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GBCC

The World after 2020

from crisis to biodiversity conservation

BOOK OF ABSTRACTS

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SUMATRAN ELEPHANTS: HUMAN-WILDLIFE CONFLICT IN THE STRONGHOLD OF WILDERNESS IN ACEH

Wahdi Azmi

Conservation Response Unit Aceh, Indonesia;
University of Syiah Kuala in Banda Aceh, Indonesia

The Sumatran elephant (*Elephas maximus sumatranus*) is a unique subspecies of the Asian elephant endemic to Sumatra, Indonesia, with only 1700 individuals left in the wild. Increased habitat fragmentation and biodiversity loss in lowland forests have led to the human-elephant conflict upsurge, posing a significant threat to elephant survival. The long-term conservation of elephants in Sumatra requires that elephants and people co-exist with minimal conflict to halt demands for their removal. Appropriate methods to mitigate elephant-human conflict need to be identified to avoid elephant population collapse. Many populations are isolated in small, vulnerable groups and often are not able to breed. While Aceh province holds most of the Sumatran elephant population and the largest and most intact forest, the elephant distribution is mostly (80%) outside the conservation area. The inadequate zoning of conservation areas creates a high potential for more incidents of human-elephant conflict. The Conservation Response Unit (CRU) is an important step in the development of a long-term strategy. The CRU utilizes captive elephants, their mahouts, and local community representatives for direct, successful field-based conservation interventions. These units support the conservation and create opportunities for local communities, achieving positive outcomes for both elephants and people. An active management approach is a crucial step for bringing CRU to the next level of operation. The team that consists of various elements from BKSDA, FMU, and CRU needs more expansion to manage elephant habitats by actively using barrier strategy, early warning system/GPS collaring; and promoting human-elephant coexistence.

FOREST ELEPHANTS IN CENTRAL AFRICA – OUTLOOK FOR RECOVERY AND COEXISTENCE?

Thomas Breuer

WWF Germany

Forest elephants (*Loxodonta cyclotis*) are not listed as a separate species. Having experienced dramatic declines of more than 85% in less than three decades, their status has recently been assessed as critically endangered. Their decline in the last decades is mainly due to poaching and more increasingly habitat loss and fragmentation. However, the issue of human-elephant conflict and impacts of climate change are increasingly impacting forest elephant populations and people in a very complex way. We urgently need coordinated actions to ensure their survival as forest elephants play a fundamental role in ecosystem services, carbon storage, and indigenous people's cultural heritage. I describe various short-term term measures that are needed to immediately protect the last strongholds of forest elephants and mitigate the threats that forest elephants face. More medium-term measures should set up participative projects to increase the coexistence of people and forest elephants and ensure the conservation of a network of protected areas, wildlife corridors, and other effective area-based conservation measures (OECMs). I describe ideas that might also help put a monetary value on forest elephants via wildlife credits for local and indigenous communities and range state governments. Lastly, long-term visions of their survival under scenarios of climate change in Central Africa are discussed.

EXPERIENCES IN MAKING AN ECOTOURISM PROJECT WORK TO FUND BIODIVERSITY CONSERVATION

Rod Cassidy

Sangha Lodge, Central African Republic

A common perception in the global tourism market is that the money spent on "eco-lodges" is directly helping to fund conservation efforts. Buzz words and catchphrases are often used to sell and enhance this idea.

Conservation of large tracts of land is expensive, and it is my experience that tourism can never be the sole funder of these costs, and in all but a very few instances does not even get close to a small percentage of these costs.

Working and living in Dzanga Sangha in the Central African Republic, I started Sangha Lodge with the idea of being the fine example of one of these lodges.

The talk will cover some of the lessons we have learned from our work that has led us to understand the fallibility of Tourism as a tool and some of our conclusions.

VIRUSES IN THE GLOBALIZED WORLD

Jiří Černý

Centre for Infectious Animal Diseases, Faculty of Tropical AgriSciences, Czech University of Life Sciences Prague, Czech Republic

Modern time brings many risks, challenges, and problems, including outbreaks of viral zoonotic diseases. Soon we will reach the milestone of 8 billion people living on the Earth. We colonized regions almost inhabited just a few decades ago and isolated from the rest of the world. It increases our contact with pathogens that circulate in these areas and the chance of adapting to us as their new hosts. Further, globalization increased the chance to spread these pathogens from their endemic regions all over the world. If the pathogen is effectively transmitted among the people, megapolises pose an ideal environment for it. If the pathogen requires a vector, current global climate change, and frequent biological invasions also increase its chances to expand into new territories. There is always a gap between the pathogen emergence and its identification. During this gap, the pathogen can spread in host populations without any limitations. A similar effect can be observed in case that when the pathogen is transmitted by an asymptomatic carrier, to stop spreading of such pathogens is also very complicated. Finally, even after developing diagnostic tests, cures, and vaccines, emerging pathogens can survive in poor undeveloped regions or start to use synanthropic animals as their reservoirs. Unfortunately, we can observe most of these characteristics now with SARS-CoV-2/COVID-19 pandemics.

Viral zoonoses will pose a significant threat also in the future. To eliminate this threat, we will have to adopt and abide by pandemic countermeasures such as active virus surveillance, information sharing, functional anti-pandemic infrastructure, etc. In such cases, we can face further outbreaks successfully.

POPULATION MANAGEMENT IN ZOOS AND AQUARIUMS: WHAT PIECE OF THE CONSERVATION PUZZLE?

Elmar Fienieg

European Association of Zoos and Aquaria, Amsterdam, Netherlands

The general public is typically unaware of the conservation minded communities that have started to thrive under the umbrella of regional associations, such as the European Association of Zoos and Aquaria (EAZA). One of how the EAZA community contributes to conservation is its EAZA Ex-situ Programmes (EEPs). These programs typically involve family planning and coordinate exchanges between different zoos and aquariums to keep these shared populations demographically robust and genetically healthy.

Recently, EAZA has started to investigate for every species if and how keeping and managing it could contribute to biodiversity conservation, following a structured approach. So far, hundreds of new or redefined EEPs have been established, with goals including driving specific changes in the behavior or perception of visitors, research, raising funds for key in situ projects, helping set up breeding programs in other countries reintroduction, etc. The challenge that is now emerging is how to live up to our full potential. This talk will investigate this challenge, illustrated by concrete examples of EEPs.

SPECIFICS OF SEA TURTLE USE AND TRADE IN SELECTED AREAS IN SUMATRA, INDONESIA

Adéla Hemelíková

Zoological Garden in Liberec, Czech Republic;
Syiah Kuala University, Indonesia; Czech University of Life Sciences Prague, Czech Republic

Although all sea turtle species have complete law protection internationally and in Indonesia, and several conservation measures have been set, many threats to sea turtles persist. The exploitation of sea turtles is still widely present, mainly in the Indo-Pacific, and Indonesia is a historical sea turtle use and trade hot spot. Many rookeries have been severely exploited for centuries, and not surprisingly, many sea turtle populations of today are ghosts of past populations. Turtle eggs, meat, and tortoiseshell are valuable commodities, and thus sea turtle populations continue to be depleted in many parts where up to 90% of population declines have been recorded. Unfortunately, a lot of information and data about sea turtle use and trade is missing. Especially in current changing times and global challenges we face, a detailed understanding of turtle use and trade is vital for proper conservation actions to save these species and the sea ecosystems they inhabit. During the presentation newest data on sea turtle use and trade in Sumatra, Indonesia, will be presented, and its specifics will be explained in further cultural and socio-economical contexts to provide perspectives for future conservation measures and management.

