EEP is drawing conclusions on how to proceed with zoo koala management to keep the population as healthy and viable as possible, taking into consideration future imports from outside the EU. In accordance with the species committee and the holders, pre-shipment tests, the selection of suitable genetic profiles and the management of non-KoRV-A animals will be decided.



Setting the agenda for conservation

IT TOOK THREE ATTEMPTS, BUT THE IUCN WORLD CONSERVATION CONGRESS FINALLY MET IN FRANCE IN SEPTEMBER TO MAKE THE DECISIONS THAT WILL CHANGE THE FUTURE OF CONSERVATION

Sandrine Camus, EAZA Communications Officer

From 3–11 September 2021, staff from the EAZA Executive Office and a number of EAZA Members attended the twice-postponed International Union for the Conservation of Nature (IUCN) World Conservation Congress in Marseille, France. With around 5,000 attendees on site and 4,200 online, this was the first in-person large-scale event experienced by most of the attendees since the beginning of the Covid-19 pandemic.

The preparation work for EAZA and partners began in 2019 with the submission of two EAZA-led motions – ‘Law enforcement regarding commercial trade in tigers and tiger parts’ and ‘Action against Asian songbird trafficking’ – the sponsorship of six additional motions submitted by EAZA Members, and the coordination of regular email updates to joint IUCN/EAZA Members, ensuring a strong and unified voice for the zoological community prior to and during the Congress.

In October 2020, online voting reached a decision for 109 motions. We were delighted to see that all those we submitted and co-sponsored were approved to become Resolutions and Recommendations, i.e. tools guiding the policy and programme of the IUCN, and the most effective means of influencing conservation policy at the species, site, national and global levels. Any motions on which agreement could not be reached online were brought to the Congress for further discussion.

In September 2021, after an inspiring opening ceremony including speeches from French President Emmanuel Macron and actor and conservation advocate Harrison Ford, the Congress took place. It started with a forum over the first four days that included plenaries, workshop sessions, posters and several events allowing discussions on seven Congress themes. There was additional overarching focus on post-Covid recovery, including nature-based solutions, the necessity to address the biodiversity and climate crises together, and the

role and rights of indigenous peoples in conservation.

To continue demonstrating that *in situ* and *ex situ* measures are part of an integrated conservation strategy, representatives of more than 20 EAZA Member institutions participated in the Congress with an involvement in more than 20 thematic sessions, speaker pitches, stands, workshops and presentations during the Forum. These opportunities were compiled in an ‘*ex situ* journey’ that was circulated to joint IUCN/EAZA Members and other relevant attendees prior to the Congress.

EAZA IN ACTION

Many of these sessions took place within the Reverse the Red Pavilion, a space co-led by the World Association of Zoos and Aquariums (WAZA) and IUCN Species Survival Commission (SSC), with additional sponsorship from EAZA, EAZA Members and others active in conservation. Topics included specific examples of the major contribution of the global zoo and aquarium community in wildlife preservation, finding conservation partners, funding projects and measuring the success of conservation activities.

EAZA’s Executive Director, Myfanwy Griffith, was invited to speak on one of the main stages in the Pavilion hall about the songbird trafficking motion and related ongoing activities after the Silent Forest Campaign. Together with Jörg Junhold, Director of Leipzig Zoo, she also participated in a panel discussion on zoos and aquariums mainstreaming biodiversity conservation. Lorenzo von Fersen, Caribbean manatee EEP coordinator from Nuremberg Zoo, talked about *ex situ* conservation options for small cetaceans. These are only a few examples of the sessions showcasing the contributions of our community to global conservation.

Of particular interest in addition to the ‘*ex situ* journey’ were the sessions introducing the IUCN Green Status of Species – a new standardised metric to assess the progress

of a species towards full recovery. Complementary to the IUCN Red List of Threatened Species – which assesses how close a species is to extinction – the Green Status helps to define objective targets for species conservation planning and encourages ambitious conservation goals.

During a press release on Species Conservation Tools, Jon Paul Rodríguez, Chair of the IUCN SSC, Carmel Kroukamp, IUCN Conservation Planning Specialist Group (CPSG) Brazil and director of Parque das Aves, and Caroline Lees, CPSG, presented a new peer-reviewed article highlighting that ‘Species conservation planning works to halt the decline of threatened species’.

MEMBERS' ASSEMBLIES

During the second half of the Congress, 1,500 IUCN members participated in the Members’ Assemblies with three objectives.

