European Association for Aquatic Mammals

OCEANOGRÀFIC VALÈNCIA

MARINE MAMMALS IN NEED

Let People know we are part of the solution

Proceedings of the

EAAM 51st annual symposium

Oceanografic – Valencia

7th – 11th of March

European Association For Aquatic Mammals

Rue de la Science 14b, 1000 Brussels – Belgium – information@eaam.com

Conference sponsors

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- Daniel Garcia Parraga, Silvia Tecles, Tamara Fuentes, Pablo Garcia - *Oceanografic*

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- Manuel García Hartmann
- Annalisa Zaccaroni
- Barbara Biancani
- Isabelle Brasseur
- Martin Böye

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A letter from EAAM President

Dear colleagues and friends,

This is not only the 51st time EAAM gathered to share friendship and expertise but also the 1st time we have managed to do it in person after the pandemic started. Yes! Finally!

The staff and volunteers at Oceanogràfic de Valencia, our host institution, did a magnificent job during the meeting. Covid did sabotage 3 times the organization of the conference in Valencia, but they did not give up! Thank you for your continuous support and for being great hosts!

Our President Elect, Martin Böye, put also a ton of energy to lead the Organization Committee to assure continuity in this new post-Covid chapter of EAAM. His enthusiasm and fresh ideas will make a difference for our association.
I also have to acknowledge the fantastic job the Scientific Committee did selecting the topics and organizing the program. This task was also possible thanks to all authors that presented their top-quality abstracts.

2022 was time to move forward and saw us renewing the MoU with EAZA, a very important achievement that recognizes EAAM expertise; and promoting our social media accounts (Instagram - @eaam_org; Twitter - @EuropAssAquMamm; LinkedIn) through our Communication Committee. However, we experienced how war can affect marine mammals too. We got together to support marine mammal facilities in Ukraine in an unprecedented action lead by our association and provided financial support to assure nutrition of several marine mammal species affected by the conflict. All our actions and commitment to marine mammals has also led us to create the “Marine Mammal Emergency Response Fund”. Definitely, together we are stronger!

2023 is full of ideas to materialize, and I hope you enjoyed the meeting as much as I did. This Symposium proved once again we are the experts and leaders in marine mammal care, science, education, and conservation. We are part of the solution!

Guillermo J. Sánchez Contreras
EAAM President

A letter from EAAM President Elect

Dear Participants, dear colleagues, and friends,

The 51st symposium of the EAAM has been a great opportunity to gather our community again after two years of digital conferencing.

At a personal level, it has been an honor to collaborate with our committees, sponsors and with our incredible host, Oceanogràfic, in order to prepare this once in a year event. I'm taking this opportunity to thank again everyone that contributed to this success.

More than a hundred of biologists, husbandry specialists, veterinarians, technician, educators that dedicate their time to increase our scientific knowledge, the level of care of aquatic mammals both ex and in situ and the protection they deserve, gathered in Valencia to share their expertise and passion.

Forty-eight presentations, ten posters, many discussions during lunch and coffee breaks turned this event in a unique three days brainstorming session that we hope gives everyone energy and ideas to keep on exploring and sharing on aquatic mammals.

Through our institutional members, thanks to our professionals, we can reach and inform millions of individuals, with the complicity of animals - ambassadors of their environment - touch emotionally and turn citizens in, not perfect, but effective environmentalists. Everyone and every positive move toward more respect for aquatic mammals' life and environment is a step in the right direction.

Four invited speakers brought inspiring thoughts on how, based on the excellent work done by our members, we can increase our impact and actions as we are more and more challenged by the society. We have a responsibility, we do good, we need to challenge ourselves, we can be creative, do better and more.

Four round tables on our conservation, on animal care - in our institutions thanks to our animal daily life specialists - and in the wild, where our expertise is needed to help marine mammal in difficult situations, and on how to better pass relevant environmental inspiring messages were organized with this thought in mind.

Dear members of the European Association for Aquatic Mammals, I wish to see you next year for our 51st symposium and meanwhile, don't forget, the Ocean is your hands, let people know we are all part of the solution !

Martin Böye
EAAM President elect

Conference program

WEDNESDAY - 8 March 2023

08:30	EAAM Registration
09:00	Official Symposium opening
09:30	→ Ignacio Gimenez – Conservation in action KEYNOTE SPEAKER
10:15	Lessons learned from Antillean manatee's reintroduction project in Guadeloupe, French Lesser Antilles by N. Rożniewska Satellite tracking of rehabilitated grey seal pups (*Halichoerus grypus*) in the Baltic sea: determination of survival and adaptation by L. Lupeikaite
10:45	Coffee Break
11:15	In-situ actions of Marineland Côte d'Azur with cetaceans in difficulties: a recap of 2022 by I. Brasseur Attending cetaceans in need by Aquarium Mar del Plata by A. Faiella (Video) The stranding of seven killer whales and how Mar del Plata Aquarium participated in the event by A. Saubidet (Video) Operation Beluga – August 2022 by I. Brasseur (Video) Significant improvements in population welfare in four marine mammal species in zoological settings by M. Böye The French debate on cetaceans in human care (Season 8 coming soon) – What we learned so far ! by M. Böye Utilizing social media effectively to support conservation and education efforts by McBride
13:00	Lunch
14:30	→ Jo Ruxton - A plastic ocean initiative - KEYNOTE SPEAKER
15:15	Up to new ventures Cetacean research at Zoo Duisburg by K.Ternes Management and care of blind animals, a short talk by S. Salido Treatment of walruses with abrasive tusks with exposed pulp cavity by a closed extraction technique, a short talk by Y. Debosschere A new service to perform pharmacokinetic studies in marine mammals: a real need to determine safe and effective treatment regimens dealing with disease. A short talk by P. Morón-Elorza Lead intoxication in bottlenose dolphins (*Tursiops truncatus*), an update. Part 1: tissue concentrations by G. Sanchez-Contreras First report of *Orthohalarachne diminuata* (*Acari: Halarachnidae*) in a captive South American sea lion (*Otaria flavescens*): clinical and pathological data, mite identification and implications on future diagnostics. A short talk by D. Ebmer Exploring the potential vector role of the seal louse: X-ray microCT-based 3D in situ visualization of seal heartworm (*Acanthocheilonema spirocauda*) larvae inside *Echinophthirius horridus*. A short talk by D. Ebmer.
16:30	Coffee Break
17:00	ROUND TABLES Conservation Consortium - L. Von Fersen Marine Mammal Presentations - A. Gonzalez
19:30	Free Dinner

Conference program

THURSDAY - 9 March 2023

8:30	EAAM Registration
9:00	→ Andreas Fahlman - Global Diving KEYNOTE SPEAKER
9:45	Ontogeny of echolocation in bottlenose dolphins (Tursiops spp.). A short talk by F. Jakobsen, Cetoscope, the Rosetta stone to understand dolphin communication. A short talk by B. Ecalle Can we learn about narwhal (Monodon monoceros) communication from belugas (*Delphinapterus leucas*)? A short talk by A. Ames Studying acoustic communication in manatees (*Trichechus manatus manatus*) under human care and potential applications for the conservation of wild populations by A. Charles Cheap and effective : a new biotag to identify dolphin callers within a group of dolphins by A. Gallo Acoustic behaviour in bottlenose dolphins during two different target discrimination tasks by A. Hernadez Sanchez
10:45	Coffee Break
11:15	The "Baby Sd": a powerful training tool for calves and moms by N. Issenjou Ten years of using the trained "copy" Sd to test the imitative capacities of Killer Whales (*Orcinus orca*) at Marineland Antibes France. by O. Charles The other side of the disease by A. Rincon (Video) Two clinical cases of gastroenteritis in captive polar bears (*Ursus maritimus*) by A. Quievy Research: a time to enjoy. A short talk by J.L. Bernabeu, Development of Pulsometer. A short talk by D. Peula-Navarrete, Presence of unidentified coronavirus in feces in a harbor seal (*Phoca vitulina*). A short talk by C. Infection by M. morganii and concurrent renal crassicaudiasis in a Cuvier's beaked whale (*Ziphius cavirostris*) stranded in Italy. A short talk by U. Romani Cremaschi Towards understanding host-pathogen dynamics of Cetacean Poxvirus: attainable approach through the application of a repetitive non-invasive skin sampling in bottlenose dolphins (*Tursiops truncatus*) under human care by S. Segura-Göthlin
13:00	Lunch
14:30	Human faces discrimination in bottlenose dolphins (*Tursiops truncatus*) by F. Corrias (Video) Extinction burst: Young beluga vomiting from blowhole by N. Cortezón Collazo (Video) Voluntary for stomach washing and aspiration with bottlenose dolphins (*Tursiops truncatus*) at Zoomarine Rome by O. Henriques Northern Seas: an ecosystem of coexistence by L. Leopardi Causes of cetacean mortality in Northern France from 1995 to 2020 by A. Quievy Cetaceans by-catch impact on the coast of Valencian Community.by J.L. Crespo Picazo Incidence of Brucella ceti on Belgian and North French coast between 1995 and 2020 in stranded harbor porpoises (*Phocoena phocoena*) by T. Gregoire
16:30	Coffee Break
17:00	ROUND TABLES Live strandings - M. Garcia Hartmann and M. Böye Gating Training - J.L. Arenarez
18:30	Annual General Meeting