ECO-FRIENDLY LIVELIHOODS IN EXCHANGE FOR SAFE WILDLIFE IN SUMATRA: A CONSERVATION STORY THAT MODERN ZOOS MADE POSSIBLE

Kateřina Holubová

Ostrava Zoological Garden and Botanical Park;
The Kukang Rescue Program, Czech Republic

Modern zoological gardens play a key role in biodiversity preservation around the world as they breed species in human care (ex situ) and at the same time realize or support field conservation projects in the species' natural areas (in situ). This way, many conservation projects can operate worldwide. One of them is The Kukang Rescue Program fighting the illegal trade in slow lorises on the Indonesian island of Sumatra. Thanks to the long-term support by numerous Czech and other European zoological gardens, the program started, among others, also engaging local communities in wildlife conservation while at the same time supporting their sustainable livelihoods. Within the "Kukang Coffee" project, representatives of the rescue program introduced a methodology for the cultivation and processing of high-quality eco-friendly coffee. The farmers receive advice and training in the harvesting and processing of coffee beans that the program consequently buys from them at a higher price than on the local market. In return, individual farmers from this Kukang Coffee community are required to make a legally binding promise that they and their families will protect endangered and protected animals and abide by the ban on their hunting. These coffee producers thus make a significant profit from nature conservation, as "Kukang Coffee" not only supports local farmers but also directly helps to protect slow lorises, pangolins, and other endangered wild animals in the adjacent forest.

EU PROTECTED AREAS UNDER THE STRICT PROTECTION – SOLUTION OR CHALLENGE?

Michael Hošek

INTEGRA Group, Czech Republic

The EU Biodiversity Strategy 2030 "...sets the ambitious goal of creating a truly coherent Trans-European Nature Network that includes the legal protection of at least 30% of the EU's land and 30% of the EU's sea, of which 1/3 (10% of the land and 10% of the sea) should be under strict protection..." The presentation aims to discuss a definition of the strict protection at the European Union level, differences between non-intervention and intervention approaches in the region, and their impact on protected areas biodiversity targets.

The protected area management experienced both "fashion waves" in the past: strict protection of areas against any measures (even those that would help maintain biodiversity there) and very active management approaches. Now, it seems that non-intervention has its comeback. Nonetheless, our current knowledge and experience should help us find a well-justified balance by setting clear and long-term objectives and measures for each protected area separately. Moreover, thus not to make mistakes by setting regional targets without adequate insight into the field practice.

CIVIL SOCIETY FIGHTING WILDLIFE CRIME IN AFRICA

Rens Ilgen

The EAGLE Network, Côte d'Ivoire and Togo

This presentation will show how the EAGLE Network, a law enforcement NGO, successfully put significant wildlife traffickers behind bars in a race against the clock to protect some of Africa's most iconic creatures. Wildlife crime, and thus conservation, is not a matter of poverty or education. It is a problem of organized crime and corruption. Significant players in wildlife traffickers are identified through undercover investigations and informants, and arrests are undertaken in close collaboration with the local authorities. As with wealthy and influential criminals also comes corruption; a team of legal advisers always works with the justice system to ensure strong prison terms are given and served. This method has been proven very effective in fighting wildlife crime in mainly West and Central Africa, where in most countries, there was never any wildlife crime case that has led to a conviction with jail time. To illustrate this, a case study of the dismantlement of a Vietnamese syndicate in Côte d'Ivoire, with even some ties to wildlife trafficking in the Czech Republic, will be taken as an example. The story begins after two significant seizures in Asia of containers with ivory hidden in the wood, originating from Côte d'Ivoire.

BUILDING AN EVIDENCE-BASED TO TRACK THE HUNTING, CONSUMPTION, AND TRADE OF WILDLIFE

Daniel J. Ingram

African Forest Ecology Group, Faculty of Natural Sciences, University of Stirling, UK

Wildlife provides a source of food and livelihood for millions of people across the tropics, yet overharvesting has been identified as one of the leading processes driving wildlife closer to extinction. Designing effective policies to ensure that the use of wildlife is within sustainable limits requires robust data on wild meat use, including the use of wild meat for food and income by local communities, the trade-in wild meat locally, nationally, and regionally, and the impact of use on species and ecosystems. We will present the WILDMEAT Project: an evidence-based and research toolkit on the hunting, consumption, and trade of wildlife globally. Using data collected from Central Africa as a case study, we will present novel analyses of the extent, magnitude, and drivers of wildlife hunting across space and time needed to help guide conservation decisions and sustainably manage wild meat resources based on the best available evidence.

CARPATHIAN PRIMARY FORESTS – RESEARCH AND CONSERVATION

Martin Mikoláš[1], Marek Svitok[1,2], Radek Bače[1], Daniel Kozák[1], Vojtěch Čada[1], Rhiannon Gloor[1], Jeňýk Hofmeister[1], Ondrej Kameniar[1], Matěj Ferenčík[1], Linda Majdanová[1], PavelJanda[1], Ondřej Vostarek[1], Miroslav Svoboda[1]

[1]Faculty of Forestry and Wood Sciences, Czech University of Life Sciences Prague, Czech Republic;
[2]Faculty of Ecology and Environmental Sciences, Technical University in Zvolen, Slovakia

Primary forests are important biodiversity refuges and serve as reference areas for understanding the effects of global change on forest ecosystems and their functions. Currently, most European forest landscapes are intensively managed, and natural forests are disappearing. Despite the small total area of these valuable ecosystems, many primary forests remain unmapped and unprotected, and they are still directly endangered by logging. Road construction has increased accessibility to mountain areas that were protected mainly for centuries due to their inaccessibility. Although natural disturbances are an essential driver of primary forest dynamics and species coexistence, salvage logging of windthrow and areas affected by bark-beetle outbreaks was the main reason for the observed primary forest loss in the Carpathian region. Forest management, particularly large-scale clear-cutting and salvage logging, have substantially fragmented wildlife populations dependent on high connectivity and primary forest structures.

Consequently, primary forests and the habitats of many rare and endangered species are isolated, and primary forest patches are too small to sustain viable populations. Almost all logging of primary forests was conducted inside protected areas such as national parks or NATURA 2000 sites, underscoring the critical status of forest conservation in this part of Europe. Our extensive study highlights the ineffectiveness of protected areas in Europe and the importance of national primary forest inventories. Effective conservation strategies are urgently needed to stop the rapid loss and fragmentation of the remaining primary forests.

ILLEGAL HUNTING – A MAJOR THREAT FOR THE BBA LYNX POPULATION?

Tereza Mináriková

ALKA Wildlife;
Faculty of Environmental Sciences, Czech University of Life Sciences Prague, Czech Republic

The Bohemian-Bavarian-Austrian (BBA) lynx population stretches along the border of the Czech Republic, Eastern Bavaria, and Upper and Lower Austria. Extirpated in the 19th century, lynx of Carpathian origin were reintroduced here in the 1970ies and 1980ies. The core area comprises the two national parks and landscape-protected areas along the borders. However, the favorable habitat of woodlands stretches far into the lowlands. The population size is currently being assessed as 130 independent animals in the area of 12 000 km2. Due to its small size, isolation from neighboring lynx populations, and the threat of genetic inbreeding, the BBA population is considered highly endangered. Moreover, the population shows very high turnover rates both in subadults (51%) and adults (28%), suggesting high levels of human-induced mortality. Is illegal hunting to blame, and what do we know about this population threat so far?