First, they needed to discuss and vote on the remaining motions and on new and urgent ones that were tabled at the Congress. The Motion M ‘Calling for an online vote on all motions following the Congress’ (i.e. over the next month) created quite a debate. Whilst many were in favour of maximum inclusivity, others highlighted the efforts of France to host the event, of people to attend or give proxies, the legality of changing the IUCN Constitution this way, and the momentum and number of key decisions that needed to be made now if we wanted to have maximally effective input into major conservation decisions, such as at the upcoming Convention on Biological Diversity (CBD) meeting. Due to a 50/50 split of votes, instead of a two-thirds majority, the motion was denied and voting on the remaining outstanding motions took place in Marseille.

Things will be different for the next Congress, however. A new Motion N was approved with a high level of support, meaning that the statutes will be updated so that in future all Congress discussions and votes on motions will be possible for in-person and online attendees alike.

Myfanwy Griffith and EAZA’s Deputy Director, Danny de Man, attended contact groups to agree the text of the motions of particular interest to EAZA, and provided input to make sure the final versions were supportive of our activities. This increased capacity to contribute was brought about by Members’ support of these aspects in the EAZA Strategy and EU LIFE NGO funding.

Secondly, the Members elected the new IUCN leadership. We were thrilled that the new IUCN President will be Razan Al Mubarak from the UAE; a strong candidate and only the second woman to hold this position. She had proactively reached out to connect with zoos and aquariums, EAZA and other zoo associations, and we are sure she will be a good advocate for our conservation activities. Six Commission Chairs were announced, including Jon Paul Rodríguez, re-elected for the position of IUCN SSC Chair. The majority of the 28 Regional Councillors – ambassadors working to serve the interests and mission of IUCN – elected for eight different regions received EAZA’s votes. Sonia Castañeda Rial, Director of Biodiversity Foundation (Spain), Hilde Eggermont, Coordinator of the Belgian Biodiversity Platform at the Royal Belgian Institute of Natural Sciences, and Maud Lelièvre, General Delegate of Les Eco Maires (France), are the new Councillors for the West Europe Region. Carl Amirgulashvili, Head of the Biodiversity and Forestry



Department at the Ministry of Environmental Protection and Agriculture of Georgia, Vilmos Kizsel, President of the Göncöl Foundation (Hungary), and Samad-John Smaranda, Senior Counsellor at the Ministry of Environment, Waters and Forests (Romania), have been elected as Regional Councillors for East Europe, North and Central Asia.

Finally, the Members approved the IUCN programme for the next four years, called ‘Nature 2030: A Union in Action’, setting its ambition for the first time in a 10-year time frame to align with the United Nations 2030 Agenda for Sustainable Development as well as the post-2020 global biodiversity framework. Beginning in the difficult context of a global pandemic, which revealed complex connections between nature and infectious disease emergence that need to be addressed, this unified programme states that:

‘The Union will take advantage of its unique structure: generating the necessary science-based evidence and knowledge that decision-makers require, building trust and consensus among disparate stakeholder groups, identifying feasible policy options and, critically, fostering a culture of delivery and action that accelerates early and sustainable implementation. It will deliver concrete and tangible positive impacts to People, Land, Water, Oceans and Climate using five pathways to transformative change.’

The five pathways are: to recognise (and promote a shared understanding of) the challenges we face, retain biodiversity, restore species and ecosystems, resource conservation by funding and investing in nature and people, and reconnect people to nature. Note here that zoos and aquariums can play a role in each and every one of these pathways.

Recognising that we have ‘one nature, one future’ and that biodiversity loss and climate change are interlinked crises that need to be tackled simultaneously, the 2021 IUCN World Conservation Congress set the nature conservation agenda for the next decade and beyond. It is clear that EAZA Members have a strong role to play in achieving this positive future for nature. The conservation knowledge and expertise we provide is receiving ever-greater recognition within the wider conservation community. What better way to end this article than with a quote from Harrison Ford in his opening speech: ‘Come on everybody, let’s get to work.’

To find out more about the congress’s key messages, download the Marseille Manifesto, reviewed and approved by the IUCN members on 10 September, at www.iucncongress2020.org/programme/marseille-manifesto. To join IUCN please go to <https://www.iucn.org/about/union/members/how-become-member-iucn>

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Making a home for the hoopoe

AS THE HOOPOE'S DISAPPEARING HABITAT WAS CONTRIBUTING TO ITS DECLINE, ONE ZOO SET OUT TO RESTORE THE BIRD'S HOME, AND TOOK A SIGNIFICANT STEP TOWARDS PROTECTING ITS FUTURE IN THE CZECH REPUBLIC

Dr Petr Suvorov, Curator of Birds, and Petr Šrámek, Curator of Fish and Reptiles, Brno Zoo, Czech Republic

The open mosaic landscape represents one of the most endangered habitats in South Moravia in the Czech Republic. It hosts a vast number of protected and endangered species of plants and animals, including the hoopoe (*Upupa epops*). It is estimated that in the Czech Republic there are only between 70 and 140 breeding pairs of hoopoe and the species is locally protected. The greatest threat the species is facing is habitat loss and bad agricultural practices.