Conference program

FRIDAY - 10 March 2023

8:30	EAAM Registration
9:00	→ Alejandro Grajal (CEO Seatle) - Future of Zoos and Aquaria KEYNOTE SPEAKER
9:45	How to define an animal welfare strategy and its relevance for all marine mammal facilities. The Oceanogràfic model by D. Garcia-Parraga Dolphin-Welfare Evaluation Tool (WET): Current Status and Future Digital Development by K. Baumgartner Cognitive foraging enrichment (but not non-cognitive enrichment) improved several longer-term welfare indicators in bottlenose dolphins by I. Clegg Evaluation of 7 years of enrichment in bottlenose dolphins (*Tursiops truncatus*) by F. Corrias
10:45	Coffee Break
11:15	Ocular health in bottlenose dolphins (*Tursiops truncatus*) under human care by S. Dryer A bottlenose dolphin *(Tursiops truncatus*) with a multimetastasic ocular melanoma by G. Sanchez-Contreras Lead intoxication in bottlenose dolphins (*Tursiops truncatus*), an update. Part 2: from pellets to urine. Estimation of absorption and excretion.by E. Eusebio Gut microbiome of stranded harbour seals (*Phoca vitulina*) admitted for rehabilitation. by A. Rubio Garcia Problems experienced in taking impressions of tusks for protective crowns, the failure of zirconium and success of CoCr crowns in the walrus (*Odobenus rosmarus*) by Y. Debosscherre Congenital disorders in harbour (*Phoca vitulina*) and grey seals (*Halichoerus grypus*) admitted into rehabilitation from the Dutch Wadden sea by S. Feher Highly malignant mammary gland carcinoma in a female patagonian sea lion (*Otaria flavescens*) by T. Alvaro-Alvarez
13:00	Official Symposium Closure and Press Conference
13:30	Lunch
15:00	OCEANOGRAFIC Visit

Ignacio Jimenez - Keynote Speaker

Tuesday, 8th March, 09:30h

Conservation in Action

Ignacio Jiménez is a Spanish biologist with three decades of experience in conservation. He worked with manatees in Central America, golden-crowned sifakas in Madagascar, and protected areas in El Salvador and Brazil. He also carried out a national assessment of the Spanish experience in endangered species recovery. Between 2005 and 2015 he designed and coordinated the largest reintroduction program in the Americas, with species as the giant anteater, pampas deer, tapir, peccary, green-winged macaw, and jaguar. He spent one year in South Africa in order to learn about how conservation organizations manage and integrate nature reserves, rewilding and ecotourism.

He presently works for Frankfurt Zoological Society where he coordinates a project aimed to promote, expand and improve protected areas in Spain. His most recent publications focus on how to improve conservation programs and organizations, as reflected in his recent book “Effective Conservation: parks, rewilding and local development”. Ignacio is also member of the IUCN Conservation Translocation Group, and a National Geographic Explorer.

Jo Ruxton - Keynote Speaker

Tuesday, 8th March, 14:30h

A Plastic Ocean - Outreach and Awareness

Jo's seven years with World Wildlife Foundation (WWF) Hong Kong Jo Ruxton established their marine conservation program that started in 1990. She left HK to work at the BBC Natural History Unit and contributed to celebrated The Blue Planet production team.

Over the past 18 years she has been involved in numerous underwater filming projects around the world, from Antarctica to the pristine reefs of the Caribbean and the Pacific Ocean.

In 2009, after leaving the BBC, she began to raise funds to make a documentary about the problems of plastic in the worlds' oceans and co-founded the Plastic Oceans Foundation. The internationally award-winning documentary feature film, 'A Plastic Ocean', was completed in 2016 and has been distributed globally since January 2017.

Together with her colleagues, she is currently taking the message of the film forward through education and science programs. She gives presentations around the world to students of all ages, members of the public, businesses and corporations to raise awareness of the plastics issue and to create a legacy for the film.

Andreas Fahlman - Keynote Speaker

Wednesday, 9th March, 9:00h

Global Diving

Andreas Fahlman is a comparative physiologist who studies the physiological traits of diving. He has experience estimating field metabolic rate of marine vertebrates and tries to develop both ethically and logistically viable methods to estimate energy requirements in cetaceans through measures of body condition, or respiratory frequency.

He uses: what could be called “modern physiology”, where tools of other disciplines such as biochemistry, molecular biology and mathematics are applied to complement physiological data. This interdisciplinary approach enables a more complete picture of the mechanism to solve central physiological questions.

He works with animals in human care to develop and validate new tools that are used for conservation research in wild populations.

Alejandro Grajal - Keynote Speaker

Thursday, 10th March, 9:00h

The Future of Zoos and Aquariums

Alejandro became the eighth leader of Woodland Park Zoo in its 117-year history, assuming the helm in May 2016. He is internationally known for his vision to define a new relationship between humans and nature by helping to restore the deep, affective bond between people and animals. He advocates for zoos as the best community institutions to create a social movement for conservation, to foster science learning beyond the classroom, and to ensure that all people have access to nature, regardless of socioeconomic background.

A noted author, Alejandro's publications include 45 peer-reviewed books, chapters, and scientific and popular articles covering topics which span the psychology of conservation, measuring the impact of environmental education, the sustainable use of natural resources and ornithology, among others. He leads the Climate Literacy Zoo Education Network (CliZEN), a coalition of zoological institutions, universities and NGOs. He has also participated in protected-area planning and conservation policy with the United States Agency for International Development, the Global Environment Fund, the World Bank and the European Union. In 2016, Trustees of the Chicago Zoological Society awarded him the prestigious George B. Raab Medal for Conservation Leadership, recognizing his lifelong contributions to environmental and species protection, and inspiring future generations of scientists and leaders to tackle big questions about living harmoniously with all beings on the planet. In his spare time, he is an accomplished wildlife artist whose work has been exhibited in galleries in major cities.

Alejandro earned his undergraduate degree in ecology from Simón Bolívar University in Caracas, Venezuela and his PhD in zoology from the University of Florida.

Round Tables

Tuesday, 8th March, 17:00h

Conservation consortium

Lorenzo Von Fersen

Invited speakers: M. Böye, D. Garcia Parraga, J. Neves, A. Lopez Goya

Lorenzo von Fersen is an Argentinian biologist who spent time working with animals in his home country. He has now lived in Germany for over 40 years and currently works at Nuremberg Zoo, where he coordinates research and species conservation projects.
The protection of aquatic mammal species has been an important concern for him for over 30 years, he coordinates numerous projects, especially in Latin America. In recent years, his main focus has been to promote species conservation along the One Plan Approach.

The conservation status of many small cetacean species and especially the persistent rapid decline of many populations has led to a paradigm shift in recent years regarding their conservation. While in the past the focus was mainly on In-Situ conservation, now - thanks to the One Plan Approach of the IUCN - an integrated approach is required to save species from extinction. Within this framework, ex situ management not only has a very important role to play, but every institution that holds animals in its care should be aware of the increasing responsibility they have. This roundtable will define the different roles that dolphinaria will have to play in the future. It is important to understand that active intervention and participation in the frame of integrated conservation efforts will be our main job. Finally, this Roundtable is intended to provide defined measures of engagement in small cetacean conservation in the future as a self-obligation for all members of EAAM.

Live Strandings

Martin Böye & Manuel Garcia Hartmann
Invited speakers: M. Aczel, I. Brasseur, A. Van Den Berg, J.L. Crespo, M. Niemeyer, S. Johnson, L. Terraube

Manuel Garcia Hartmann is a veterinarian working with animals in human care and has gained experience in rehabilitating wildlife since graduating from veterinary college in 1989 and getting its postgraduate specialization in zoo and wildlife medicine in 2002.
He is an expert in marine mammals and zoo animals medicine and in wildlife rehabilitation.

Martin Böye, biologist and curator is interested in marine mammal science, care and welfare and co author of several peer reviewed publications in the field. Active in promoting the role of modern zoos and aquaria in science and conservation, one of his actual goal is to make zoological institutions know-how and expertise more available to contribute to wildlife in situ care and welfare.

Dolphins and whales are known to have stranded since centuries. But in recent times, while we live the human-induced sixth mass extinction of animal species, we also have new communication means with an unprecedented outreach. Attempts to save the animals' life attract high expectations from our citizens and deserve to be met with the highest standards and level of organization.
These stranded or distressed cetaceans cruelly become ambassadors of their species and their entire ecosystem and should be opportunities to convey messages on the need to protect our oceans.

Recent cases in France showed disparity in the way NGO's, authorities or professionals from the zoological community manage such events. Different levels of coordination, historically separated networks, lack of experience or protocols may affect the needed efficiency and can lead to postponed decisions as well as a waste of energy and resources.

By organizing this round table, we wanted to have international field experts and decision makers around one table, and wish to gather and compare differences in know-how, such as the existing experiences in dolphin medicine, field interventionists or zoological experts. The intention of the round table is to produce a set of recommendation which help management of live-stranded animals.

Round Tables

Tuesday and Wednesday, 8th and 9th, 17:00h

Marine Mammal Presentations

Adrian Gonzalez

Adrian is the director of training at l'Oceanografic Valencia with extensive experience in the training and care of cetaceans.
Having previously worked with orcas at Marineland Antibes in France, as well as both dolphins and orcas at Loro Parque in Tenerife - Adrian is committed to the importance of sharing these wonderful animals with the public as well as learning what we can through research in order to protect their wild counterparts.

Communication with our visitors is one of the fundamental values to capture their attention and continue gaining followers in parks with a controlled environment.
We see more and more presentations with clearer messages about conservation, research, education or training in them and how important they are for their welfare.
Debating the innovation and the trend that we want to take in the coming years is essential so that our visitors can capture the appropriate and real message of the conservation of our system.

Gating Training

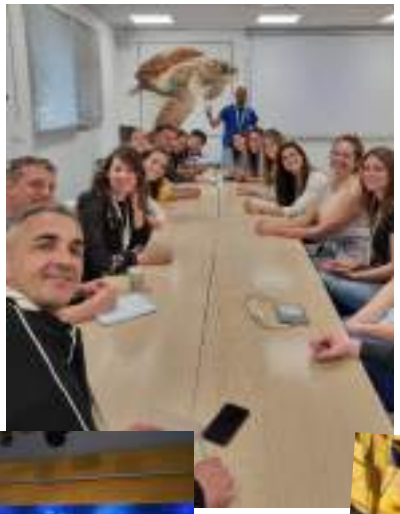
J.L Arenarez

Juli Arenarez is the head trainer of the Oceanografic dolphin team who has been working with bottlenose dolphins for over twenty years.
Her expertise and experience allows her to accurately interpret animal behaviour and problem solve in training.

Nowadays, the good management and movement of our animals within their facilities is increasingly important. Practicing safe cleaning, moving animals to medical pools or due to social variability of our individuals, being able to separate or socialize at the appropriate times are examples of the importance of being able to use all parts of the facility without any restrictions.
But what happens when an animal is not able to go through a door? How do we solve all the problems that can arise when the animals enter the blocking phase? Let's share experiences in order to improve.