INTEGRATING ANIMAL MANAGEMENT PRACTICES AND REPRODUCTIVE SCIENCES FOR CONSERVATION OF ENDANGERED UNGULATES

Budhan Pukazhenthi

Smithsonian Conservation Biology Institute, Front Royal, VA, USA

The International Union for Conservation of Nature and Natural Resources recently reported that twenty-eight percent of all species assessed to date are threatened with extinction. Major causes for this decline include loss of habitat, poaching, competition with domestic livestock, disease, and climate change. On-going efforts to conserve various species focus on protecting the habitat, safeguarding animals from poaching, and maintaining self-sustaining insurance populations of animals in human care (zoos and conservation breeding centers). The Smithsonian Conservation Biology Institute is home to 21 rare and endangered species where staff design, develop, and evaluate improved animal management practices to enhance reproductive success, support conservation research, and produce animals for reintroduction. Our general approach involves integrating management practices to facilitate safe hands-on research on rare and endangered species. This presentation will highlight our experiences with wild equids (Przewalski's horse and Persian onager) and a North African desert antelope, the extinct-in-the-wild Scimitar-horned oryx. Our successes can be attributed to our broad institutional support (investments in infrastructure), experienced animal management staff, and systematic approach to understanding the species' biology. We believe that such efforts can assist in maintaining self-sustaining populations and permit species recovery.

DIFFERING PERSPECTIVES ON WILDLIFE MANAGEMENT IN ALBERTA, CANADA AND THEIR IMPACT ON SPECIES SURVIVAL AND BIODIVERSITY

Clio Smeeton

Cochrane Ecological Institute, Canada

The "landscape" view of biodiversity means that the individuals within a species are unimportant from a government perspective here in Alberta. We can examine this using two case studies in which we were involved;

1. Swift Fox reintroductions: In 1978, declared extirpated in Canada and some of the northern United States. The captive Breeding program at CEI in 1971/72 First reintroductions in 1983 concluding in 1997 (over 900 Swift Fox reintroduced) Species declared Endangered in Canada in 1998. The government was reluctant to begin the program and, once started, tried to eliminate CEI. The government is extremely hesitant to accept input from scientists or CEI on release methods. Subsequent releases in Montana proved an increased survival rate for the new method (70% vs. 15% in Canada)

2. Bear (Black and Grizzly) Management in Alberta: Government reluctant to rehab and release Black Bear cubs. CEI and other facilities do work at no cost to the government. Do not respond to Rehabilitation protocol improvement from NGOs. Development protocols with little or no data and limited experience.

Most of the problems that have been encountered in contributing to conservation and biodiversity activities have resulted from the lack of communication opportunities between groups and the inability of groups to try and grasp the concepts proposed by the different bodies or to even listen to the proposals. Changing paradigms on communications between groups (Government and NGOs) is very difficult in the 21st century. In many cases, science and ethics give way to ego-making for deplorable decision-making on both sides.

HOW TO BREED AN EXTINCT SPECIES? THE CURIOUS CASE OF THE NORTHERN WHITE RHINO

Jan Stejskal

Safari Park Dvůr Králové, Czech Republic

The northern white rhino (NWR) is one of the rarest mammals at present. It roamed in large parts of central Africa for hundreds of thousands of years, but due to demand for rhino horns were recently poached to extinction in the wild. There are only two NWR known to humans at present, both females. Both were born in Safari Park Dvůr Králové, Czech Republic, but now live in Ol Pejeta, Kenya, in an environment closer to their original range. As they are not capable of natural reproduction, the NWR is functionally extinct. Its only hope lies in artificial reproduction techniques such as in-vitro fertilization, embryo transfer, or the generation of stem cells that could be used for generating reproductive cells. These techniques are known but have not been performed in rhinos. After years of research, an international consortium of scientists and conservationists coordinated by Safari Park Dvůr Králové and led by Leibniz-IZW Berlin in 2019 created the first NWR embryos in vitro, using eggs collected from the two remaining females and frozen sperm from deceased males. The embryos are now stored in liquid nitrogen to be transferred into a surrogate mother of southern white rhino origin in hopefully the near future. This new approach enhances chances of successful preservation of a species after "classic" conservation approaches – e.g., habitat protection or a regular ex-situ breeding program – did not deliver the hoped-for result.

THE FUTURE OF BIODIVERSITY IN THE ANTHROPOCENE

David Storch

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We live in a time of unprecedented impact of human civilization on the planet, called the Anthropocene. One of the most pressing issues is biodiversity change. However, biodiversity change cannot be reduced to species extinctions, and although extinctions represent the most severe consequence of anthropogenic pressure on the biosphere, many other things are going on. Spreading of non-native species and the emergence of new habitats leads to a rearrangement of biota on Earth, followed by hybridization and emergence of new species, eutrophication, and climate changes leading to increasing ecosystem productivity and changing resource base for consumers. Such processes make predictions concerning biodiversity future difficult without a proper theory of biodiversity dynamics. I will show one theoretical approach to biodiversity dynamics that can be useful for encompassing the complex biodiversity changes that we are facing.

GLOBAL BIODIVERSITY TOWARDS 2030

Veronika Hunt Šafránková

UN Environment Programme, Brussels Office, Belgium

We depend on nature – our livelihoods, health, well-being, and prosperity. More than 70 percent of the world's population living in poverty rely on natural resources. Nevertheless, the use of natural resources has more than tripled since 1970 and continues to grow. According to the Global Resources Outlook 2019, the extraction and processing of natural resources have accelerated over the last two decades and accounts for more than 90 percent of our biodiversity loss.

Biodiversity loss is one of the triple – interconnected – planetary crises we face today, along with climate change and pollution, and hence must be addressed together. Nature, for example, offers a range of solutions that could effectively tackle climate change and provide essential ecosystem services. Nature-Based Solutions play a key part in climate and biodiversity, offering a broad range of actions that deliver benefits for climate resilience, healthy populations, sustainable economies, green jobs, and biodiversity conservation.

The presentation will bring some of such examples on a global scale and references to the European Green Deal. The overall focus will be on global efforts to prevent, halt, and reverse the degradation of ecosystems as we marked the UN Decade on Ecosystem Restoration launch in June 2021. It will include the to-be-negotiated post-2020 global biodiversity framework at the UN Biodiversity Conference in 2021 and 2022, which will guide actions worldwide through 2030 to preserve and protect nature and its essential services to people context of the Earth's interrelated environmental emergencies.

THE PRZEWALSKI'S HORSE: A TEXTBOOK CONSERVATION STORY AND ITS FUTURE CHALLENGES – THE RETURN OF THE WILD HORSES PROJECT

Jaroslav Šimek, Miroslav Bobek

Prague Zoological Garden, Czech Republic

Owing only to the ex-situ breeding, the Przewalski's horse, once eliminated from the wild, has returned to its homeland since the early 1990s. Three reintroduction projects were established in Mongolia, with various successes and challenges. Severe winters are limiting factors for re-established populations, as in 2010, when 2/3 of the Gobi's population was wiped out. Prague Zoo's Return of the Wild Horses project was launched to boost the surviving population. By unique cooperation with the Czech Army and the International Takhi Group, 38 horses were released in western Mongolia. These releases significantly contributed to the recovery of the population and its continuous increase. However, quantity is not the only and ultimate factor guaranteeing long-term survival. There are other challenges to cope with, like regular surveillance, habitat exploitation, livestock competition for pasture and water sources, genetic diversity, risk of hybridization, or impact of climate change. Therefore, similar activities are essential and consist of support for local rangers, governmental conservation bodies, related monitoring and research, support for the local communities, and even political lobbying. To diminish the risk of having "all the eggs in one basket", the fourth reintroduction site in eastern Mongolia is being prepared.