The hoopoe lives in an open landscape dominated by pastures and grasslands interspersed with groups of trees or open forests that provide nesting holes. Since the hoopoe is not able to carve its own holes, its population is largely dependent on the number of available tree cavities. The species uses the surrounding short-stemmed grassland as a food source. This type of habitat is severely endangered by the decline of traditional, small-scale agricultural practices (mainly grazing), which leads to undesirable overgrowth.

The hoopoe is a charismatic and well-known bird, and is therefore a very good flagship species for biodiversity conservation, since the public tends to give more support to projects that help a familiar and attractive species. The hoopoe is also a very good umbrella species, because it shares its habitat with many endangered species that are important to the ecosystem. Protection of these areas in the region therefore helps many other endangered species. Active management aimed at the hoopoe contributes to the return of succession stages that are currently disappearing fast in the region due to overgrowing.

To help the hoopoe overcome these difficulties, Brno Zoo has begun a project that aims to enlarge the hoopoe population by installing nesting boxes to increase the number of available nesting cavities, and by active management of the bird's feeding habitat. To increase the hoopoe population it is necessary to perform large-scale and long-term management,



ADULT HOOPOE: (MATYÁŠ SLAVÍK; NEST BOX: PETR ŠRÁMEK / BRNO ZOO

including cutting shrub and grass meadows and pastures and combining this with extensive grazing. Managed sites are mowed or grazed in segments, which means that no segment is cleared twice in consecutive years.

The result of this management is a diverse and harmonious landscape that has existed here for centuries. Over-intensive grazing pressure and large-scale grass mowing both represent undesirable and detrimental extremes that lead to the destruction of this habitat. Other factors that improve the likelihood of a hoopoe nesting successfully include regular care for potential natural cavities (for example, cleaning and shrub elimination) and, if there is an insufficient number or total absence of such cavities, the installation of man-made nesting boxes.

The project has now been running for five years and the Brno Zoo team coordinates it, raises money for management, regularly collects data in the field and carries out regular maintenance of the nesting boxes. Man-made nesting boxes have been placed in five locations that have been carefully chosen to fit the hoopoe's needs. Throughout the project, hoopoes have successfully nested in three nesting boxes in four years out of five, and

have raised 24 offspring. Several other bird species have nested in the boxes as well, the most significant being the Eurasian wrenneck (*Jynx torquilla*), which, like the hoopoe, is a locally protected endangered species.

Large-scale management has been carried out in cooperation with two local NGOs, the Czech Union for Nature Conservation Morava and the Association for the Rescue of Butterfly Paradise. We have been able to actively manage many hectares every year. The results are very encouraging. We can already see a significant increase in the numbers of many protected and endangered species of plants that are restricted to short-stemmed grasslands. This habitat is one of the most threatened in the local area, because it is very vulnerable to expansive grasses and shrub overgrowth. Left unmanaged, this could lead to its destruction in just a few years, which would mean the virtual elimination of the endangered species of plants and animals that live here.

In 2021, with help from the EEA and Norway Grants, we started to manage two new large areas of threatened habitat. We believe that our project might serve as an example that the role of zoological gardens should shift from the protection of individuals to conserving entire local biotopes.



The march of the Hargila Army

HOW ONE WOMAN INSPIRED A LOCAL COMMUNITY TO WORK TOGETHER TO PROTECT AN ENDANGERED STORK

Purnima Devi Barman, Wildlife Biologist, Aaranyak, Director of the Women in Nature Network (WiNN) and Founder of the Hargila Army

In Assam, in the far northeastern corner of India, lives one of the largest and rarest of the stork family, the greater adjutant stork (*Leptoptilos dubius*). The greater adjutant must be one of the most striking birds in the world; it is an enormous stork, standing up to 1.5m tall. However, due to habitat loss and poaching, it is today an endangered species; globally only 1,200 greater adjutants are left, and the population is declining. Only two small breeding populations are now in existence: the largest colony is in the Indian province of Assam (in the Brahmaputra Valley) and the other is in Cambodia. Assam is considered to be its last stronghold, holding more than 75% of the global population.