ABSTRACTS

Let People know we are part of the solution



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Lessons learned from Antillean manatee's reintroduction project in Guadeloupe, French Lesser Antilles

Rożniewska, N. (1) *

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Antillean manatees (*Trichechus manatus manatus*) were extirpated in the Lesser Antilles in the early 20th century.
In 2007, Guadeloupe National Park initiated the project of manatee's reintroduction. Its objective was to re-create the population of Antillean manatees in the former site of their distribution in Grand Cul-de-Sac bay and to contribute to the conservation of the species.
In 2016, two males were translocated by plane from Singapore Zoo. Health assessment prior to loading consisted of visual examination, body measurements (weight, total curvilinear and straight length, girth at umbilicus, axilla, and peduncle), blood analysis (CBC and biochemistry), and ultrasound fat tissue measurement.
The same assessment was repeated 7 weeks post-release and revealed severe kidney insufficiency in one manatee, who died two days later. Necropsy, post-mortem histopathology, and symmetric dimethylarginine (SDMA) analysis from frozen serum samples collected in Singapore confirmed chronic kidney disease as a cause of death.
Subsequently, public support for the project dropped from 82% in 2012 to 65% in 2017. The project was stopped in 2018.
This first experience shows that veterinary assessment should take place before the translocation plans and include serum SDMA and fructosamine analysis to enable a better choice of suitable candidates.

Satellite tracking of rehabilitated grey seal pups (*Halichoerus grypus*) in the Baltic sea: determination of survival and adaptation

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The doctoral studies research aims to determine rehabilitated Baltic grey seal pups (*Halichoerus grypus*) survival and adaptation in their natural environment and provide recommendations for the protection of the species. Moreover, it is the first step of evaluating the usefulness of satellite transmitters for rehabilitated seals monitoring in the Baltic sea. Over a period of three years 30 rehabilitated seals will be released with satellite transmitters (SPLASH10-F-297 manufactured by Wildlife Computers) attached to their fur, gathering seal‘s locations and dive depth. According to these data, vertical and horizontal movements, ontogeny of diving behaviour, foraging areas and overall habitat use will be evaluated.
The first 8 rehabilitated and tagged seals were released in September 2022 and are currently being tracked. Based on the preliminary results, adaptation of the pups is progressing successfully. The pups did not gather in groups and dispersed one by one, although they were released together. Most of the individuals have already settled in the southwestern part of the Baltic sea, while the others - in the western Gotland and the Gulf of Gdańsk. Furthermore, they spend~80 % of time diving, which suggests that the animals are in a good physical condition and actively foraging.

In-situ actions of Marineland Côte d'Azur with cetaceans in difficulties: a recap of 2022

Brasseur, I.* (1)

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The year 2022 has been a remarkable year, in France, with an exceptionally high number of cases of erratic marine animals. The episodes of the orca and a few months later the beluga in the Seine made the headlines of the national and international media. Immediately after, an important number of strandings occurred; whales on the Britany's coast, a solitary dolphin along the French Riviera and a walrus observed from the Channel to the Seine-Maritime continued to challenge the institutional structures in charge of those events.
For some of those cases, Marineland offered its expertise in terms of veterinary medicine, zootechnics, operant conditioning and communication. Despite the current anti-captivity climate of the last decade, Marineland skills have been welcomed with respect and consideration by the state institutions, the NGO's and the citizens. A unique opportunity to convince that zoos are part of the solution!

Attending cetaceans in need by Aquarium Mar del Plata

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Video

Mar del Plata Aquarium is a well known and established facility in Argentina.
The park has a very active Marine Fauna Rehabilitation Center. The team has participated in thousands of rescues and rehabilitation efforts involving marine mammals and other marine species, and it is a fundamental organization in conservation efforts in the country. Despite all the effort and energy, sometimes it is not possible to save all animals but the knowledge and professionalism of the specialist forming part of Zoos and Aquariums is fundamental to assure the best chances to succeed in these types of events.
In this video, we present the actions taken during the stranding of a young humpback whale (*Megaptera novaeangliae*) and two orcas (*Orcinus orca*) in need that occurred in 2018 and how collaboration with the authorities and other actors can be beneficial for wildlife conservation.

The stranding of seven killer whales and how Mar del Plata Aquarium participated in the event

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Video

On September 16th, 2019, the team at Mar de Plata Aquarium, Argentina, received a call notifying them about the stranding of seven killer whales (*Orcinus orca*) 30 km North from the city. The initial information about the incident was uncertain. When the staff of Aquarium's Marine Fauna Rehabilitation Center arrived at the location, they found the stranded animals distributed along 250 meters of beach. Almost all cetaceans were lying on their body side showing difficulty breathing. Their blowholes were either under the water or exposed directly to the waves. The first action was to put every animal right on their belly. Sadly, it was too late for one of them. With the help of coastguards and volunteers the remaining six orcas were driven back to the sea until they all swam off the shore.

This was the first multiple stranding event registered for orcas in the province of Buenos Aires. The necropsy of the dead animal showed signs of decompression sickness. Hydro acoustic prospection activities carried out over those days and around the area may have played a big role in this event. This is an example of how professionals of our field can contribute to rescue and rehabilitation efforts.

Operation Beluga –August 2022

Video

Brasseur, I.* (1)

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A beluga is reported in the Seine at the beginning of August 2022! It will gradually become the major center of interest of the general public in France. A rescue operation, "Operation Beluga", is launched in an attempt to help this weakened cetacean.

The network, expertise, vital forces and material of several European marine zoos played a key role during the intervention.

Despite the death of the animal, this unprecedented event in France was a unique opportunity to show the interest of bringing together actors from various backgrounds (State and institutional, zoological structures, animal experts and associations), around a common objective : attempting to save an animal.

A look back at an extraordinary and instructive experience.

Significant improvements in population welfare in four marine mammal species in zoological settings

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A long-standing debate around animal welfare in zoos has been the focus of legislative changes to ban the management of marine mammals. Albeit with little empirical evidence, the assumption of shorter life expectancies ex-situ compared to those in the wild has raised the notion that zoos provide suboptimal conditions. Given the growing debate, science-based decisions will help effective legislative changes and ensure better implementation of animal care. In humans, improvements in societal and well-being have been linked with increases in two demographic measures: life expectancy and lifespan equality. We applied them at the population level for the harbour seal (*Phoca vitulina*), California sea lion (*Zalophus californianus*), polar bear (*Ursus maritimus*), and common bottlenose dolphin (*Tursiops truncatus*), including 8,864 animals held in zoos from 1829 to 2020. We found that life expectancy and equality increased for the four species. Overall, life expectancy increased from 4% to 237%, and juvenile mortality shrunk from 31% to 7%, depending on the species. Life expectancies of animals living in zoos currently are 123 to 406% longer than those of their wild counterparts. These significant improvements at the population level occurred concurrently with advances in zoo practices focusing on nutrition, enrichment, veterinary treatment, and population management.

The French debate on cetaceans in human care (Season 8 coming soon) – What we learned so far!

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In March 2015, French parliamentarians, based on information received from several associations, asked for the prohibition of cetaceans in human care.
There, followed by a multitude of episodes worthy of the best series with their share of reversals, dramas narrowly avoided, political declarations, heated discussions, and twists.
Over the course of this "feuilleton", politicians, several ministers, activists, journalists, scientists, media stars, lawyers, conservationists, polemicists, lobbyists have tried to influence decision-makers on what should be the future of dolphins and orcas in zoos.
In November 2021, more than seven years after the start of the whole story, a law passed which leaves the door open to different interpretations and will be followed by further discussions leading to a more formal legal framework.
During this journey, lessons have been learned, strategies, some more effective than others, have been tried.
This presentation aims to share what has proven useful, but also some thoughts on the societal expectations on animal welfare and wildlife protection that the zoo community, particularly in relation to marine mammals, must anticipate better.

Utilizing social media effectively to support conservation and education efforts

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In recent years, social media has risen from being something that ran in the background of our lives, to a force that is very much at the forefront of our days. In many cases, social media can be used to spread misinformation and promote propaganda. We are all familiar with the backlash from certain smear campaigns that has left many of us feeling disheartened, frustrated, and burnt out. As a result, the response from many marine mammal facilities and individuals has been to avoid using it for fear of the repercussions.
So how do we use social media to help marine mammals in need? Through running my personal social media platforms for over four years, educating about potentially the most controversial marine mammal species in human care – the killer whale, I have learned how to navigate the online world and harness it to our advantage. How to connect to the public through posts, as well as present information in both an educating and engaging way.
By giving institutions and passionate individuals their voice back, while harnessing the power of SEOs and KPIs, we can foster organic connections that have a lasting impact and give hope for the future.

Up to new ventures – cetacean research at Zoo Duisburg

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Since 1949 Zoo Duisburg in Germany is keeping marine mammals under human care.
Next to polar bears (*Ursus maritimus*), West Indian manatees (*Trichechus manatus*) and seven species of pinnipeds, Beluga whales (*Delphinapterus leucas*), Guiana dolphins (*Sotalia guianensis*), Commerson dolphins (*Cephalorhynchus commersonii*), Amazonas River dolphins (*Inia geoffrensis humboldtiana*), Harbor porpoises (*Phocoena phocoena*) and bottlenose dolphins (*Tursiops truncatus*) were housed.
Four cetacean species were maintained for many decades, one unique in Europe, and were and are subject of various research projects. Many scientists were able to gain valuable results in fundamental research, many of them applicable to conservation projects.
This oral presentation provides a historic overview of what has been achieved and emphasize the importance of ex-situ research.

Management and care of blind animals

Short talk

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In the presentation we show the case of two female Patagonian sea lions with different states of blindness. After the progressive degeneration of sight in adulthood due to different medical pathologies, these animals have had to go through a process of re-education in day-to-day handling compared to their life before blindness these involve individual and group control, enrichment, medical controls.
All the above had to be rethought and adapted for these animals in order to facilitate and improve their well-being by enhancing their other senses such as hearing and touch.