SAVING THE RARE SPECIES OF THE ANNAMITES: THE NEXUS BETWEEN IN-SITU AND EX-SITU CONSERVATION

Andrew Tilker

Re:wild, USA;
Leibniz-Institute for Zoo and Wildlife Research, Germany

Anthropogenic pressures have caused the widespread loss of biodiversity from tropical forests. Among tropical regions, the Annamites ecoregion of Vietnam and Laos is exceptional because of its high concentration of endemic species – including several mammals only recently discovered by science – and the level of threat it faces from the unsustainable hunting through indiscriminate snaring. Annamite endemic species such as the saola (Pseudoryx nghetihnensis) and large-antlered muntjac (Muntiacus vuquantensis) are Critically Endangered and close to imminent extinction, while others such as the Annamite striped rabbit (Nesolagus timminsi), Owston's civet (Chrotogale owstoni), and the Annamite subspecies of crested argus pheasant (Rheinardia ocellata ocellata) are Endangered and not far behind. To save the Annamites' biodiversity, conservation stakeholders will need to build new and collaborative approaches that integrate in-situ and ex-situ conservation strategies under the IUCN One Plan Approach. Under this approach, in-situ threat reduction works parallel to establishing ex-situ conservation breeding populations to prevent the extinction of highly threatened species in the short term and secure areas for reintroduction in the future. An integrated in-situ and ex-situ approach can save the Annamite species from extinction if conservation stakeholders act quickly. This type of collaborative approach also can serve as a model for species conservation in other contexts.

THE LINKS BETWEEN THE CIRCULAR ECONOMY, CLIMATE CHANGE, AND BIODIVERSITY IN CITIES – A STORY FROM PRAGUE

Vojtěch Vosecký

Circle Economy, Sweden

Cities play a vital role in the global economy. Home to more than half of the world's population, they are creative, innovative growth centers. However, with the expected projections of our population reaching 10 billion by 2050 and urbanization up to 70%, the way we build our cities in the next 30 years will decide about the future of our planet.
At the same time, ninety percent of biodiversity loss is caused by the way we extract and process materials, fuels, and food in what is fundamentally a linear economy.

The good news is that this economy can be redesigned. A circular economy provides powerful tools to tackle the root causes of biodiversity loss, such as the production and consumption of goods and services, waste generation, and climate change, by phasing out waste, keeping resources in perpetual loops, without the loss of quality and by regenerating the local ecosystems.

The presentation will focus on global issues and tell a local story about Prague, its carbon neutrality pledge, its circular economy journey, and the results and lessons learned until now.

THE OTHER SIDE OF CONSERVATION: HOW PEOPLE IMPACT THE SUCCESS OR FAILURE OF A CONSERVATION INITIATIVE

Matthew Ward

Talarak Foundation Inc., Philippines

Conservation is the challenge to preserve endangered species and overturn or mitigate the threats that affect them. As biological researchers, we look predominantly at habitats and wildlife, aiming to improve their survivability by studying their life histories, ecology, and interactions. However, we are missing some of the most significant impacts on survival by looking here. During the release of endemic and critically endangered species in a small protected reserve, we have developed research and ecological studies to monitor the survival of these released individuals. However, we are also involved in community engagement to ensure that any anthropogenic threats are mitigated. We entered the Bayawan Nature Reserve wildlife reintroduction project with the intention of the wildlife and community being treated equally, having a regular engagement with the local people, ensuring to respect and represent the local community values in our activities, and building the local financial and skill capacity. So far, we have seen that this approach shows an excellent level of mutual respect from the community personnel. Without using only financial incentives, we have built pride and excitement within the local villages, but we are also having great success in local hiring to develop the community's economic options and build skills for their future.

CAN WE MAKE IT TOGETHER? LOCAL COMMUNITIES' AND RANGERS' PERCEPTIONS ON PROTECTED AREAS MANAGEMENT IN GHANA

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Local rural communities in Africa are dependent on hunting and natural resources for their livelihoods and rely on their understanding of the environment. On the side of protected areas management, rangers are front-line workers conducting law enforcement patrols to control illegal activities. These two groups seem, therefore, to have irreconcilable attitudes and roles. An understanding of local ecological knowledge and perceptions of people towards conservation area purposes is therefore essential for protected areas management to form effective and sustainable conservation management plans and recognize people's role in conservation and find ways for mutual communication and cooperation. Our research aimed to expand the understanding of local communities' perceptions of protected areas and what makes people support nature conservation in nine protected areas in Ghana (n=1259 households). Motivations of rangers for doing their job in protected areas were explored additionally to complete the picture on the conservation in protected areas (n=67 rangers). While prevailing reasons for illegal activities were economic, most local people expressed positive attitudes towards protected areas for economic reasons (job opportunities) and acknowledged non-consumptive ecosystem services. Rangers mostly appreciated their job, motivated through an intrinsic sense of ownership, but they pointed out also the insufficient recognition by higher authorities and inadequate equipment and salaries. After coupling all findings, there are significant positive common grounds in both groups' attitudes which are possible to put together with the potential to apply for collaborative conservation.

ENDEMIC LIZARDS *GALLOTIA GALLOTI* INFECTED BY INVASIVE NEMATODE *ANGIOSTRONGYLUS CANTONENSIS* IN TENERIFE, SPAIN

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The Canary Islands are a biodiversity hotspot with numerous endemic species threatened by biological invasions. Among others, *Rattus rattus* and *Rattus norvegicus* threaten many endemic species by predation and may spread invasive pathogens, including the rat lungworm *Angiostrongylus cantonensis*, an invasive metastrongylid zoonotic nematode. This parasite causes eosinophilic meningitis in its accidental hosts – various vertebrates, including humans – and impacts wildlife health. Even though the parasite originates in South-East Asia, it has spread worldwide, especially into fragile island ecosystems. Since 2010 it has been known from the north of Tenerife as well. *Gallotia galloti* is an endemic lizard in the Canaries, native to Tenerife and La Palma. It is known that some lizards serve as paratenic hosts to *A. cantonensis*, and this study evaluates the role of these endemic lizards in the parasite's lifecycle. Thirty-nine specimens of G. gallot were captured in Tegueste, Tenerife, and liver samples were examined microscopically and by qPCR for *A. cantonensis* larvae. During the microscopic examination, eight liver samples (20,51%) contained cysts with nematode larvae. Ten samples were positive using qPCR (25,64%). This study is the first report of a reptile species acting as paratenic host of *A. cantonensis* in the Canaries. The parasite is well-established in this island ecosystem and uses endemic lizards as transporting hosts may have important implications for the parasite's ecoepidemiology and for other species that depend on lizards as their food source well.