THE LOCAL SCAVENGER OF ASSAM

These gentle giants, locally known as 'hargila', were not considered beautiful,

nor were they prized by the villagers living near the storks' breeding grounds in Assam. The greater adjutant stork had long been disliked by the locals, as it was a scavenger bird and considered 'dirty'; it was often treated as a bad omen, a disease carrier and a pest. As the storks live in trees in areas that are shared by humans, and drop pieces of rotten food and excreta on to the ground below, they were unpopular with the villagers. Annoyed by the foul smell, the constant need to clean up the droppings and food in their backyards, the stork's status as a bad omen and the general cacophony made by the birds, the villagers would cut down the trees to get rid of the birds. Land expansion, construction and the lure of easy money made by selling the wood from the trees also posed a serious threat to the greater adjutants' shrinking habitat.

A RAY OF HOPE

The situation remained grim until an initiative began in 2007, led by Purnima Devi Barman, a biologist from Assam and a member of Aaranyak, and became a revolutionary conservation movement. Identifying the core issues that lay behind the greater adjutant's population decline, the initiative recognised the need for the villagers' participation, and for them to take ownership of nesting trees for the birds.

The movement began in the Kamrup District of Assam, and soon, despite all the challenges, there was a ray of hope, as the project succeeded in persuading local communities to feel a sense of ownership towards the hargila. Purnima and her team received a future conservationist award from the Conservation Leadership Programme in 2009 and began working tirelessly to save this species from extinction.

INNOVATIVE METHODOLOGY

The project found an astonishing variety of ways in which the villagers could protect the storks and make them a valued part of their culture. These included:

- Building a feeling of ownership among the tree owners and communities through a relentless awareness campaign.
- Forming a sustainable group of women drawn from nearby villages. The group, known as the Hargila Army, is a community conservation movement that converts housewives into conservationists and each woman brings her entire family to join the efforts. This group now has 400 women as active leaders and more than 10,000 women pledged to be part of the army.
- Empowering local women. The project has trained more than 10,000 women in creating a livelihood, capacity building and providing environmental education. Rural women were given a voice through this programme.
- Supporting the local women by providing handlooms, yarn and training. The project also pioneered the incorporation of the stork motif into Assamese handlooms and textiles. Women now make and sell these products to provide an income at the same time as raising awareness; the hargila has become a symbol of

beauty on traditional clothing.

- Integrating the birds into traditions and rituals in the villages. Women have created folk songs and rituals to celebrate the bird, which have become a part of their culture over the last decade. Local weddings have included drawing henna storks on the guests' hands and arms, and placing giant models of the storks at the entrance to the wedding. The Hargila Army even throws baby showers every year during the storks' breeding season, just as they do for Assamese expectant mothers.
- Facilitating scholarships, rewards and training for the tree owners.
- Rescuing and rehabilitating fallen chicks and forming a youth group of rescue volunteers.
- Constructing artificial nest platforms, with support and guidance from many European zoos. Studying breeding behaviour and success by constructing and accessing a 26-metre-high bamboo platform every year.
- Studying eggshells to understand the connection between eggshell status and breeding success
- Supporting communities by producing more than 11,000 face masks during the Covid-19 pandemic, each bearing a stork motif.
- Involving government stakeholders from the local District Administration and police, and introducing wildlife laws in a very positive way without any conflict.
- Creating the world's first Hargila Learning Centre in a government school in the breeding village.
- Taking the greater adjutant awareness and conservation module into local schools and educating more than 30,000 schoolchildren on environmental matters.

POSITIVE IMPACTS

One of the most successful aspects of the campaign has been the creation of the Hargila Army to sustain the many efforts. These women are safeguarding around 32 wetlands, which are under pressure due to urbanisation. By involving local village women, the bird was seamlessly introduced into the community's traditions and rituals. The project team reached out to local schoolchildren, who played an important role in motivating and educating their parents to protect

the nesting trees. Hargila craft classes were even included in the local school syllabus. The local police and administration as well as the Assam state zoo became partners in this effort, providing much-needed help in the rescue and rehabilitation of the species. So far, 200 chicks have been released into the wild and five fledglings have flown away from the artificial nest platform.

In 2017, the project received a Whitley Award, also known as the Green Oscars, which boosted the profile of the species. The project team leader also received the President's Award, Nari Shakti Puraskar (Woman Power Award), which is the highest civilian award for Indian women, and the Hargila Army received a UN Development Programme India Biodiversity Award.

