

RESEARCH & CONSERVATION IN SOUTH AMERICA

Symposium

Saturday, June 25th 2016
Sunday, June 26th 2016



ISFAS 2016

PROGRAM AND ABSTRACTS

Zoo Nuremberg
Am Tiergarten 30, 90480 Nuremberg, Germany



ISFAS 2016

Research & conservation in South America

Hosted by: YAQU PACHA e.V. – Organization for the Conservation of South American Aquatic Mammals and Zoo Nuremberg

In cooperation with:
CMS – Convention on the Conservation of Migratory Species of Wild Animals

Saturday, June 25th 2016, Location: Naturkundehaus

- 9:00 - 9:15 WELCOME AND OPENING REMARKS**
Dr. Lorenzo von Fersen – Host and Chair YAQU PACHA e.V. & Zoo Nuremberg
- 9:15 - 10:15 THE BEHAVIORAL ECOLOGY OF LEAF-CUTTING ANTS, AN ECOSYSTEM ENGINEER IN THE NEOTROPICS**
Prof. Dr. Flavio Roces
- 10:15 - 11:15 AMAZONIA – THE FROGGY PERSPECTIVE**
PD Dr. Stefan Lötters
- 11:15 - 11:30 COFFEE BREAK**
- 11:30 - 12:30 TOOTHLESS NO MORE: PERSPECTIVES AND CHALLENGES FOR THE CONSERVATION OF XENARTHRA**
Dr. med. vet., PhD Mariella Superina
- 12:30 - 13:30 LUNCH**
- 13:30- 14:30 CONSERVATION ACTION ORIENTED BY RESEARCH:
A CASE STUDY ON COASTAL BOTTLENOSE DOLPHINS IN SOUTHERN BRAZIL**
Prof. Dr. Eduardo R. Secchi and Dr. Pedro Fruet
- 14:30 - 15:30 HOW CAN ZOO RESEARCH ON MARINE MAMMAL ACOUSTICS
SUPPORT CONSERVATION EFFORTS IN THE WILD?**
Prof. Dr. Vincent M. Janik
- 15:30- 16:00 COFFEE BREAK**
- 16:00 - 17:00 RESEARCH AND CONSERVATION OF THE FRANCISCANA DOLPHIN (Pontoporia blainvillei)**
Consorcio Franciscana
Prof. Dr. Eduardo R. Secchi and Dr. Lorenzo von Fersen
- 17:00 - 18:00 IMPROVING SATELLITE TAGGING TECHNOLOGY:
CAN WE ENHANCE CONSERVATION OF LARGE WHALES AND MINIMIZE ANIMAL WELFARE PROBLEMS?**
Dr. Alexandre N. Zerbini
- 18:00 - 19:00 SPARE TIME**
- 19:00 - 22:00 BARBECUE AT ZOO NUREMBERG – INFORMAL DISCUSSIONS**
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Sunday, June 26th 2016, Location: Dolphin Lagoon

- 9:00 - 10:30 MARINE MAMMAL ACOUSTICS – A DEMONSTRATION OF CONCEPTS AND METHODS**
Prof. Dr. Vincent M. Janik
- 13:00 - 15:00 GUIDED VISIT TO THE TECHNICAL BUILDING AND Q&A SESSION WITH KEEPERS,
BIOLOGISTS AND STAFF MEMBERS**



THE BEHAVIORAL ECOLOGY OF LEAF-CUTTING ANTS, AN ECOSYSTEM ENGINEER IN THE NEOTROPICS

Prof. Dr. Flavio Roces

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Leaf-cutting ants are the dominant plant consumers in the Neotropics. They cut vegetation into small fragments they transport to the nest along conspicuous trails. Leaf-cutting ants excavate the largest and likely most complex nests among ants, with several thousands of underground chambers, mostly for rearing a symbiotic fungus on the harvested plant fragments. Because of the marked alterations they cause in the physical environment and in the plant communities surrounding their nests, leaf-cutting ants are considered significant ecosystem engineers. Major effects refer to the removal of standing leaf crop and to the disturbance and enrichment of soils, which influence plant regeneration and recruitment. In my talk I will highlight some of the ecological impacts leaf-cutting ants cause as herbivores and soil modifiers, and concentrate on the foraging and nest-building behaviours that underlie the major success of leaf-cutting ants as generalist herbivores in the Neotropics.