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HYBRIDIZATION OF WOLVES AND DOGS: INTRODUCING RESEARCH ABOUT ARTIFICIAL SELECTION AND ITS EFFECT ON GENOME

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The evolution of dogs had dated approximately to 15-40kya when the process of wolf domestication appeared. Since then, the wolves and dogs have separated into distinct species but still lack a complete reproduction barrier due to the incomplete lineage sorting and no establishment of isolating reproductive mechanisms. Introgressive hybridization is present in many species and is usually considered a threat, especially for small and endangered wild populations.

The lack of reproductive barrier was later used in several, mainly military, independent experiments when humans crossed wolves and dogs to create new dog breeds. The aim was to create a strong, persevering wolf-alike individual with the tameness and trainability of the dog. These experiments are known from Czech Republic (*Czechoslovakian wolfdog*), Netherlands (*Saarloos wolfdog*), Russia (Volkosob), United States (American wolfdog), or China (Kunming). These breeds are good model organisms for studying artificial selection, hybridization, and their effect on an individual's genome. However, ubiquitous artificial selection may bring side effects that might also be negative. In the end, the artificial selection may harm an organism with accumulated runs of homozygosity, selective sweeps, or genetic hitchhiking. Within these genomic regions, fixed harmful alleles can be transferred to the next generations.

So far, we have used 73.341 SNPs shared within Saarloos wolfdog, Czechoslovakian wolfdog, and the wolves. Using the genomic data in domestic species, whose genome is well known, can predict the effect of hybridization on the genome for wild species and impact species conservation.

MOLECULAR TAXONOMY OF TERMITES IN EBOGO II (CAMEROON)

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The termites are indispensable insects mainly living in tropical regions. Termites decompose dead plant biomass in the forests, relocate the matter by tons per hectare annually, and are thus crucial in nutrient recycling and creating soil heterogeneity and aeration. Unfortunately, deforestation and turning forest stands into the plantations reduce the termite diversity and abundance, leading to soil impoverishment. Studying the termite diversity in the tropical forest is a necessary first step to understanding the complexity of the soil nutrient cycles. The termites' species identification is traditionally based on the soldier caste, which is often rare or even missing, especially in soil-feeding termites, making most termites inhabiting tropical forests. Modern molecular approaches allow for rapid and precise identification of the species by the selected barcode gene – we used the cytochrome c oxidase subunit II (COII) gene. We selected 940 individual samples and identified by COII more than 75 termite genera collected in the past decade for several past and running lab projects around Ebogo II (Mbalmayo, Cameroon). The highest diversity of termites occurs in forests higher than surrounding swamps or crop fields. Also, we found here two genera new to the science (*Roisinitermes, Ebogotermes*).

CONSERVATION GENETICS OF PANGOLINS IN THE CONGO REPUBLIC

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Pangolins are currently considered the world's most illegally trafficked mammals, and their numbers continue to decline. Furthermore, there is still a lack of knowledge on their population structure and dynamics. We provide the first population-level molecular study focused on pangolin populations in Odzala-Kokoua National Park in the Congo Republic. We sampled individuals of White-bellied pangolin (*Phataginus tricuspis*) and Giant pangolin (*Smutsia gigantea*) and analyzed their mitochondrial (control region) and two nuclear markers (beta-fibrinogen, titin). The mitochondrial haplotype network in *P. tricuspis* indicates differences between sub-populations from western and central Africa, supporting the cryptic diversity of *P. tricuspis*. We detected population growth in *P. tricuspis* 500 kya. The population expansion started during a period of aridity, and it seems that P. tricuspis is, to some extent, capable of adaptation to various conditions and is not fixed solely to rainforest habitat.

In *S. gigantea*, we detected a slow decline that started around 500 kya, probably also driven by habitat changes. According to genetic distances between the samples from Odzala-Kokoua NP, we estimate the local origin of the pangolins at the trade market. The study provides data on the population structure and dynamics of pangolins in the Congo Republic and can be used to better understand the population biology of pangolins and the local trade dynamics and may contribute to conservation management planning.

INDIVIDUAL DEVIATION OR CAPTIVE BREEDING FAILURE? A PECULIAR CASE OF POST-RELEASE BEHAVIOR OF REINTRODUCED CAPTIVE-BRED LITTLE OWL (*ATHENE NOCTUA*)

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Ever-increasing pressure on the environment resulting in constant biodiversity loss, population restoration programs using captive-bred individuals are becoming more important tools in species conservation than ever. A pivotal aspect contributing to the success of such programs is the selection of suitable habitat, one that meets a species' biotic/abiotic needs through space/time. However, securing adequate locations does not always imply that the released individuals survive and/or remain at the release site. Captive breeding programs delivering vital individuals ready to be released equally important. Our study (Bušina et al. 2021, Glob. Ecol. Conserv.) provides a record of unusual post-release spatial behavior and erroneous habitat selection by the little owl (*Athene noctua*), for which a restoration program was launched in the Pilsen region (Czech Republic) due to the constant population decline. During observations, the absence of forest avoidance specific for this species, along with unusual underground roosting, were observed. More specifically, one of the soft-released captive-bred individuals settled in a patch of dense forest, establishing a home range equivalent in size to 3.54 ha. Within its home range, underground cavities were regularly used for diurnal roosting. It is crucial to determine whether this behavior was just an accidental event or the result of captive breeding management and thus whether its manifestation can be expected in other individuals that originate from captivity in the future. In this case, the captive breeding conditions do not allow such a behavior deviation before release. Therefore, we strongly suggest not neglecting intense post-release monitoring.

LIVING THROUGH MULTISPECIES SOCIETIES: THE BORDERS OF BEING HUMAN

Laÿna Droz

Basque Center for Climate Change, Spain

How can we think about biodiversity and our relation to it and integrate it in decision-making and practices? This question lies at the core of debates in biodiversity conservation policy-making. Two slippery slopes must be avoided. On the one hand, erasing other species and our dependence on them from the discourses and decision-making leads to unsustainable practices, which threaten both humans and biodiversity. On the other hand, erasing the limited, cultural, and prone to error perspective of the humans who make decisions can lead to ecofascist practices and abuses against other human groups and other-than-human elements by naturalizing claims, placing them beyond criticism by other humans, and imposing them on other worldviews and cultures.

A way forward would be to rethink what it is to be human while acknowledging our interdependence to the other-than-human world and our limited cognitive and sociocultural tools and knowledge. The Life Framework of Values proposes the four dimensions of living from, with, in, and as nature to map the global diversity of human-nature relations1.This paper argues for a fifth dimension to go beyond the "human-nature" divide and capture the interdependent and ever-changing aspects of the relation of human life to nature: living through multispecies societies. The case of the human microbiome is developed as an archetype of the dynamicity and porosity of the borders of our bodies and communities.

RIDING A VIRTUAL TIGER: HOLD ON TIGHT!

Radana Dungelová, Jan Horešovský

Zoo Brno and Environmental Education Centre, semi-budgetary organization
Wild Immersion Productions Limited, Czech Republic

Brno Zoo invites all to a new center focused on modern approaches in species conservation education. We have already accepted the role that modern technology plays in the lives of visitors as a fact. We called the project, where we offer virtual meetings with wild animals and knowledge in nature conservation, the Brno Zoo Virtual Expedition. Innovatively, we fulfill our mission to awaken understanding for wildlife and motivation to protect it.