The project has been extremely successful; nest numbers have increased from 26 in 2006 to 220 in 2020 in just one colony, and in the whole of Assam, nest numbers increased from 40 to 300. The Assam population of greater adjutants has increased to around 950–1000 in 2020, up from 400 birds in 2006. As a result of the local initiatives, not one nesting tree has been cut down in the last 10 years in Kamrup District.

The effects are clear: the nesting colony of the Dadara-Pacharia-Singimari village complex of Kamrup District harbours more than 60% of the stork's global population and has become the biggest nesting colony of this bird. Now about 600–800 birds can be seen in Kamrup District alone. Experiments with artificial nesting platforms were implemented and several birds were found to nest successfully in such platforms. This initiative could be used to revive other former nesting colonies of this bird, which are now deserted due to a lack of proper nesting trees.

Despite the recent challenges facing the project, this year the Hargila Army celebrated Hargila Day, which was launched by the Assam Forest Department and celebrated in a colourful and impactful way in different parts of Assam. One of the special attractions of Hargila Day was the stall set up by Hargila Army members in collaboration with the Assam State Zoo; the conservation message was broadcast by displaying the hargila motif on

handmade products sold at the zoo. The Honourable Forest Minister of Assam, Sri Parimal Suklabaidya, visited the stall and encouraged the team in their long-term battle to save the storks from extinction.

FUNDING THE FUTURE

Community conservation is a never-ending process and requires long-term resources and funding. The project team has been facing a crisis during the global pandemic and is running out of resources. We need to continue supporting our communities and the Hargila Army with aid, scholarships and other assistance to protect these nesting colonies and to encourage the villagers to protect the wetlands' biodiversity. From small initiatives, the project established a people's movement in Assam, and now we need to support at least 2,000 families with sewing machines, yarns, training and other assistance. We opened a hargila learning centre in a local school, but we are running out of resources to sustain it. Also this year the project does not have any resources to continue the artificial nest platform. We need a great deal of help and support from zoos and other organisations.

One of our big dreams is to start a hargila hospital in collaboration with the Forest Department and the local administration. We are asking for help with this from international organisations and well-wishers. We have also started protecting lesser adjutant storks during our fieldwork and so far we have saved 20 nesting colonies, including 300 nests of lesser adjutant storks. Supporters of the project can 'adopt' a woman from the Hargila Army as their sister, and adopt the nests that she protects.

The project for hargila conservation is now not only about saving the birds, but also about empowering women, children and young people, and encouraging social change in the villages in Assam. Our project now needs support from all over the world. During the global pandemic RE:WILD created a link to support our NGO Aaranyak with donations, so we are providing the link here and hope for your support: <https://secure.qgiv.com/for/purfun>.

Do get in touch by writing to us at purnima.aaranyak@gmail.com.

Information for all

THE *JOURNAL OF ZOO AND AQUARIUM RESEARCH* IS AN INVALUABLE AND FREELY ACCESSIBLE SOURCE OF INFORMATION ABOUT THE VITAL RESEARCH THAT IS CURRENTLY BEING CARRIED OUT IN ZOOS AND AQUARIUMS AROUND THE WORLD

Zjef Pereboom, Research Manager, Antwerp Zoo and Chair, EAZA Research Committee

Globally, zoos and aquariums are becoming ever more involved in research activities. But unfortunately, a considerable amount of that work hardly gets published or is communicated in other ways to zoo staff or to the scientific community. To improve the communication of research results from zoos and aquariums, and to provide free access to scientific publications, EAZA's scientific journal, the *Journal of Zoo and Aquarium Research* (JZAR) was developed about a decade ago as a diamond open-access journal. This essentially means that readers don't pay for access and there is no author fee for publishing in the journal.

JZAR publishes zoo- and aquarium-based scientific articles with a focus on peer-reviewed research papers, review papers and evidence-based case studies. Research covered by JZAR includes studies in pure and applied biological sciences (e.g. behaviour, genetics, veterinary medicine, nutrition, population management and reproduction), *in situ* conservation research, and research aimed at developing other roles of zoos and aquariums (e.g. visitor learning and marketing). Most importantly, JZAR is devoted to submissions of original, previously unpublished case studies documenting the effects of husbandry interventions. Evidence-based husbandry aims to apply the best available evidence gained from scientific studies to decision-making, and, as such, an important aim of JZAR is to make the assessment and dissemination of the effectiveness of husbandry actions a routine part of zoo management practice.