Treatment of walruses with abrasive tusks with exposed pulp cavity by a closed extraction technique

Short talk

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Walruses (*Odobenus rosmarus*) have two modified enlarged aradicular hypsodont maxillary canines (tusks) and bunodont, brachydont premolars (theoretical dental formula I1-2/0, C 1/1, P3-4/3-4, M 0/0). Tusks are important in the social display, but even more important is to haul their bodies on the ice (from where their name “walking on teeth”). Additionally, they use their tusks together with their sensory vibrissae and passive acoustics to feed on benthic invertebrates.
In captivity, walruses tend to explore their hard-walled enclosure, leading to rapid wear off of the tusks which only have enamel on the tip and the rest is dentine, resulting in an open pulp with irreversible, necrotic and painful pulp (pulpitis). If not addressed at an early stage, this leads to an irreversibly painful condition resulting in infection and fistula formation.
Usually, the pulp cavity is rinsed with a sterile or antiseptic solution, but this cannot stop the advancing necrosis and certainly not the unavoidable ascending infection. Therefore, extraction is the only option. The most common technique is through a lateral alveolectomy.
This case report discusses a novel and less painful extraction technique, through a closed extraction. Which makes the recovery of the animal much quicker and less stressful.

A new service to perform pharmacokinetic studies in marine mammals: a real need to determine safe and effective treatment regimens dealing with disease

Short talk

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Aquariums can serve as vital research facilities for the study of marine mammals. They have contributed to our present knowledge in a wide variety of fields, including disease management and therapeutics. Disease management can be challenging in marine mammals since their diagnostic and therapeutic databases rely mostly on empirical data. Pharmacokinetic studies are the first step to generate safe and effective therapeutic protocols, as they evaluate drug disposition in the body. However, there are few published studies and extrapolated doses from domestic animal counterparts are commonly prescribed. Even for those drugs studied, sample sizes are often small. The objective of the project entitled "Pharmacokinetics in non-domestic animal species", established as a collaboration between the Complutense University of Madrid and the Oceanogràfic of Valencia, is to provide a platform to generate new relevant information in terms of drug pharmacokinetics, clinical and therapeutic management for non-domestic animals. To advance in treatment accuracy, different pharmacokinetic studies with antimicrobials, antifungals, and analgesics/anti-inflammatories are now being conducted in different taxa. Future collaborations with other institutions will help provide a wider variety of species and drugs to be tested and larger sample sizes in order to maximize therapeutic success in the animals under our care.

Lead intoxication in bottlenose dolphins (*Tursiops truncatus*), an update. Part 1: tissue concentrations

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No data exists regarding concentration of lead in tissues of intoxicated bottlenose dolphins (*Tursiops truncatus*) in human care due to the extremely rare and improbable occurrence of these events.
Following an episode of intoxication, which led to the death of 3 out of 5 affected dolphins, necropsies were performed, and tissue samples from blubber, brain, kidney, liver, muscle, and skin were submitted for analysis. Results showed that Pb can be found in the blubber of intoxicated animals, with dolphin 1 showing the highest concentration. As expected, high levels of Pb were found in the brain, kidney, and liver samples. Unexpectedly, the skin samples analyzed contained concentrations comparable to those observed in the liver and kidney though. Pb concentrations in brain samples, evaluated in three different areas of the cerebrum, highlighted differences among the three animals, which could correlate with the severity of neurological symptoms observed during the intoxication.
The present work allows us to better define the distribution of Pb during an acute intoxication in dolphins in a managed setting, identifying skin as a potential marker to be used for Pb intoxication diagnosis. This information can be of help in similar cases affecting wild populations.

First report of Orthohalarachne diminuata (*Acari: Halarachnidae*) in a captive South American sea lion (*Otaria flavescens*): clinical and pathological data, mite identification and implications on future diagnostics

Short talk

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Large endoparasitic mites of the genera Halarachne and Orthohalarachne (*Acari: Halarachnidae*) parasitize the respiratory tract of marine mammals, including pinnipeds and sea otters. However, knowledge on occurrence of halarachnid mites infesting pinnipeds in zoological gardens is scarce.
A two-year-old South American sea lion (*Otaria flavescens*), born at the Vienna Zoo, was anesthetized for pre-transport examinations. During the final phase of general anesthesia, the individual abruptly became apneic and died despite all attempts at resuscitation. At necropsy, 45 highly motile structures were macroscopically detected in the lower respiratory tract and were identified as adult stages of *Orthohalarachne diminuata*. After trepanation of sinus paranasalis, 410 larval and nymphal specimens were detected. Macroscopically, sinus mucosa showed multiple petechial hemorrhages and histopathological analyses revealed mite cross-sections surrounded by sanioserous exudate and epithelial exfoliation. For the first time, *O. diminuata* was molecularly characterized and phylogenetically analyzed. This study constitutes the first record of *O. diminuata* in a captive *O. flavescens*.
We present clinical and pathological data and discuss the etiology of this autochthonous infestation. Further studies on occurrence and pathogenic effects of halarachnid mites, as well as on the development of non-invasive sampling techniques are essentially required for a better understanding of (ortho-)halarachnosis in pinnipeds.

Exploring the potential vector role of the seal louse: X-ray microCT-based 3D in situ visualization of seal heartworm (*Acanthocheilonema spirocauda*) larvae inside *Echinophthirius horridus*

Short talk

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The seal heartworm *Acanthocheilonema spirocauda* (Nematoda: Onchocercidae) parasitizes the right heart and pulmonary arteries of various phocids of the Northern hemisphere. Over many decades, potential vectors of this parasite have been discussed, and even to date, the life cycle is not fully known. Representing a stationary, permanent and hematophagous ectoparasite of phocids, the seal louse *Echinophthirius horridus* (Anoplura: Echinophthiriidae) has early been hypothesized to function as obligate intermediate host.
Using X-ray microCT imaging, we examined 11 adult female E. horridus specimens collected from naturally infested stranded harbour seals (*Phoca vitulina*) during a rehabilitation-period at the Sealcentre Pieterburen. Thereby, in three of these specimens, thread-like larvae were detected in insect organs. Detailed imaging of the most infected louse revealed a total of 54 A. *spirocauda* larvae located either in the fat bodies or in the hemocoel. Histological analysis of the same specimen illustrated nematode cross-sections and confirmed X-ray microCT data.
The current data strongly suggest *E. horridus* as natural obligate intermediate host in the marine life cycle of *A. spirocauda*. Moreover, we here demonstrate the potential of X-ray microCT-based imaging as a non-destructive method to analyze (intermediate) host-parasite interactions, especially in the neglected field of marine mammal parasitology.

Ontogeny of echolocation in bottlenose dolphins (Tursiops spp.)

Short talk

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Dolphins' exquisite echolocation abilities require elaborate acoustic neural processing skills and constitute a major sensory window for learning about the world. Little is known about how echoloca-tion develops in newborns.
We regularly recorded sound and behaviour of neonate bottlenose dolphins (*Tursiops truncatus and Tursiops aduncus*) during the first weeks after birth, for animals born both under human care and in the wild. Recordings with acoustic data loggers and hydrophone arrays, in synchrony with video observations gave detailed behavioural and acoustic data from mothers and calves. We found that dolphin neonates are born with the ability to produce echolocation clicks, and that clicks obtain the spectral and temporal structure of adults within the first three weeks of life.
The range-dependent modulation of source level and inter-click intervals found in adult dolphin bio-sonar seems to develop in calves already a few weeks post-partum. The rapid development of echolocation abilities strongly indicates that sensory input from biosonar can be used by neonate dolphins at a very young age.

Cetoscope, the Rosetta stone to understand dolphin communication

Short talk

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Bottlenose dolphins (*Tursiops truncatus*) are social marine mammals that communicate by using behavioural and acoustical signals (i.e. clicks, whistles and burst pulsed sounds). Because dolphins produce sounds without visual cues, until recently, it was impossible to ID the sounds' emitters in a group of wild dolphins swimming in a 3D environment. Thanks to our Cetoscope, now it is possible! This innovative device includes four hydrophones and six cameras and is able to simultaneously film the environment in 360° and to record the dolphins' sound productions. A posteriori, we are able to precisely localize the position of the sound source(s) and visualize it in the 3D marine scene.
We will briefly present an etho-acoustical analysis of a sequence involving 17 bottlenose dolphins in the presence of two passive observers. We will then discuss the benefits of using Cetoscope on different species and in various situations to help wild marine mammals' conservation.
The first version of our device was made possible because of the active collaboration with Parc Asterix dolphinarium (i.e. human and financial resources). To conclude, we will present how you could help our scientific project and contribute to the conservation of wild marine mammals.

Can we learn about narwhal (Monodon monoceros) communication from belugas (*Delphinapterus leucas*)?

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Short talk

Narwhals (Monodon monoceros) are social odontocetes endemic to the high Arctic. Like other odontocetes, narwhals are sound centered, relying heavily on acoustic signals for biologically criti-cal behaviors. However, narwhals are a difficult species to study given their elusive behavior and limitations associated with researching Arctic taxa.
Little is known regarding narwhal communication, but it may be possible to deduce information re-garding narwhal vocalizations from belugas (Delphinapterus leucas). The beluga is the only other monodontid species, and there are similarities across the two species' vocal repertoires. Here we provide an example:a female narwhal was fitted with an acoustic tag as part of larger studies on East Greenland narwhals. At the time of tagging, it became apparent that the female had a calf. While separated from her calf, the mother produced a highly stereotyped call, similar to beluga con-tact calls. Another stereotyped signal within the mother's acoustic record was identified as her calf's potential call, based on findings from beluga ontogenetic studies. This unique opportunity coupled with knowledge gained from previous research on beluga ontogeny resulted in new information on narwhal mother-calf communication, demonstrating the value of comparing information between species well managed in human-care and those similar species more difficult to study in the wild.