In search of suitable content, we met the company Wild Immersion, which has grasped state-of-the-art technologies for the benefit of enlightenment and conservation education and actively supports specific species conservation projects. The legendary Jane Goodall became their project's patron. We opened the venue in January 2020. During covid restrictions, we developed opportunities for cooperation with Wild Immersion, which proved to be extremely promising at a time of growing demand for digital content. The formal business relationship quickly grew into something completely new. Modern technology will continue to help us reverse species extinction. We share the planet, we share the values, and we can help each other professionally. Zoo Brno brings its expertise in wildlife and educational needs. Wild Immersion helps with technical issues. We are convinced that a model can also be applied in other zoos. Together, we are developing an utterly innovative fundraising tool to support global biodiversity conservation that the zoo community will undoubtedly hear about soon, too.

STUDY OF HOSTPLANT SPECIALIZATION IN A POPULATION OF THE POLYPHAGOUS BUTTERFLY *CATOPSILIA POMONA*

Tusheema Dutta, Ullasa Kodandaramaiah

IISER Thiruvananthapuram, India

Many herbivorous insects which have generalized diets over the species' entire geographical range show a great tendency to function as specialists with restricted diets in local communities. Specialization may mean that a species uses a relatively narrower portion of a resource spectrum than a generalist. Specialization often leads to speciation. Colonization of new niches is also a strong driving force for speciation. 250 *Catopsilia Pomona* larvae were collected from Trivandrum, Kerala, from January to May 2021. We measured oviposition and neonate preference of about 120 second-generation captives on four host plants: *Cassia fistula, Senna Tora, Senna siamea,* and *Sesbania grandiflora*. We found that both adult females and larvae preferred only *C. fistula* young leaves, and larvae did not survive when forced to feed on the other three species. The results demonstrated that the population in Trivandrum is highly specialized on *C. fistula*, and there might be a possibility of coevolution or formation of a new subspecies.

HOME RANGE AND MOVEMENTS OF A TRANS-LOCATED SUMATRAN TIGER (*PANTHERA TIGRIS SUMATRAE*) BASED ON GPS COLLAR MONITORING

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Detailed studies on the movement ecology such as distance, speed and home range intensity have not been carried out for the Sumatran tiger. This study aims to know such movement aspects of a trans-located Sumatran tiger. The animal was a trans-located male individual that entered human settlement in Pulau Burung Indragiri Hilir regency in November 2018. After eight months rehabilitation in Dharmasraya Sumatran Tiger Rehabilitation Center. The individual was released in Giam Siak Kecil-Bukit Batu Biosphere Reserve from July 2019. This study analyzed coordinate of 46 days movements that collected by GPS collar. The results showed that the Sumatran tiger individual has 259.11 Km2 home range, average 2,165 m daily movement, average speed 113.84 m/h, and the movements does not always move in a straight line that has ratio 0.63 between distance and movement. Based on this result we discuss movement ecology of the Sumatran tiger in comparison to previous studies.

PRELIMINARY MODELS FOR PREDICTING CURRENT AND FUTURE DISTRIBUTION OF TWO BOREAL OWL SPECIES IN RESPONSE TO CLIMATE CHANGE

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Species distribution models (SDMs) are an essential tool in species conservation with good reason, one of which is their ability to predict the distribution of species under climate change. In Serbia, our study area, two boreal owl species, *Aegolius funereus*, and *Glaucidium passerinum*, are listed on Annex I of Birds Directive, whose distribution is linked to coniferous and mixed forests in higher altitudes and are endangered by deforestation in these areas. Therefore, we aimed to assess these two species' current and future distribution of conservation importance under the effects of different climate scenarios. To evaluate these species' current and future distribution in Serbia, we utilized the most common program for SDMs, MaxEnt (3.4.4), by using species' presence-only data, elevation and high-resolution current and future climatic data obtained from the World Climate Database. Our model showed that the high suitable areas for *A. funereus* and *G. passerinum* cover 20 and 23 km2, respectively. In response to the three future climate scenarios, *A. funereus* increased its range for the RCP 4.5 and RCP 6 but decreased for RCP 8.5 climate change scenarios. In comparison, *G. passerinum* increased its range for RCP 4.5 and RCP 8.5 but decreased for RCP 6. Overall, our preliminary models contribute to the knowledge of both species' current distributions, which is valuable for their future conservation projects and management strategies in Serbia. As for the future predictions related to climate change, future research should include more environmental variables to obtain a more precise SDM.

THE COEXISTENCE OF THE WEST AFRICAN GIRAFFE AND HUMANS IN NIGER

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The West African giraffe (*Giraffa camelopardalis Peralta*) was spread across much of the Sudano-Sahelian zone but is now only present in Niger. Several factors caused the dramatic decline during the later 20th century. In 1996, only 49 individuals remained, concentrated in the 'Giraffe Zone (GZ), formally not protected area ~60 km from the capital Niamey. Conservation activities resulted in the increase of the giraffe population to currently >600 individuals. In November 2018, a new satellite population was established by reintroducing eight giraffes into the Gadabedji Biosphere Reserve (GBR) where the animal disappeared in the 1970s.

The close human-giraffe coexistence from time-to-time results in a conflict and people's complaints about crop damages. On the other hand, the community put much effort into giraffe conservation.

To better understand this apparent paradox, the study aimed to assess people's attitudes towards giraffes in GZ and GBR. Data from 312 questionnaires in the two areas highlighted contrasting perceptions towards giraffes: in the GZ, people reported more giraffe-related issues than in the GBR ($x2=185.8$; $p<0.001$). The human-giraffe coexistence was seen beneficial only for 48% and 15% of respondents in the GZ and GBR, respectively. Despite these somehow negative perceptions, people declared they were happy to live nearby the giraffe for 95% and 98% of them in the GZ and GBR, respectively. The findings are essential to understand the coexistence of local people and giraffes and ensure that benefits overweight the cost, mitigate the conflict, and support initiatives for the giraffe.

WORRYING FOR WRONG BEES? EXEMPTED REDEMPTION THROUGH THE EYES OF WILD BEES: A CASE STUDY IN INDIAN EASTERN HIMALAYAS

Dibyajyoti Ghosh, Ratnesh Karjee, KA Subramanian

Southern Regional Centre Zoological Survey of India, India

Globally 87.5% of plants are dependent on animals for pollination services; Bees are known to be very established and effective pollinators due to their morphological and behavioral changes to collect plant-specific resources (pollen and nectar). Recent studies have shown pollinator decline worldwide and have predicted several responsible drivers influencing the decrease of pollinator diversity and abundance spatially and temporally. Multi-modal approaches are therefore explored for the conservation need of bees both locally and on a large scale. A study was done in the Indian eastern Himalayas, a biodiversity hotspot region, to understand the role of habitats in bee abundance and distribution. The chosen study site is a high-altitude region, predominantly inhabited by the "Mondpa" tribe with a community conservation approach (CCA), which subsequently facilitated a locally conserved pristine habitat and native biodiversity. The crops are harvested organically without any use of chemical pesticides or insecticides. Bee specimen were collected from crop fields and adjacent non-crop plants (shrubs, herbs, and weeds) to understand the changes in abundance and species diversity in two different habitats. A total of seven crops and 23 species of non-crop plants were surveyed to deduce which habitat has more influence on harboring bee community dynamics.

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ANTELOPE CONSERVATION ACROSS WEST AFRICAN SAVANNAH

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The effective conservation of mammals on the brink of extinction requires an integrated socio-ecological approach. The knowledge of ecology remains fundamental in designing successful conservation plans while decolonizing research, local capacity building, and local communities' environmental awareness through school education and public campaigns represent other pillars for the ecosystem conservation approach accounting for human dimensions on a large scale.