As a sample of the types of study that are featured in JZAR, we highlight below three contributions that were published in the current volume 9 (2021). Each of these publications underscores the relevance



of using scientific methodology to improve day-to-day zoo practice from a different perspective. The first study describes the

development and practical use of a body condition score system for giraffes. The second provides an example of how simulation modelling can estimate the effect of alternative breeding strategies in group-housed species in zoos. The third example on gut-loading in earthworms is included as an example of a simple but effective experimental approach contributing to evidence-based practice in zoo nutrition.

Body condition scores indicate that zoo-housed giraffes are not worse off than their free-ranging counterparts

Giraffes in zoos are known to have a high prevalence of deaths associated with digestive problems. This has been linked to the notion that giraffes as browsers are more difficult to feed appropriately compared to grazing ruminants. One would therefore

expect that zoo-housed giraffes might have a poorer body condition than their free-ranging conspecifics. In this recent study, photographs of free-ranging and zoo-housed individuals were used in combination with information on sex, age, body mass and height to develop and validate a body condition score (BCS) for giraffes.

In this publication, the authors report on the development, validation and application of a BCS for the shoulder area and hip area of giraffes, based on 532 free-ranging and 232 zoo-housed giraffes. The BCS for the hip was positively correlated with body mass index for adult female giraffes, suggesting that it reflects body condition. The hip BCS differentiated better between age, gender, season in free-ranging animals, and habitat (zoo vs. free-ranging). The shoulder BCS was less precise, most likely because the visibility of the shoulder does not only reflect subcutaneous adipose tissue, but also muscle tissue and skin thickness, especially in males. Using the shoulder score or the presence of skin folds on the side of the thorax/abdomen for routine BCS application is therefore not recommended. Adult



males in the wild generally had higher BCS hip scores than the females in the wild, which was not the case in zoo animals.

In contrast to what was predicted, zoo-housed animals had higher scores than free-ranging animals, which indicates that on average, zoo-housed giraffe are less constrained by dietary resources than their free-ranging counterparts. This corresponds to reports of an improvement of zoo diets in European zoos and the subjective impression of a reduced incidence of serous fat atrophy in recent years. Nevertheless, the highest score, often equated with obesity in other BCS systems, was observed in both zoos and in the wild, possibly excluding obesity as a pathological condition in the zoo-housed giraffe population. While low scores should be avoided in zoo-housed giraffes, there are no indications so far that high scores in this BCS system are detrimental.

JZAR, volume 9(3), July 2021.
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Inbreeding rates in *Hamadryas* baboons can be reduced with a breeding circle

Genetic management of zoo populations based on kinship relatedness is common practice in many population management programmes. Generally, kinship breeding is used to maximise genetic diversity and minimise inbreeding in a population. But breeding based on mean kinship of individuals is difficult to apply for animals living in groups without reliable pedigrees, and with limited control over which animals

mate and which don't. Rotational mating is an alternative breeding strategy for populations for which no pedigrees are required, and where regular exchanges of animals between groups in a breeding circle should theoretically limit inbreeding and maintain genetic diversity.

In this study the authors used computer simulations to estimate the effect of the implementation of such a breeding circle for the European zoo population of *Hamadryas* baboons. The breeding circle consisted of the 14 zoos that house the largest populations in Europe. Newborn females were transferred using a fixed scheme from Zoo 1 to Zoo 2, Zoo 2 to 3, 3 to 4, etc., and from Zoo 14 to Zoo 1. The simulations showed that breeding circles reduced inbreeding levels compared to a situation without any exchanges between zoos, while genetic diversity levels were almost the same. Without exchanging animals between zoos, the inbreeding rate per generation of the whole population was 1.93%. With a breeding circle, the inbreeding rate per generation ranged between 0.64% and 1.47%. Increasing the frequency of transfers and the number of transferred females resulted in even lower inbreeding rates.

Within zoos, high inbreeding rates (up to 12.3%) without exchange disappeared with breeding circles (up to 2.3%). With random exchange between zoos, inbreeding rates were higher than with a breeding circle. Genetic diversity after 100 years was almost the same (98.5%) when no exchange, random exchange and with

breeding circles was simulated. Based on these simulations, the authors indicated that breeding circles can be an effective way to genetically manage zoo populations in a way that is not labour-intensive.