Studying acoustic communication in manatees (*Trichechus manatus manatus*) under human care and potential applications for the conservation of wild populations

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To build and to lead efficient wildlife conservation projects, it is absolutely mandatory to understand the behavior, cognition and ecology of the concerned species.
The Antillean manatee (*Trichechus manatus manatus*) is recognized to be a vulnerable taxon with a lack of scientific knowledge on its behavior, cognition and communication skills. The aim of our study was to investigate several aspects of captive Antillean manatees' acoustic communication in order to help populations management in wildlife parks. We first present a brief summary of experiments we conducted in two French zoological parks (i.e. ZooParc de Beauval and Paris zoological Park) on manatees' vocal behaviors. Our preliminary results suggest that their vocalizations are modulated by contextual and environmental factors and some vocal signals tend to act as call signals for conspecifics. We will then briefly introduce our field work in Mexican Caribbean on wild manatees. Finally, we discuss potential applications in wild settings and rehabilitation centers (e.g. presence detection of manatees, estimation of population size, animal welfare), and the benefits for conservation to build collaboration with zoological parks and local research labs.
This work is part of a PhD project funded by Beauval Nature Association and National Museum of Natural History, Paris.

Cheap and effective : a new biotag to identify dolphin callers within a group of dolphins.

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To study acoustic communication and its social functions is pivotal to associate signals to the vocalizing animal (caller). In cetaceans this is still an unsolved challenge, especially because they produce sounds underwater with no distinctive behavioral cues. Within the different techniques used to identify callers, bio-logging technology seems the most promising. Nevertheless, devices developed so far are not reliable in caller identifications and costly to be produced. Here we present a cheap acoustic tag that proved to reliably identify callers within a group of dolphins under human care. We tested its capabilities in both controlled and spontaneous contexts of vocal production. Results showed that our tag allowed a reliable association vocalization-emitter via qualitative analysis of sonograms and quantitative measures of amplitudes without suffering any effect of dolphins' body orientation/distance. Although the entire group was not simultaneously equipped with, it enabled efficient exclusion of individuals who were not the caller, thus indicating an effective identification if all the individuals were tagged.
To our knowledge, this is the first low-cost safe recording device that allows the identification of a vocalizing dolphin in a group under human care. Finally, this device could be promising in increasing our knowledge of dolphin acoustic communication.

Acoustic behaviour in bottlenose dolphins during two different target discrimination tasks

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Echolocation is an active sensory system that gives an acoustic representation of the surroundings by the animal emitting clicks, detecting and analysing echoes. However, little is known about dolphin biosonar in moving animals, as well as of the process of controlling click emissions, and the cues used by the animal to discriminate between different targets.
We studied how bottlenose dolphins may use their dynamic sound production and hearing abilities, along with head and body movements, to detect and classify objects through echolocation. We designed two different experiments with blindfolded bottlenose dolphins (*Tursiops truncatus*) swimming freely along the pool and actively discriminating between two targets of three different materials, and a second one to determine the capability to discriminate wall thickness differences in cylindrical targets of the same material. By means of synchronized cameras and hydrophones we observed clear differences between individuals of the same species in terms of ability to discriminate, but similar performance with the harbor porpoises in relation to the materials chosen with the difficulty of the task.
Studying how the dolphins solved a simplified echolocation task, allows a better understanding of the processes behind target detection and discrimination capabilities during natural biosonar circumstances.

The “Baby Sd”: a powerful training tool for calves and moms

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In all species, any newborn as well as mother-calf pairs may present huge challenges for trainers, like for example: A mom not taking care of the new-born or even being aggressive towards it, a cub which needs to be handled, gatings to other pools that must be done. These are all situations we have already faced or will face when having a newborn under our care.
Therefore, in a controlled environment, being able to start training the calf at an early stage may be key to success, to its mental and physical well-being; it will have an important impact on its development and whole life.
So, whether it is aimed at problem-solving or at effectively creating early positive experiences with trainers, a “baby retrieval” behavior taught to the mom becomes a powerful tool and contributes to build a triangular, trust-based relation: Mom <> Calf <> trainers.
Originally used just as a tool based on Premack’ principle to reinforce the mom, the language has been pushed further with orcas by L. Rubincam. It’s since been a saving resort with belugas and, now at Pairi Daiza, is a precious help in our management and care of walruses and Steller sea lions. The use of the “Baby Sd” brings serenity to our animals and our training team.

Best Training Presentation award 2023

Ten years of using the trained “copy” Sd to test the imitative capacities of Killer Whales (*Orcinus orca*) at Marineland Antibes France.

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Ten years ago, Marineland welcomed for the first time Maria Victoria Hernandez-Lloreda (2) and José Zamorano-Abramson (3) for a research project aiming at proving capacities of killer whales to imitate their counterparts by using the paradigm “do-as-other-does”. The animal team trained a new Sd called “Copy” bringing an individual to imitate familiar and novel actions performed by a conspecific demonstrator. In 2018, the same Sd did permit to prove that killer whales are, relatively quickly, capable of making recognizable copies of familiar and novel conspecific and human speech sounds. The motivation of the scientists, the animal team but especially the killer whales for this type of session, led us to take up again the research in 2020 with the imitation of familiar actions but, this time, after a latency ranging from 5 to 150 seconds interrupted by a distractor (non-target) actions performed by the demonstrator and by the subjects during the delay period. Not only this long-term study allows to produce experimental evidence for action and vocal imitation in the killer whales but it enriches the environment of the killer whales present at Marineland while helping scientists to study cognitive abilities that cannot be conducted in-situ.

The other side of the disease

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Video

Animal training is one of the most fundamental tools for animal welfare. But what happens when it cannot be used due to medical reasons?
Venus, one of our female bottlenose dolphins was diagnosed with autoimmune hemolytic anemia in November 2021 causing her many recurring behavioral lapses since then.
We will show all the procedures and techniques (variability, reinforcement, and enrichment) we used during this period, in order to turn this critical medical situation into a less invasive as possible experience, minimizing the negative impact and ensuring her welfare during this period.

Two clinical cases of gastroenteritis in captive polar bears (*Ursus maritimus*)

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Gastrointestinal problems are known in different species of bears including polar bears.
In October 2022, two captive polar bears presented severe lethargy, anorexia, vomiting and diarrhea. Blood samples taken by voluntary medical behaviour showed high levels of hepatic enzymes. The coprological examinations highlighted the abundance of Clostridium perfringens in both animal's feces.
C. perfringens is a normal inhabitant of the gastrointestinal tract of many carnivores, but it can also be associated with enterotoxemia and gastroenteritis.
The feces of polar bears were diluted 1/100 and 10µl of this dilution was inoculated onto a culture medium targeting gram-positive bacteria incubated anaerobically. With this method, only if there are large numbers of Clostridium in the intestines there will be growth and we presumed that such high concentrations would indicate pathogenicity.
A symptomatic treatment (maropitant, kaolin) and supportive treatment (Hepa supp®) were given in addition to antibiotics. After 5 days, the animals seemed better and started to eat again. During subsequent testing, no more anaerobic germs were found in the feces and blood values returned to normal.
With this case report we highlighted the positive role of medical training in the treatment of infectious gastroenteritis in polar bears. We believe that the voluntary medical training made the situation and the recovery less stressful for the animals.

Research: a time to enjoy

Bernabeu-Navarro, J.L. (1); Peula Navarrete, D. (2)

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Short talk

Nowadays, Zoos and Aquariums have an important role in the conservation of many species in the wild. Working together with scientists in the collection of data for different studies and research programs is what makes this mission possible.
This is why in Oceanográfic we spend a big part of our daily time working in these sessions.
As trainers, we know that positive reinforcement has the ability to convert practically any behavior into a positive consequence for the animals.
In this presentation we will talk about how our team works daily with this kind of research sessions, integrating them in a variable, new and surprising way, the reinforcing impact it has on our animals, and how this also helps us to guarantee the success in this type of behaviors and studies.

Development of Pulsometer

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To develop new devices in the field of research, the voluntary stake of animals living in controlled environments is necessary.
During this presentation we want to show the development of a physiological research project using heart rate and movement monitor from two different points of view. Researchers and trainers work together for a common good
On the one hand, we will see the desensitization process and on the other the results obtained during the development of this project.

Presence of unidentified coronavirus in feces in a harbor seal (*Phoca vitulina*)

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SARS-CoV-2 virus is the causal agent of the COVID-19 pandemic that has been affecting the world since January 2020. It is considered a pathogen of animal origin that has crossed the species barrier to affect humans. Since the beginning of the pandemic, several species had been naturally or experimentally affected by the virus, including pet, zoo and wild animals.
Here we present a *Phoca vitulina* that was positive in two different antigen tests against SARS CoV-2 in fecal samples that was impossible to isolate by PCR or other molecular methods. Therefore, we attempted next generation sequencing (NGS) to try to detect which microorganism was interfering in these antigen tests. This approach yielded 623,796 reads, but, after application of the quality and sequence length filters, and following removal of 54,085 reads that mapped with the seal genome, 116,637 high-quality reads remained (given the high number of small reads). These high-quality reads reflected the entire population of microorganisms present in the stool sample, with only 38,000 of them mapping to the SARS-CoV-2 consensus genome. When we analyzed these sequences, we saw that these regions are shared with other coronaviruses and this is why we obtained false positive in the antigen tests.

Infection by M. morganii and concurrent renal crassicaudiasis in a Cuvier's beaked whale (*Ziphius cavirostris*) stranded in Italy

Short talk

Romani-Cremaschi, U. * (1); Zoppi, S. (2); Mattioda, V. (2); Audino, T. (2); Marsili, L. (3,4); Varello, K. (2); Iulini, B. (2); Marra, C. (2); Zoccola, R. (2); Battistini, R. (2); Dondo, A. (2); Garibaldi, F. (5); Berio, E. (6); Pautasso, A. (6), Rosso, M. (7); Ascheri, D. (8); Casalone, C. (2); Grattarola, C. (2) ; Giorda, F. (2)

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(7) CIMA Research Foundation, Savona, Italy
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A juvenile male Cuvier's beaked whale (*Ziphius cavirostris*) stranded along the Ligurian coastline (Italy) and underwent a complete postmortem examination. Histopathological findings were consistent with a septicemic infection and concurrent renal crassicaudiasis. An M. morganii alpha-hemolytic strain was isolated in pure culture from liver, lung, prescapular lymph node, spleen, hepatic and renal abscesses, and CNS. Bacterial identification was achieved by matrix-assisted laser desorption ionization-time-of-flight mass spectrometry (MALDI-TOF MS) and confirmed by PCR (16S rRNA gene). Adult nematodes of the genus Crassicauda were observed in both kidneys. No other pathogens, including Morbillivirus, Herpesvirus, Brucella spp., and T.gondii, were detected by PCR or serology. Additional testing was performed to detect environmental pollutants and possible antimicrobial resistances (AMRs) of the M. morganii strain. A high load of organochlorines (OCs), particularly DDTs and PCB, was measured in the blubber, likely compromising the immune system and the health status of the CBW. On the other hand, the isolate did not show any major antibiotic resistance but reduced susceptibility to Trimethoprim-Sulfamethoxazole was observed, leading to consider it as a 'non-wild-type' for this antimicrobial.