The West African savannah is rich in diversity of antelope species, yet facing similar threats across the savanna belt from Senegal to Chad, especially habitat loss, competition with livestock, poaching, and climate change. Many antelope species are at the brink of extinction; for instance, Western Derby eland as one of the most endangered animals in the world. At the threshold of long-term viability, its numbers are deficient and spatially restricted only to Niokolo Koba National Park in Senegal. It is a flagship species, then conservation measures based on ecological knowledge and strengthening capacity and cooperation of local networks may promote conservation of other species in the ecosystem. West African hartebeest, Western kob, Defassa waterbuck are few examples of other antelopes dwelling in the West African savanna facing similar threats regardless of protected area and country. To ensure that the antelopes will have the opportunity to play their ecological roles and remain a part of this unique ecosystem for future generations, we promote and support ecological research of local early-career academics, educate local environmental educators, environmental awareness campaigns, local communities' involvement in conservation activities in Senegal, Niger, Benin, Chad, Cameroon, and adjacent areas.

DISTRIBUTION AND MOVEMENT OF KORRIGUM (*DAMALISCUS LUNATUS KORRIGUM*) AND WESTERN HARTEBEEST (*ALCELAPHUS BUSELAPHUS MAJOR*) IN W-ARLY-PENDJARI (WAP) COMPLEX, WEST AFRICA

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Korrigum (*Damaliscus lunatus korrigum*), classified by IUCN as Endangered, and western hartebeest (*Alcelaphus buselaphus major*) as Vulnerable, are the only two Alcelaphini representatives occupying West African savannah. Moreover, the WAP (W-Arly-Pendjari) Complex in Niger, Burkina Faso, and Benin is one of the last strongholds where their populations occur together. Wildlife in this complex of protected areas has been affected by poaching, habitat loss, competition with cattle, uncontrolled bushfires, and the influence of climate change. We provide new insight into the korrigum and hartebeest distribution and movement patterns due to the lack of previous studies and rapidly decreasing trends in both populations. First, we deployed 58 camera traps in Pendjari during March-June 2020. We then fitted six korrigums and eight western hartebeests with GPS collars in Pendjari and W in December 2020. Since that, the data has been continuously gathered, giving GPS locations of each animal 12 times per day. The results from the camera traps will show us occupancy and habitat preferences. By applying a continuous-time movement model to data from the GPS collars and using the autocorrelated kernel density estimator (AKDE), we will account for differential space use and movement between species, among individuals, sex, regions, and habitat types. In addition to spatial information, this will also help us identify impending threats that might impact populations' sustainability.

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EFFECT OF LIVELIHOOD DIVERSIFICATION ON WELL-BEING OF HOUSEHOLDS INVOLVED IN COLLECTION OF NON-TIMBER FOREST PRODUCTS (NTFPS): A CASE STUDY OF OYO STATE, NIGERIA

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Livelihood diversification has become an essential income-generating strategy for households who depend primarily on NTFPs due to the depletion of these forest resources. This study was carried out to analyze the effect of livelihood diversification on the well-being of households involved in the collection of NTFPs in Oyo State, Nigeria. Well-being was addressed using a multidimensional approach from which a composite well-being index was generated. Data were collected through a semi-structured questionnaire administered to 120 households selected through a multi-stage sampling technique. Simpson's index of diversification(s), fuzzy set analysis, and Tobit regression were applied to; quantify/estimate livelihood diversification; generate well-being indices, and reveal the factors responsible for the well-being of households in the study area, respectively. The average diversification index of the respondents was established as 0.009. The overall composite well-being index in the dimensions examined was relatively low at 0.287. The well-being indices of the respondents that fall into low, medium, and high levels of diversification were at 0.232, 0.353, and 0.263, which shows that households involved in NTFP collection with a medium level of livelihood diversification have the highest well-being index. Inadequate access to credit facilities and increased monthly expenditure on non-food items were factors identified to affect the well-being of households involved in the collection of NTFP in the study area. Therefore, it was recommended that relevant agencies collaborate with the government to formulate policies to improve farmers' access to credits with little or no interest rates.

CLIMATE CHANGE IMPACTS ECOSYSTEMS AND ADAPTATION OPTIONS IN NINE COUNTRIES IN SOUTHERN AFRICA: WHAT DO WE KNOW?

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Southern Africa harbors exceptional biodiversity increasingly threatened by climate change, land use, and other pressures. However, risks to the regional ecosystems and quality and consistency of adaptation strategies remain understudied, making conservation and restoration efforts challenging. Here we reviewed scientific articles published during the period 2000-2020, which (i) addressed observed and projected impacts of climate change on different species, populations, and ecosystems in nine southern African countries, and (ii) formulated management and policy responses aiming to mitigate these impacts. We identified and evaluated 28 papers meeting these search criteria. We found that the three components of our investigation, i.e., ecosystem type, type of impact, and management and policy responses, were covered by research rather fragmentarily. However, the reviewed publications addressed various species and ecosystems and various ecological processes, ranging from local extinction, range contraction, and increased mortality to modified inter-specific interactions. The identified human responses included active vegetation and animal management, improved conservation policies, and monitoring. Most of the publications highlighted severe data limitations, lacking coordination of conservation policies, and insufficient consideration of transient environmental conditions in management and policy planning. We conclude that the current understanding of climatic threats to species and ecosystems is limited in southern Africa, and new coordinated research and monitoring actions are needed. This review characterized the high diversity of climate change risks to ecosystems and related social responses, potentially helping to attract further research attention and inform regional adaptation strategies.

NEW ONLINE ATLAS OF CZECH LICHENS AND DATABASE OF LICHENS AND BRYOPHYTES IN THE CZECH REPUBLIC

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Online Atlas of Czech Lichens (Dalib.cz) was created to make the data on the occurrence and ecology of all the lichens known from the Czech Republic more accessible and understandable. For each species, the website presents dynamically generated maps of distribution, current Red-list categories, description of ecology and substrate preferences, photographs, and prediction models of a potential distribution. General functions include an interactive biodiversity model, identifying, for example, the national diversity hotspots. The portal uses data from Dalibor (Database of Lichens and Bryophytes, available at Dalibor.ibot.cas.cz), a database of bryophytes and lichens of the Czech Republic created in 2019. This tool is designed to integrate, administrate and validate species occurrence data scattered in the literature, institutional and personal databases, and herbaria. The database serves scientific purposes, such as evaluating changes in species distribution and abundance during the time, predictive distribution models, and assumptions of new localities for rare species. The practical application of both domains, the Dalibor database and the Online Atlas of Czech Lichens, is primarily focused on nature conservation.

CONSERVATION INSIDE OUT: GASTROINTESTINAL PARASITES OF THE WESTERN LOWLAND GORILLA (*GORILLA GORILLA GORILLA*)

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Western lowland gorillas (*Gorilla gorilla gorilla*) are among the most critically endangered mammalian species, showing continued population decline. They are key components in their ecosystems, helping maintain functional biodiversity in the tropical forests they inhabit. They are also considered scientifically valuable for their close phylogenetic relationship to humans (Homo sapiens). Effective species conservation relies on understanding their ecology and conservation threats, including those encompassed by parasitic diseases. Gastrointestinal parasite infections are typically asymptomatic in primates, but alterations to transmission mechanisms or host conditions can exacerbate clinical implications, such as those caused by habitat disturbance, changing climate, or shifting group dynamics. While gorillas host a broad spectrum of parasites, strongylid nematodes are particularly prevalent, occurring in complex communities within host individuals. Though, little is known on their diversity, with traditional coproscopic techniques insufficient for species or even genus level identification. To investigate this, we analyzed fecal samples from 212 wild western lowland gorillas from five distinct localities. We applied novel high-throughput sequencing techniques to describe and compare the genetic diversity of these strongylid communities. We identified Necator and Oesophagostomum as consistently dominant across localities but found community composition varied. We also identified species previously described in humans, highlighting a zoonotic potential for parasite transmission, which should be considered for both wildlife conservation and public health. Our research highlights the complexity of strongylid communities in gorillas and provides a framework for ongoing research amongst great apes, establishing baseline data for inclusion in conservation management strategies.