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Nutritional gut-loading of *Dendrobaena* earthworms fails to improve calcium content

The diets provided to many captive insectivores are deficient in calcium and high in phosphorus, which can lead to nutritional disease. Husbandry professionals may address this imbalance through supplementation, but the efficacy of different methods varies between invertebrate taxa. Earthworms are frequently used for aquatic and fossorial insectivores and this, along with their rapidly shed mucus layer, makes dusting with supplements ineffective; gut-loading is probably the only available route to improving nutritional quality. Moreover, earthworms are often considered to be a good source of calcium, although data exist only for some taxa and results are mixed with regards to calcium content.

The present study analysed the calcium and phosphorus content of *Dendrobaena veneta* earthworms, a species commonly commercially reared and sold for insectivore food, gut-loaded on three diets and quantified the zinc, copper and magnesium content of fasted worms. *Dendrobaena* worms contained sufficient zinc, copper and magnesium to meet the general requirements of domestic birds, mammals and other vertebrates for these metals. However, calcium and calcium-to-phosphorus ratios of worms were deficient and did not improve after being offered fortified diets. Insufficient calcium in the diets, unpalatability of food and habituation effects also potentially contributed to this result. Unless a better means of improving the calcium content of *Dendrobaena* can be developed, husbandry professionals should be circumspect in their use of this species in a diet and ensure that dietary items with sufficient calcium are also provided.

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Turtle solutions



A NEWLY FORMED SEA TURTLE WORKING GROUP AIMS TO INCREASE COOPERATION AND COLLABORATION BETWEEN AQUARIUMS TO HELP CONSERVE THIS POPULAR SPECIES

Sidonie Catteau, Marineland, France, Nicole Kube, German Oceanographic Museum, Germany, and Mark de Boer, Rotterdam Zoo, the Netherlands

One of the most appealing aquatic species to be seen in zoos is the sea turtle. Sea turtles are charismatic, long-living animals and very popular with visitors. However, the husbandry is not easy and includes a great many challenges and adaptations for hosting institutions.

Almost all sea turtle species are endangered – they range from Vulnerable to Critically Endangered on the IUCN Red List (see Table 1) – and many efforts are being made across the world to try to conserve the species. Typical problems encountered by sea turtles are predators, habitat destruction – such as disturbance of the laying beaches by humans – and light pollution created by buildings along the coastline. Sea turtles are regular victims of by-catches and accidents with shipping, and suffocation in plastic waste and nets is also a problem. Climate change can also have disastrous consequences; for example, rises in sea level threaten the beach habitats where eggs can be laid. Global warming also has an effect on egg development; higher nest temperatures lead to more females, creating the

possibility that there will be nests in which few or no males are born. In the long run, this could have dramatic consequences on the sex ratio and genetic variation within the species.

In 2016, Pablo Montoto Gasser, the then curator of Zoo Aquarium Madrid, carried out an inventory within the European Union of Aquarium Curators (EUAC) to get an impression of the numbers of sea turtles being held in European aquariums and how the animals are kept. The results of the inventory were discussed in a workshop organised by the German Oceanographic Museum in Stralsund in 2017.

The inventory showed that at that time 24 green sea turtles (*Chelonia mydas*), 47 loggerheads (*Caretta caretta*) and six hawksbills (*Eretmochelys imbricata*) were kept in European aquariums (more recent numbers can be seen in Table 2). One of the main outcomes of the questionnaire was the discovery that participants wanted to know more about the husbandry needs of these special animals. In the past few decades, husbandry information for sea turtles had played only a

minor role in European conferences and on information platforms. Those aquariums who keep sea turtles had developed their own institutional husbandry and veterinary protocols, and information was passed only between a few institutions.

Therefore, to improve cooperation between European aquariums, it has been decided to set up a working group. The aim of the Sea Turtle Working Group is to continue to monitor the aquarium population and to jointly try to solve the questions that arise concerning the care of these animals. Monitor coordinators were appointed for the three most common species: Sidonie Catteau (Marineland, Antibes) for the loggerheads, Nicole Kube (German Oceanographic Museum Stralsund) for the hawksbills and Pablo Montoto Gasser (Zoo Aquarium Madrid) for the green sea turtles. Mark de Boer (Rotterdam Zoo), who is active both within the EUAC and EAZA, was asked to be the chair and the liaison between EAZA and EUAC. The working group has also become part of the EAZA Reptile Taxon Advisory Group.



A second workshop in the Greek Creteaquarium in 2018 was entirely devoted to drawing up Best Practice Guidelines for the various species kept in aquariums. The EAZA format was used as a guideline. Important points for discussion for the Best Practice Guidelines were husbandry standards, what the correct size is for aquariums where sea turtles are permanently resident, what lighting requirements the sea turtles have, nutritional needs for the different species, and common veterinary problems. All these issues were processed by Tom Baer, a student at the German Oceanographic

Museum in Stralsund. In addition to all the practical components, a lot of time was also spent on the literature review to describe the first part of the Best Practice Guidelines, the biology.