Towards understanding host-pathogen dynamics of Cetacean Poxvirus: attainable approach through the application of a repetitive non-invasive skin sampling in bottlenose dolphins (*Tursiops truncatus*) under human care

Segura-Göthlin, S.* (1); Fernández, A. (1); Arbelo, M. (1); Almunia, J. (2); von Fersen, L. (3); Baumgartner, K. (3); Câmara, N. (1,2,4); Grande, F. (2); Felipe-Jiménez, I. (1); Colom-Rivero, A. (1); Sierra, E. (1)

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Zoos are proactively committed to developing new approaches in health assessments by embracing minimally invasive sampling methods and enhancing animal and management. Hence, implementation of cytology cell samplers as a non-invasive skin sampling device on 18 bottlenose dolphins housed in two facilities in the Canary Islands during 2019 was performed in order to isolate cetacean poxvirus in tattoo-like lesions through a real-time PCR based on the DNA polymerase gene. Samples were repeatedly collected over time from eleven tattoo-like lesions, and on apparently healthy skin to serve as a control from all the study animals.
From the total 55 skin samples obtained, detection of poxvirus was attained in 31 (56.36%); specifically, on 20 of 21 samples collected from tattoo-like lesions (95.23%) and on 11 of 34 samples acquired from apparently healthy skin (32.35%). Likewise, ten of the eleven dolphins that showed tattoo lesions housed in Facility 1 were positive to Tattoo Skin Disease while four dolphins held in Facility 2 were positive to cetacean poxvirus without ever showing clinical evidence of the disease.
Accordingly, further scientific research on cetaceans under human care could provide the knowledge to understand the host-pathogen dynamics of cetacean poxvirus and their effect on cetaceans' health.
To our knowledge, this is the first low-cost safe recording device that allows the identification of a vocalizing dolphin in a group under human care. Finally, this device could be promising in increasing our knowledge of dolphin acoustic communication.

Human faces discrimination in bottlenose dolphins (*Tursiops truncatus*)

Corrias, F*. (1) ; Perlado-Campos, E. (1); Santos, I. (1); Robaina, I. (1); Revert, P. (1)

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Video

Recognition of other individuals plays a fundamental role in the animal world, where each species can use different and unique cues to recognize other individuals.
It's known that bottlenose dolphins (*Tursiops truncatus*) produce individually distinctive signature whistles that broadcast the identity of the caller. It's also proven that captive bottlenose dolphins can discriminate individuals from their body, and they spontaneously discriminate human individuals visually using bodily rather than facial cues.
This study examines dolphin's ability to discriminate between human faces by training.
A bottlenose dolphin called Nilo was subjected to two experiments. He was asked to recognize the target trainer when paired with one of four other trainers through partial visual cues of their body. He learned to discriminate with an accuracy of 86%. The results improved increasingly, reaching 100% accuracy in the final sessions.
In the second study, he was asked to recognize the same target trainer using only facial cues. He recognized the face with an accuracy of 79%, a lower percentage compared to partial body cues, but still to be considered positively.
We can finally affirm that dolphins can learn to visually discriminate people by their faces.

Extinction burst: Young beluga vomiting from blowhole.

Cortezón Collazo, N. (1); Ciulla, C. (2); Muñiz García, A. (3)

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Video

Sometimes stereotypes appear in animals living in controlled environments. The importance of identifying them on time and taking measures to make them disappear is essential for their welfare.
Kylu, our young beluga male, vomited from his blowhole for the first time in January 2021. Since that day, measures have been taken to eradicate a behavior that could have serious consequences for his health. The effort of the trainers and veterinarians has been essential so that today, we consider that this behavior has been extinct.

Voluntary for stomach washing and aspiration with bottlenose dolphins (*Tursiops truncatus*) at Zoomarine Rome

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Zoomarine Rome is a zoological garden with a strong focus on marine mammal species. The facility currently hosts 6.5 bottlenose dolphins (*Tursiops truncatus*) in a 7200 m3 controlled habitat.
The park's entire area insists on being green, with plenty of trees and bush; the area is also frequently used by migratory bird species, and seasonal changes in the environment occasionally cause foreign objects to fall and float in the water.
Despite the animal training and water department efforts to remove any objects, the dolphins can occasionally ingest natural objects, such as leaves, which create a vegetal layer on the stomach, causing pH and appetite changes in the animals. That's why we decided to train and implement the voluntary procedure of forestomach washing and aspiration in our routine, to avoid invasive procedures or endoscopies.

Northern Seas: an ecosystem of coexistence

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Video

The new facility of the Artic represents the underwater and land ecosystem of the Artic circle.
The final goal of this habitat is the chance to see many different species (invertebrates, fish, birds, and mammals) interacting with each other in harmony in the same environment.
In this video, we will presents one of the problems we had to deal with: the predation food chain (the seal and the birds hunting the fish of the habitat).
To solve this problem we started to increase the amount of sessions and variability for each species by using the technique of the classic conditioning: different types of recalls.
This habitat is a crucial part of our conservation mission and is able to create consciousness on all our visitors and the future generations.

Causes of cetacean mortality in Northern France from 1995 to 2020

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Recognition of other individuals plays a fundamental role in the animal world, where each species can use different and unique cues to recognize other individuals.
It's known that bottlenose dolphins (*Tursiops truncatus*) produce individually distinctive signature whistles that broadcast the identity of the caller. It's also proven that captive bottlenose dolphins can discriminate individuals from their body, and they spontaneously discriminate human individuals visually using bodily rather than facial cues.
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In the second study, he was asked to recognize the same target trainer using only facial cues. He recognized the face with an accuracy of 79%, a lower percentage compared to partial body cues, but still to be considered positively.
We can finally affirm that dolphins can learn to visually discriminate people by their faces.

Cetaceans by-catch impact on the coast of Valencian Community.

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This study presents the data of the interaction between professional fishing and marine mammals, obtained through strandings and bycatch cases from 2010 to 2022.
All cases were assisted by the veterinarian staff of Fundación Oceanogràfic in Valencia, being part of the stranding network of the Valencian Community. The strandings and death causes were determined by the complete physical and clinical examination in live animals, linked to the post-mortem examination and complementary analyses obtained in dead animal cases.
The number of species found during this period shows a clear prevalence of striped dolphins (*Stenella coeruleoalba*) and bottlenose dolphins (*Tursiops truncatus*), although other species also showed by-catch compatible lesions during the exams. Different types of fishing gear were associated with these captures. However, the main limitation of this study was the carcass condition and the internal organs autolysis, reducing the possibility of establishing the correct diagnosis.
The data obtained shows a clear interaction specially between the two main species in this area and their consequences should be further researched.

Incidence of Brucella ceti on Belgian and North French coast between 1995 and 2020 in stranded harbor porpoises (*Phocoena phocoena*)

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We know Brucella ceti is a zoonotic diseases following the first case in 1999. The means of transmission from cetaceans to humans are still unknown, although microscopic, electron microscopic, or culture results have shown lungworms in harbor seals infected with Brucellae spp., suggesting that the lungworms may serve a role in this infection. In this study, we reviewed archived case material from 185 harbor porpoises (*Phocoena phocoena*) stranded on the northern French and Belgian coasts between 1995 and 2020. Once the DNA had been extracted, a q-PCR was performed targeting the omp25 gene. In total, 7 animals were potentially infected with Brucella spp. An immunohistochemical investigation showed diffuse intracytoplasmic positive staining for Brucella spp. on 5 animals and the presence of Brucella spp. in the lungworms and larvae of 2 animals. Most of the time the positive animals had clinical evidence and a pulmonary parasitosis. Based on these observations we suggest that on the French and Belgian coast the amount of Brucella ceti on stranded Harbor Porpoises is approximately 9,5%. As the parasite cycle of these nematodes involves fish (Parafilaroides spp.), the consequences for human health would be considerable if evidence of Brucella spp. in fish flesh were to be demonstrated.

How to define an animal welfare strategy and its relevance for all marine mammal facilities. The Oceanogràfic model

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Animal welfare is a keystone aspect to consider within the management policy at any zoological institution. The mission in favor of the conservation of biodiversity that is carried out from these centers can only be deployed and sustained if the welfare of the animals is guaranteed. Nowadays it is vital not only to provide the best level of care for the animals but also to compile scientific evidence about adequate welfare status on each individual. This is especially relevant in marine mammal collections. This presentation describes how we conceptualized and implemented an animal welfare strategy in the Oceanogràfic with the support of an external academic institution with international recognition: the ZAWEC Group of the Universitat Autònoma de Barcelona. The strategy relies on a multi-layer scheme on the top of the curatorial staff and all basic animal care programs, including the establishment of a new institutional figure, the Animal Welfare Officer (AWO), an accredited Animal Care and Welfare Committee (ACWC, with members from inside and outside the organization), an internal Whistle Blow Policy, an internal standardized audit system for all animal enclosures and all independent external audit systems considering specific animal welfare evaluations.

Dolphin-Welfare Evaluation Tool (WET): Current Status and Future Digital Development

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The Welfare Committee of the EAAM and experts in the field have been working on the Dolphin-WET – a protocol to measure the welfare of bottlenose dolphins under human care - since 2018. The first version of the protocol is currently being tested in different EAAM institutions. The possibility of developing a digital platform is discussed to make the tool more user-friendly. At Nuremberg Zoo, veterinarians, biologists, and computer scientists have been working for several years on digital solutions to improve the analysis of animal welfare and behavior of their animals. Among others, this collaboration has resulted in an AI-supported system for automatically recording individual behavior in polar bears.