AMAZONIA – THE FROGGY PERSPECTIVE

PD Dr. Stefan Lötters

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Amazonia is one of the world's megadiversity areas. This also applies to amphibians. More than 10% of all known species is known from this region; that is more than 600 species. They belong to all three amphibian orders, but almost all of these species belong to the order Anura – frogs and toads. Understanding diversity patterns, genesis and functionality is a most challenging research task. In particular this research is significant, because amphibians belong to the globally most threatened vertebrates, with more than one third of all species threatened with extinction.

Multiple evolutionary hypotheses have been suggested for the evolution of Amazonian biota, and anurans may serve as a model group. One of the most intriguing and little studied – but putatively important – scenarios for diversification is the disturbance-vicariance hypothesis. It explains young speciation processes which remain infinite due to (Pleistocene) climatic fluctuations. Harlequin frogs, genus *Atelopus*, are a group of small anurans with interesting biogeographic patterns which can be explained by the disturbance-vicariance hypothesis. It is amazing that the observed processes lead to high (intraspecific) diversity in coloration which is in a remarkable contrast to the identified genetic diversity.

Atelopus frogs are suggested have undergone long distance dispersal via the entire Amazon basin but today are absent from central Amazonia. Long distance dispersal, including species turnover along the Amazon river (beta diversity), can well be studied in extant anurans which inhabit 'floating meadows'. These are water surface plant formations that are highly dynamic. At the same time, floating meadows are favored frog habitats, which often have overlooked in research. Recent findings imply that underlying dispersal processes are quite complex and that many research questions remain unanswered.

Amazonian anuran diversity is not only expressed in species richness. Especially in reproductive biology, these vertebrates are highly diverse. Thirty-nine reproductive modes have been defined in anuran amphibians, and 24 of them can be found in Amazonia. One such mode is performed by poison frogs, family Dendrobatidae. These small colorful toxic frogs deposit eggs on land and carry their tadpoles on the one parent's back into small water bodies, such as mini-pools in leaf axils of plants (e.g. bromelidas). Some species in the genus *Ranitomeya* are able to recognize if mini-pools are occupied by conspecific tadpoles. They use chemical cues for the discrimination if tadpoles are of the same or another species. The main reason is that *Ranitomeya* larvae are cannibalistic and that the presence of a conspecific larva is unfavorable, whereas the presence of non-cannibalistic tadpoles (i.e. of other species) are a potential food resource.



TOOTHLESS NO MORE: PERSPECTIVES AND CHALLENGES FOR THE CONSERVATION OF XENARTHRA

Dr. med. vet., PhD Mariella Superina

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Armadillos, sloths, and anteaters conform the superorder Xenarthra. These fascinating mammals are exclusive to the Americas, and are one of the four major clades of placental mammals. There are many misconceptions about these animals, once known as Edentata, or “Toothless”. A giant armadillo, for example, has over one hundred teeth. There is abundant information about them, but how this information is generated and disseminated has become a key point in their conservation.

The Xenarthra are all under considerable pressure. For example, habitat degradation and fragmentation is thought to affect at least 21 of the 31 known species of xenarthrans, and virtually all armadillo species are subjected to hunting. While the populations of many xenarthrans are declining, a considerable amount of information is being generated day by day, from diverse sources, and in careful coordination.

My main goal, and passion, is the research and conservation of armadillos in South America. Since 2001, in Mendoza Province of Argentina, we have used different approaches to study and save the pichi (*Zaedyus pichiy*) and other armadillos such as the pink fairy armadillo (*Chlamyphorus truncatus*) from extinction. These strategies were extended to the Program for the Conservation and Management of the Armadillos of the Eastern Floodplains of Colombia in 2012. This other program has become an exemplary initiative involving field research on elusive species such as the giant armadillo, ex situ conservation, and an education and awareness program that has already reached over 20,000 persons. We hope to expand similar programs to other parts of the continent.

As Chair of the IUCN/SSC Anteater, Sloth and Armadillo Specialist Group, my work also involves the production, dissemination, and advancement of the science that allows for the conservation of all Xenarthra. Training courses and talks have proven to be key to raise interest in xenarthrans and motivate students and young professionals to work with these amazing creatures. Our journal *Edentata* – an ironic and outdated name, but one the publication is known for – is gaining relevance as a channel to publish information that contributes to the conservation of xenarthrans. The future for xenarthrans is becoming brighter, as more and more enthusiastic researchers work together to save these incredible animals from extinction.