In June 2019, a third workshop was organised in Valencia to discuss the draft version of the BPG and to jointly try to answer the questions that had not yet been answered.

Important themes concerning housing were the size and decoration of the basins, beaches and lighting. Enclosure sizes are set to satisfy the need of the turtles to show natural behaviours at all ages. Dimensions in aquariums and other animal habitats are always subjective and depend on best practice husbandry experiences and recent literature. The minimum space requirement set for each turtle with a straight carapace length measurement greater than 65cm is nine times the length of the carapace by four times the width of the carapace, with a minimum water depth of 2m. Tank size should allow for natural behaviour, easy movement and the ability for the turtle to dive. Examples for additional animals are listed in a table in the guidelines.

Another important theme is the decoration of the aquarium. Theming the enclosure should provide hiding spaces and must be sea-turtle-proof. Any materials must be able to withstand the strong bite of the turtles. Sea turtles live most of their life in water and therefore do not need a large dry surface. However, it is mandatory to provide a beach for the female turtles to give them the opportunity

to dig nests and to limit the risk of egg retention.

Frances Baines (UV Guide UK) has helped extensively with the subject of UV lighting in indoor facilities. At the moment there is very little scientific evidence to support husbandry recommendations on this subject. Current suggestions are based upon work with large terrestrial tortoises, the literature about UV-B radiation and vitamin D, and basic lighting practices used in other areas of reptile husbandry. We urgently need zoos to conduct trials with full spectrum lighting. When taking routine health checks involving blood sampling, it is highly recommended to also run tests for serum 25(OH) D levels as standard. In the best cases, direct access to natural light is recommended.

In addition to the husbandry issues, the process of obtaining animals proved to be an interesting topic. Beyond the protection status of these species and the resulting regulations, everyone agrees that permanently keeping wild-caught sea turtles in an aquarium is not appropriate in a modern zoo. Even if setting up an *ex situ* population management programme to build a sustainable population could be possible, the conservation status of these species requires as a priority the implementation of measures such as nest and habitat protection. The working group therefore discourages the permanent placing of healthy wild sea turtles in aquariums. However, the feeling is that rescue centres frequently have overcrowded facilities and that there might be little communication between them and aquariums. It could be interesting to improve this joint work – in accordance with the regulations – by hosting non-releasable animals or offering the use of our large tanks prior to release, with all the implications that has for educational projects.

The Sea Turtle Working Group has scheduled a new workshop for June 2022 in Antibes, France. We invite all sea turtle holders to participate in this workshop. The topics that will be covered will follow in the coming months, but anyone who is interested can contact the working group and will be kept informed about the exact dates and topics via the group's mailing list.

Table 1: Sea turtle population status

Species	IUCN Red List	Last assessed
Green Sea Turtle (<i>Chelonia mydas</i>)	Endangered (EN)	2004
Loggerhead Sea Turtle (<i>Caretta caretta</i>)	Vulnerable (VU)	2015
Hawksbill Sea Turtle (<i>Eretmochelys imbricata</i>)	Critically endangered (CR)	2008
Kemp's Ridley Sea Turtle (<i>Lepidochelys kempii</i>)	Critically endangered (CR)	2019
Olive Ridley Sea Turtle (<i>Lepidochelys olivacea</i>)	Vulnerable (VU)	2008
Flatback Sea Turtle (<i>Natator depressus</i>)	Data deficient (DD)	1996
Leatherback Sea Turtle (<i>Dermochelys coriacea</i>)	Vulnerable (VU)	2013

Table 2: Sea turtle population in European aquariums

Species	Numbers	# Institutes
Green Sea Turtle (<i>Chelonia mydas</i>)	35	26
Loggerhead Sea Turtle (<i>Caretta caretta</i>)	33	18
Hawksbill Sea Turtle (<i>Eretmochelys imbricata</i>)	26*	7

*Including 13 animals at Coral World Underwater Observatory Eilat – Israel

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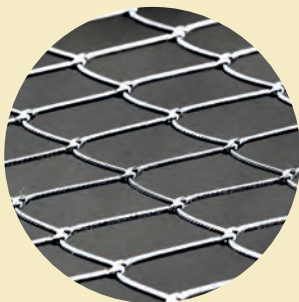


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