The development of an app-based solution is planned for the Dolphin-WET project. This app will help conducting observations, analyze data, enable storage, and support automated analysis. The development of such an app is challenging. It must be designed to meet the exact needs of different users so that functionality and usability allow for a smooth integration into everyday life. We aim to utilize classical and AI-based algorithms to analyze data and predict the development of animal behavior. A prototype is planned to be available for testing by participating institutions by October 2023.

Cognitive foraging enrichment (but not non-cognitive enrichment) improved several longer-term welfare indicators in bottlenose dolphins

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Cognitive foraging enrichment is not commonly provided to dolphins in zoos, and research with other species suggests potential for significant welfare benefits. We provided 11 bottlenose dolphins (*Tursiops truncatus*) at Kolmårdens Djurpark with alternating weeks of only cognitive enrichment, or only non-cognitive enrichment devices over an 8-week study period. Data were collected on several multidimensional welfare-related parameters during and outside the enrichment provision. We found that the dolphins were more engaged by cognitive enrichment items, both when measured through qualitative caretaker scores and quantitative behavioural observations. We also found longer-term welfare-related changes: during cognitive enrichment weeks, dolphins were more motivated for training sessions, and showed less anticipatory and stereotypic behaviour. These results suggest that sustained positive affective states were induced by the cognitive aspects of the enrichment we provided.
We recommend that goal-oriented cognitive foraging enrichment is prioritized by dolphin facilities and discuss how this might best be achieved in practice.

Evaluation of 7 years of enrichment in bottlenose dolphins (*Tursiops truncatus*)

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Environmental enrichment allows stimulation of natural behaviors in animal species that live in captivity. It is a fundamental tool to increase animal welfare and reduce unwanted behaviors such as stereotypes.
This study examines 2006 environmental enrichment sessions, collected over seven years, by observing the behavior of eleven dolphins (*Tursiops truncatus*). We used more than eighty enrichment elements, which focus on five stimulus categories: feeding, structural, physical, sensory and social. Data collection followed the methodology described by Perlado en 2017.
The research allowed us to establish the effectiveness of each enrichment element and of each category, being able to analyze their impact, and detect the most positive elements for the group and for each single animal, and thus classify personalized elements.
Through a more detailed analysis of each month and year, we were able to see how enrichment can be both an instrument for stimulus as an indicator of animal welfare, evidencing moments of stress, discomfort and peculiar situations.

Ocular health in bottlenose dolphins (*Tursiops truncatus*) under human care

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A comprehensive assessment of the health status of bottlenose dolphins (*Tursiops truncatus*) should include eye examination. Although dolphins rely on echolocation for their orientation in their natural habitat, they primarily use vision in zoological environments. Surprisingly, studies on ocular health of dolphins including ultrasonographic examinations are very rare. From 2018-2022 both eyes of 129 bottlenose dolphins in 14 institutions were examined. At first, a basic ocular examination was performed. This included anamnesis, signalment, physical examination, distance examination and "hands-on" examination including slit lamp biomicroscopy and neuro-ophthalmic testing. Afterwards ultrasound images of the eyes were obtained using B-scan ultrasonography. The ultrasonographic images were complemented by digital photography of the eyes for further documentation.
Of the 129 animals examined, only 30 were free of ocular abnormalities. In the 258 eyes examined, the most common findings were keratopathy (n=155), followed by cataract (n=44), enophthalmos (n=17) and entropion (n=7). Single cases of lens luxation, synechiae, pupillary abnormalities, corneal ulcers, conjunctivitis, buphthalmos or eyelid edema were also noted.

Best Student Presentation award 2023

A bottlenose dolphin (*Tursiops truncatus*) with a multimetastasic ocular melanoma

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A female bottlenose dolphin (*Tursiops truncatus*) born in professional care presented a corneal lesion in the left eye following a trauma. Despite the treatment, the lesion developed as a mass of granular tissue that over time covered the entire eyeball. Meanwhile, a swelling area, hard at touch, developed in the palate showing thermographic changes. Given the discomfort associated with those lesions, the attitude and appetite of the specimen was intermittent. Skull radiographs revealed bone density changes as well as alterations in the symmetry, and a radiopaque area in the maxilla that coincides with the previously mentioned swelling. Discomfort became evident resulting in difficulty for the animal to eat. In spite of the efforts, the body condition gradually deteriorated, and the specimen passed away.
At necropsy, lesions were observed in the lungs and liver. Granular tissue involved the entire eyeball and proliferated affecting the maxillary bone and through the left parietal. The histopathological diagnosis of the lesion indicated the presence of a poorly differentiated malignant melanoma with metastases to the lymph nodes, spleen, lungs, and affecting the bones. Up to our knowledge, this is the first reported case of a multimetastasic ocular melanoma in a bottlenose dolphin..

Lead intoxication in bottlenose dolphins (*Tursiops truncatus*), an update. Part 2: from pellets to urine. Estimation of absorption and excretion.

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Metal intoxications in marine mammals in professional settings are rare to observe and diagnose, and this can have a dramatic effect on treatment when they occur. Defining toxic thresholds and identifying markers to be used for diagnosis and prognosis is thus very important.
Following an episode of lead intoxication occurred in 5 bottlenose dolphins, the results of studies performed to assess in vitro the speed of dissolution of lead pellets in gastric acids (GA) of dolphins and identify possible routes of excretion of the metal showed that: lead is rapidly dissolved in the low gastric pH, being then readily available for absorption; the amount of lead that solubilizes in GA is correlated to the concentrations observed in blood; urine, known as the main excretion route of Pb in terrestrial mammals, presents low levels of the metal, suggesting not to be an important route of elimination; while on the contrary, milk seems to play a bigger role in the excretion of Pb, as proven by the fact that lactating calves were also intoxicated.
Obtained data helps in defining the risk connected to Pb ingestion in dolphins and can be used as reference for other episodes and for wild animals.

Gut microbiome of stranded harbour seals (*Phoca vitulina*) admitted for rehabilitation.

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In the Netherlands, the Sealcentre Pieterburen rehabilitates an average of 250 grey seals (*Halichoerus grypus*) and harbour seals (*Phoca vitulina*) per year. Being held in temporal captivity for rehabilitation might have an effect on the seals' microbiome, and our study aimed to understand this effect in the gut microbiome of stranded harbour seals and the main factors contributing to it.
We investigated the distal gut microbiome of two large cohorts (pups and weaners) of stranded harbour seals that were admitted for rehabilitation at the Sealcentre. The gut microbiome of young harbour seals stranded in the Netherlands is composed of Proteobacteria, Firmicutes, Bacteroidota, Fusobacteriota, Campylobacterota, and Actinobacteriota, and corresponds with the main core phyla described for this species in other parts of the world. The alpha diversity (richness and Shannon diversity) of the pup's microbiome increased significantly during rehabilitation, while there were no significant changes in the weaners. Beta diversity of both pups' and weaners' gut microbiome was different before and after rehabilitation, with age and sex as main factors.
We conclude that there was an important change in the microbiome of stranded harbour seals that were admitted to the Sealcentre.

Problems experienced in taking impressions of tusks for protective crowns, the failure of zirconium and success of CoCr crowns in the walrus (*Odobenus rosmarus*)

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Tusk fractures and/or abrasions are the most encountered dental problems in the walrus. In one study on museum specimens three-quarters of all fractures were maxillary canine fractures.
In captivity beside fracture, abrasion by rubbing on hard surface is the most commonly seen condition. Once the pulp cavity is exposed, extraction is the only proper solution, that needs to always be done always under high-risk general anesthesia.
Therefore, protection by placing metal crowns is a frequently suggested option.
Despite prosthodontics being an easy procedure in humans, while in wildlife dentistry, and especially in the walrus (considering also their enclosure) these procedures can present several challenges.
Impressions are made with self-curing soft putty which have a perfect base-catalyst reaction at room temperature. Crowns nowadays are made of Zirconium, which is the strongest metal alloy for crowns, but with 2 major disadvantages: 1-First of all this alloy is much more brittle than Co-Cr; 2- it needs to be made of plates of 2 cm high, which makes the production of a crown in one piece impossible. Co-Cr on the contrary was the most common but almost not available anymore and it needs to be produced by 3D printing.
This case report will discuss the difficulties, failures and success of different techniques and metal alloys.

Congenital disorders in harbour (*Phoca vitulina*) and grey seals (*Halichoerus grypus*) admitted into rehabilitation from the Dutch Wadden sea

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Congenital disorders are functional or structural defects that are present at birth. Monitoring of birth defects in wildlife can provide conservationists with information about the status of that population and can help with the detection of emerging teratogens. In marine mammals, there are few reports on congenital abnormalities, which are mostly found during postmortem examinations.
Harbour (*Phoca vitulina*) and grey seal (*Halichoerus grypus*) populations of the Dutch Wadden sea are stable and considered healthy.
The current study summarizes information on sporadically appearing congenital or potentially congenital abnormalities in harbor and grey seals between 2014 and 2022. All animals were admitted into rehabilitation at Sealcentre, Pieterburen, in The Netherlands. We focused on the diagnostic methods and outcomes of each individual. The diagnoses were based on physical examination, clinical symptoms, and diagnostic imaging.
These cases included melanism, partial albinism, microphthalmia, esophageal stenosis, impaired swallowing reflex, vestibular disease, dwarfism, hiatal hernia, cleft lip with cleft palate, arthrogryposis, and megaesophagus.
During the study period, a total of 2719 seals were admitted into rehabilitation. The prevalence of congenital disease in our study was 0.59%.

Highly malignant mammary gland carcinoma in a female patagonian sea lion (*Otaria flavescens*)

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A 13-year-old, born under-human-care, female South American sea lion (*Otaria flavescens*) presented with mild bilateral hindlimb paresis and lethargy. On the physical exam, moderate weight loss was observed, and two subcutaneous nodules were noted on the left side of the abdomen. The nodules were around 3 cm diameter, firm on palpation, non-painful and slightly hyperthermic.