CONSERVATION ACTION ORIENTED BY RESEARCH: A CASE STUDY ON COASTAL BOTTLENOSE DOLPHINS IN SOUTHERN BRAZIL

Prof. Dr. Eduardo R. Secchi and Pedro Fruet

Marine Megafauna Ecology and Conservation Laboratory
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In this talk I will describe the benefits of a continued research effort to understand the population dynamics, spatial and trophic ecology to the conservation of a small resident population of bottlenose dolphins (*Tursiops truncatus*) inhabiting the Patos Lagoon Estuary (PLE) and adjacent marine coast in southern Brazil. This resident population is part of one of five distinct Management Units (MUs) of bottlenose dolphins from southern Brazil/Uruguay. The home range of this MU overlaps with artisanal fisheries and bycatch in some years is high. Social and network analyses of photo-identified individuals strongly suggest that this MU consists of three social units. One of the units is strongly associated with the PLE while the others with shallow waters of the southern and northern adjacent marine coasts. Although interactions between social units occurred, the associations were brief and occurred only among a few individuals. We proposed that the social units be the framework for understanding intrapopulation dynamic and assessing its viability. Under this framework, data from an 8-year (2005–2012) mark-recapture (MR) study were used to estimate demographic parameters and life history traits of female bottlenose dolphins from the PLE. Results also supported a birth pulse strategy, with most births occurring during late spring and summer, in association with increasing water temperature and food supply. Female bottlenose dolphins first reproduced at a minimum age of 8 years. Mean inter-birth interval was 3 years (mode = 2), which is consistent with an inferred weaning near age 2. First and second year annual calf survival estimates were 0.84 and 0.86, respectively. Older females reproduced at lower rates, suggesting an age-related decrease in reproductive fitness. At an individual level, marked variation in reproductive success was observed. The estimate of annual apparent survival was higher for adult females (0.97, 95% CI: 0.91–0.99) than for adult males (0.88, 95% CI: 0.75–0.94) and juveniles (0.83, 95% CI: 0.64–0.93), which may explain an observed bias in sex ratio (1 male:2 females) of known adult dolphins in the PLE. Total abundance estimates were highly precise and did not exceed 88 individuals. Abundance estimates were similar to a previous MR study conducted in the same area almost a decade earlier, suggesting a relative stable dolphin unit over almost 15 years. The apparent stability in abundance, however, should be viewed with caution since this community would need a substantial mortality of at least 10% before a decline in abundance is detected with a desirable statistical power of 90%. Our findings highlight the importance of long-term studies for long-lived mammals to yield individual- and population-level parameters for demographic and viability analyses that are useful for conservation and management.



HOW CAN ZOO RESEARCH ON MARINE MAMMAL ACOUSTICS SUPPORT CONSERVATION EFFORTS IN THE WILD?

Prof. Dr. Vincent M. Janik

Scottish Oceans Institute
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Conservation research has two main aspects, one in which animal abundance and population status is being monitored and another which tries to assess the impact of environmental and anthropogenic stressors on populations. Zoos play an important role in this latter part, since experimental approaches are often more powerful than observational studies in the wild. For example, studies on temporary hearing threshold shifts are only possible when animal hearing can be measured repeatedly before and after noise exposure. Furthermore, baseline hearing thresholds of marine mammals are needed as key information to assess the effects of noise on different species. Almost all published hearing curves of marine mammals come from studies in captive facilities. To assess the effects of noise on hearing curves in wild harbour seals, we recently used auditory evoked potential methods to compare hearing in wild seals with a noise exposure history to those of seals in zoos that were not exposed to noise. Zoos also provide important opportunities to develop and test new methods to study marine mammals in the wild. Studies at Zoo Duisburg allowed us to test the passive acoustic localization abilities of DTAGs on their bottlenose dolphins before we used them on wild animals to monitor acoustic activity over time. This provided so called cue rates that are the main data required for assessing animal abundance from acoustic monitoring equipment in the wild. Similarly, work on bottlenose dolphins at Duisburg allowed us to develop a novel method to recognise signature whistles without having to capture or restrain animals. This identification method allows us now to conduct mark-recapture studies on wild populations where visual surveys are not possible or too cost intensive. Our work on the startle reflex in marine mammals has also used captive facilities to establish startle thresholds in seals and delphinids. Together with hearing thresholds, startle thresholds determine how animals react to impulse sound as is common in sonar use and during pile driving. These examples highlight the role of zoos in conservation efforts and highlight the importance of experimental work to implement successful conservation.