Serial blood analyses suggested a nonspecific inflammatory condition. Abdominal radiographs showed displacement of the intestines towards the left side of the abdominal cavity and on ultrasonography multiple masses in the retroperitoneal space associated with the left kidney were discovered. Fine needle aspiration of the subcutaneous masses suggested a neoplastic origin.

Initial treatment consisted of analgesics and antibiotics. After a diagnosis of neoplasia was made prednisone and cabergoline were added.

The initial impaired ambulation rapidly progressed to total paralysis in a few days. As it evolved, neurologic examination revealed dramatic loss of pain perception and dysuria and tenesmus were also noticed. Moreover, mass size of the primary tumors as well as the intra-abdominal metastases increased rapidly.

A CT scan and myelogram confirmed the initial findings and revealed an additional metastatic lesion in the spine. Upper management, caretakers and veterinarians evaluated together the best decision for this case, where failure of treatment and evidence of invasive metastases were strong indicators of poor prognosis, and the animal was euthanized at this time.

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Biochemical parameters in subadult female Risso's dolphins (*Grampus griseus*)

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The purpose of this study is to identify Reference Intervals of biochemical parameters in Risso's dolphins as there is limited information on blood parameters in this cetacean species. Reference Intervals are specific to the test methods and should be calculated from a group of healthy animals. In 3 years, 818 blood samples were collected from 9 pre-pubertal females hosted under human care during clinical routine checks. Blood was obtained from periarterial venous rete in the ventral side of the flukes and then placed in tubes without anticoagulant for serum. The fundamental biochemical parameters were determined and reported as mean ± sd In literature, studies on CHEM parameters for Risso's dolphins are rare. Some analytes, such as the lipoproteins profile, and cholesterol levels could also differ significantly due to the dietary habits of different genera. Establishment of reference intervals specific to the species or group (i.e. sex, age) is essential for correct diagnosis and management of medical conditions that are monitored by laboratory testing.

ABYSS: an N.G.O dedicated to cetaceans' conservation in the western coast of La Reunion Island.

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ABYSS is a N.G.O. based in La Réunion Island that studies wild cetaceans and their habitats. We have 4 main topics:
1. CETOSCOPE to study cetaceans' communication. We are able to identify the individual(s) that vocalize(s) within a group of cetaceans swimming in a 3D environment, to link the vocalizations to the individual's behaviours and to analyse its conspecifics' sound productions and behaviours.
2. BEC (Bien-être des Cétacés) to assess wild cetaceans' health status and welfare. Following a non-intrusive protocol, we collect faecal and skin samples in order to assess faecal (skin) glucocorticoid concentrations. Anthropic pressure raises in La Reunion Island and potentially impacts cetaceans, BEC investigates it.
3. THETYS, to track humpback whale populations and describe their environmental conditions. Using satellite images, we are able to spot humpback whales (and potential behaviours) and to observe environmental conditions. This project offers the possibility to study the marine megafauna in the Indian ocean.
4. BioEparDev, to study the fauna and flora associated to algae and floating macro-wastes to assess their potential risks for the marine (mega)fauna and human health.
ABYSS needs your help: we will list actions that you could undertake and explain how you could join us to protect cetaceans.

Use of rebound tonometry as a diagnostic tool in preventative medicine of sea lions: the Jungle Park experience

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One of the most common medical problems in California sea lion (Zalophus californianus) is ocular disease. The aim of this study was to measure intra ocular pressure (IOP) as a part of the preventative medicine in a group of 8 sea lions kept under human care at Jungle Park, Tenerife, Spain. In order to standardize the methodology, all animals were trained to maintain the same specific position, with open eyes, to allow the ophthalmologist to perform the examination in the same condition. Measurements were taken always in the same area of the eye between middle and peripheral area, 4 times a year, during 4 years, by using the Icare TonoVet. Thanks to routine measurements under normal condition, it was possible to obtain reference values for the animals studied. The results showed the IOP in healthy eyes was 36+/-10 mmHg. Changes in the IOP values were directly related to symptomatology and to a positive response to the treatment. The IOP was 22+/-2 mmHg in the case of an uveitis, while increased up to 50+/-5 mmHg in case of hypertension/glaucoma. In our study IOP measurements resulted to be a very useful tool for clinicians to diagnose and to set up a proper treatment as long as a strict standardized protocol is followed.

Use of ultrasound as a diagnostic tool to identify ingested foreign bodies in sea lions: the Jungle Park experience

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Sea lions under human care may ingest leaves or other vegetal material that accidentally reach the pools. Ingested plant material foreign bodies may cause vague clinical signs at the time of initial presentation, but can progress to cause obstruction, ulcers and debilitating gastro-enteric disease. Ultrasonography is a non-invasive technique that can be used to identify precisely the presence, location and size of radiolucent foreign bodies. This study reviews the ultrasonographic findings in 3 Californian sea lions, hosted in Jungle Parks, (Tenerife, Spain), which under voluntary endoscopic evaluation confirmed the ingestions of vegetal foreign bodies, during two years. Ultrasonography was recorded using a Logiq Versana active, General Electric, with a 2-5MHz curvilinear transducer. Right and left lateral recumbencies of the subjects have been used in the examination. Ultrasound was performed with fasted animals with and without hydration as the water works as a contrast medium. Voluntary endoscopy was performed after ultrasonography evaluation to confirm the presence of foreign bodies. Ultrasonography appears to be a valuable adjunct to endoscopy for detection of foreign bodies.

Hematological parameters in subadult female Risso's dolphins (*Grampus griseus*)

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The purpose of this study is to identify CBC Reference Intervals on Risso's dolphins. There is no database of blood parameters in cetacean species and the correct evaluation is fundamental to interpret any pathological variations. In three years, 818 blood samples were collected from 9 pre-pubertal females hosted under human care during clinical routine checks. Blood was obtained from periarterial venous rete in ventral side of the flukes and then placed in EDTA tubes. The Complete Blood Count (CBC) parameters were considered and are going to be reported as mean±sd (MIN; MAX). Studies on CBC parameters for dolphins are rare and obsolete. This is the first study carried out on a large number of samples of Risso's dolphins, which differ in feeding habits and in some ethological aspects from the other genera of the family. This is a preliminary research for future studies related to the difference for sex and age.

Intercet: a web-based GIS platform for the study and conservation of cetaceans in the Mediterranean Sea

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Intercet (www.intercet.it) is a web-based GIS platform to favor cooperation between cetacean researchers of the Mediterranean Sea, sharing their data on a common online support. Since its activation in 2010, Intercet has served as a common platform for many national and international projects and today has over 50 scientific partners from 9 countries of the Mediterranean basin: Spain, France, Italy, Slovenia, Montenegro, Greece, Turkey, Israel and Tunisia. The common dataset consists of over 800,000 km of sampling effort and about 25,000 sighting points, referable to 13 species of cetaceans. The analysis of the common dataset in aggregate form makes it possible to obtain information on the presence and conservation status of cetaceans on a large scale, unattainable by individual research groups. Intercet represents a successful networking experience for research and conservation of cetaceans in the Mediterranean Sea.

Bitable plastic rings as a tool to prevent agonistic interactions on bottlenose dolphins (*Tursiops truncatus*) under human care

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In modern facilities bottlenose dolphins are kept under human care for research, conservation, and education. Agonistic interactions between dolphins can occur in the form of rough play or sexual occasions causing rake marks on their body. Environmental enrichment provides proper stimulation that improves the welfare of animals under human care.
In a dolphinarium in Mexico, a higher number of rake marks were noticed on one dolphin. Bitable plastic rings were designed and introduced with the aim of reducing agonistic interactions and thus reducing rake marks. Rake marks were counted daily and quantified to determine their variations in the absence and presence of bitable rings. For comparison we used the total number of rake marks: in the group, in each individual and for each body region. The results show a significant reduction in rake marks in the presence of bitable rings, especially in ventral peduncle, belly area and on the posterior side of the body in the observed dolphin. Therefore, bitable rings can serve as a tool to reduce agonistic interactions and/or sexual aggression. Furthermore, the results could investigate dolphin agonistic behavior in the wild, indicating the importance of research in a controlled environment. Further studies including more animals are needed to confirm the conclusions.

SAWA app - Scientific Animal Welfare Analysis

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During the last EAAM symposium, we had the opportunity to present a well-being assessment protocol carried out as part of Ana Pascaud's veterinary thesis in collaboration with the Planète Sauvage animal park. This work was then awarded by the World Veterinarians Association (WVA).
This protocol has since evolved into a software that can be used on a computer, a tablet or a smartphone, making it possible for professionals to assess animal welfare continuously and at the individual level.
Usable daily by animal caretakers, ethologists or veterinarians, SAWA (Scientific Animal Welfare Analysis) allows data on the diet, health, environment and behavior of animals to be continuously recorded. Based on scientific literature, field experiments and the latest scientific research, these data are integrated within the framework of Mellor's five domains model, in order to obtain a panorama of the welfare of each individual in the form of color code indicators (green - no action requested, orange - vigilance, or red - action to be taken). Our system, already offering continuous animal welfare monitoring, is also a decision-making tool for animal teams by allowing immediate implementation of appropriate corrective measures.

When marine zoological structures help paleontology

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Oceans warming and its impact on biodiversity is one of the challenges of this century. The study of paleontological archives allows to document past oceanic temperature changes and their effect on organisms. Paleontologists use a geochemical thermometer based on the oxygen isotope composition (δ18O) of the fossil remains of ectothermic organisms (invertebrate shells, fish bones and teeth). However, this method requires knowledge of the oxygen isotope composition of the marine water (δ18Owater) from which organisms mineralize their hard tissues. To estimate past δ18Owater, cetaceans have been used assuming that the δ18Obw value of their body water reflects that of the water in which they live. We present the first measurements of δ18Obw values of *Orcinus orca* and *Tursiops truncatus* raised in the controlled environment of a zoological structure, allowing the access to biological samples (blood and urine) and nutritional data. We observed different trends between the δ18Obw values of cetaceans and those of their basin water and food related to their diet needs and physiological specificities. These results highlight the need to better constrain the relationship between body water and surrounding water in order to use cetaceans as reliable oceanographic tracers.

Analysis of cortisol in bottlenose dolphins' gastric fluid in view of monitoring animal welfare under human care.

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