RESEARCH AND CONSERVATION OF THE FRANCISCANA DOLPHIN (*Pontoporia blainvillei*)

Consortio Franciscana

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Dr. Lorenzo von Fersen

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In this talk we will describe the effort on research and conservation of franciscana dolphin (*Pontoporia blainvillei*), which were based on long-term collaboration among several institutions from Brazil, Uruguay and Argentina. Franciscana is a small cetacean endemic to coastal waters of the subtropical western South Atlantic. Entanglement in fishing gear is the greatest threat to the viability of this and many other cetacean species. The franciscana has suffered from very high levels of fishing-related mortality (bycatch) in the last five decades. Collaborative work allowed relevant data on intra-specific structure, population-specific life history parameters, abundance and bycatch rates to be generated and the species' conservation status to be assessed. Viability analyses suggest that franciscana cannot sustain the current levels of bycatch and that immediate and extreme limitations on fishing practice and effort are necessary to avoid collapse of franciscana populations and to reduce its risk of extinction. Nevertheless, in developing countries, decision-makers often argue that scientific evidence is not strong enough for justifying conservation action. After several years of negotiation with stakeholders, the scientific-based advice was finally used for management decisions to and the gillnet fishery (franciscana's main threat) was regulated. Nevertheless, current data indicate that franciscana's mortality remains high and further action should be taken to mitigate bycatch. The Franciscana Consortium (Consortio Franciscana), composed mostly by the very same group of researchers and institutions that have been working together for more than two decades and coordinated by YAQU PACHA, was established in order of strengthening collaboration and to define strategies to make conservation actions more effective. Hopefully such actions will help to conserve franciscana, an umbrella species, and, therefore, to recover stocks of fisheries target species that in turn would benefit fishermen themselves.



IMPROVING SATELLITE TAGGING TECHNOLOGY: CAN WE ENHANCE CONSERVATION OF LARGE WHALES AND MINIMIZE ANIMAL WELFARE PROBLEMS?

Dr. Alexandre N. Zerbini

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Satellite tracking uses polar-orbiting satellites to calculate latitude and longitude from radio signals sent from electronic transmitters attached to the body of individual animals. In recent years, technological improvements have produced tags capable of providing, in addition to locations, environmental and behavioral data. As a result, this research method has greatly improved our understanding of wildlife ecology and conservation. The application of satellite telemetry to large cetaceans is challenging because, unlike terrestrial or small marine animals, they cannot be captured for tag application. For this reason, tags have to be remotely deployed, either with a pole or with a pneumatic rifle. Long-duration (several months) tags typically require penetration of the body and anchoring underneath the skin and the fat-tissue, blubber layer. Therefore, these transdermal tags have the potential to cause behavioral, physical, physiological, and/or demographic effects to tagged individuals. Systematic studies to investigate whale tag limitations and their potential impacts to individual whales have been limited. In addition, variable and shorter-than-expected post-deployment durations of transdermal satellite tags have been difficult to explain. In recent years, follow-up studies designed to assess satellite tag performance and health effects on cetaceans have significantly contributed to advance our understanding on how tags perform and, consequently, have led to major improvements in tagging technology. This presentation will show how these studies are contributing with the development of new, more robust, and more durable tags, while minimizing potential impact to individual animals. It will also discuss how new ecological findings associated with tag improvement can enhance conservation of cetaceans and their habitats. Finally, novel ideas and challenges to advance satellite telemetry methods for large whales will be presented.



MARINE MAMMAL ACOUSTICS – A DEMONSTRATION OF CONCEPTS AND METHODS

Prof. Dr. Vincent M. Janik

Scottish Oceans Institute
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In this session, we will introduce some of the equipment and recording techniques for conducting acoustics research on marine mammals. We will explore different hydrophone configurations and compare their performance, list key aspects to consider when using recorders and explore strengths and weaknesses of acoustic monitoring techniques. We will observe bottlenose dolphin behaviour in the presence of hydrophones, investigate how echolocation clicks change at a hydrophone depending on its position in relation to an animal, and record signature whistles of individuals to look at inter-individual differences. The demonstration will last 2 hours and will give you a first glimpse at some of the advantages and challenges when collecting acoustic recordings in the context of animal conservation.



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