POPULATION GENETICS OF MONGOLIAN MAMMALS

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The number of livestock increases worldwide, contributing to an escalation of human-wildlife conflicts. This trend is evident in developing countries like Mongolia, where most people depend upon livestock production for food and revenue. As livestock grazelands expand, they overlap with wildlife habitats, making interactions and resource competition inevitable. Molecular data to address how the populations cope with the latest trends via population genetics parameters is mostly missing. This lack of data makes it harder for ecologists to assess species' conservation status. From what we know, genetic swamping through hybridization is possible in some species but has not been studied till today. The same applies to other molecular approaches like metabarcoding, which uncovered conflicts in trophic relationships between related species and their domestic forms.

For one year now, we have been collecting fecal samples in the natural reserves of Mongolia. We aim to provide a basic population genetic overview of the selected species of mammals (*Canis lupus, Procapra gutturosa, Saiga t. mongolica, Gazella subgutturosa*). The same samples will be used to investigate trophic ecology in Mongolian ecosystems, which may help mitigate the country's human-wildlife conflict.

VARYING EFFECTS OF TREE DIVERSITY ON BIODIVERSITY OF CENTRAL EUROPEAN FORESTS: IMPLICATION FOR FOREST MANAGEMENT

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Increasing tree diversity is one of the critical adaptations of forest management to support the resilience of Central-European forests. However, it is not clear how such changes will affect the diversity of understory plants and invertebrates, which represent the majority of forest organisms in terms of forest biodiversity. We combined extensive field sampling with structural equation modeling to tackle the issue to evaluate the simultaneous effects of tree diversity, composition, and environment on the species diversity of understory herbs, beetles, and earthworms. The results showed that tree diversity increased the species richness of earthworms and saproxylic beetles but slightly decreased the richness of herbs. Tree composition had a variety of mainly indirect but significant effects ranging from negative to positive. Increasing tree diversity in forests might be, therefore, beneficial for invertebrate organisms but not for herbs. However, the strong tree identity effects suggest that, in terms of biodiversity protection, the main focus of forest management should be on proper tree species composition.

ALLELOPATHIC POTENTIAL OF *ROSA GORENKENSIS* BESSER AS ONE OF THE MECHANISMS OF INFLUENCING THE BIODIVERSITY

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The natural range of *Rosa gorenkensis* Besser is limited to the southern regions of the European part of Russia, the northern part of Kazakhstan, western Siberia, and Ukraine. It has long been cultivated or wild in Lithuania, Latvia, Estonia, and Poland. In Europe, it is considered an invasive species. It has the kenophyte status and has been included in the "List of Species Alien in Europe". However, its negative impact on the diversity of native flora or other elements of natural habitats has not been described so far. In the experiment performed here, the germination reactions of monocotyledonous and dicotyledonous plant seeds to the aqueous extracts of *R. gorenkensis* were investigated to determine the allelopathic potential of this plant.

Seeds of common plants – wild-growing *Festuca Rubra* L. and cultivated *Raphanus sativus* L. var. *radicula* Pers. cv. Rowa were treated with aqueous extracts from the roots, stalks, leaves, and flowers of *R. gorenkensis* at concentrations 1%, 2.5%, and 5%. Along with the increase in the concentration of allelochemical compounds in the extracts, a negative effect on the germination capacity of the tested seeds was observed. Depending on the concentration and type of the extract, changes in biomass and water content were also revealed. The most remarkable differences in the leakage electrolytes were noted in seedlings watered with 5% of extracts. The study showed that the aqueous extracts of leaves and flowers of this species had the greatest allelopathic potential, increasing its expansion possibilities.

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FISHPONDS AS BIODIVERSITY HOTSPOTS IN CENTRAL EUROPEAN LANDSCAPE: ACTUAL STATUS AND POSSIBLE MANAGEMENT

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Fishponds and fishpond systems represent the common wetland types in Central European Landscape, including the Czech Republic. Fishponds were created in suitable sites since the Middle Ages and often replaced the original wetlands (peatbogs, flooded meadows, riparian forests, etc.). Recently, they represent shallow, eutrophic water bodies, often over-grown with littoral macrophytes. Almost all fishponds are recently aimed at fish production (mostly Carp *Cyprinus carpio*), which has increased since the 1880s.
In Czech fishponds, the numbers of breeding populations of many waterbird species had increased till the early 1980s when the numbers of grebes, ducks, coots, and Black-headed Gull dramatically declined. The decline can be explained by a direct effect of increasing fish stocks. The significant grazing effect of fish (especially Carp) has been recognized as affecting benthic and plankton communities, the extent of littoral vegetation, and consequently, water transparency.

Based on a seven-year (2014-2020) experiment with reduced fish stock, we found an increase in the number of waterbirds and improved its reproductive success on Rod fishpond (Třeboň Biosphere Reserve). It seems that establishing a functional network of fishponds with reduced fish stock can improve the population dynamic of invertivorous waterbirds, as the indicator species, in the long-term period.

INVENTORY OF FOOD AND MEDICINAL PLANT SPECIES IN URBAN HOMEGARDENS OF BOGOTA, COLOMBIA

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Homegardens offer habitats for a high diversity of plants in urban contexts. They have been recognized to provide local communities with easily accessible, diverse, and affordable nature-based (re)sources to meet their dietary and healthcare needs. This study aimed to characterize usefully tolerated and actively cultivated plant species diversity in home gardens from Bogota, Colombia, and analyze its contribution to gardeners' livelihoods. We thus visited 119 homegardens between February and June 2021. A total of 131 food and medicinal plant species (16% native and 84% exotic) were recorded through a walk-in-the-woods approach combined with semi-structured interviews where respondents were encouraged to show all valuable plants in their gardens. From the 43 families registered, the best-represented were Lamiaceae (with 16 species), Asteraceae (12), Solanaceae (12), and Rosaceae (9). Additionally, twenty-one families were represented only by one species. Most of the species documented were herbs (71%) and were used only for food (39%) or for both food and medicine (36%). The importance of documented species for local households was quantified through the Relative Frequency of Citation index, identifying *Brassica oleracea* (RFC = 0.72), *Lactuca sativa* (RFC = 0.64), *Beta vulgaris* (RFC = 0.55), *Apium graveolens* (RFC = 0.53) and *Ruta graveolens* (RFC = 0.53) as the most important species for Bogota inhabitants. These findings suggest homegardens act as a medicine and food pantry for households, enhancing people's well-being.

THREATS TO BIODIVERSITY RESULTING FROM LOW REFLECTION OF THE LIVING WORLD COMPLEXITY IN CLIMATE POLICIES

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Humanity faces an unprecedented multifaceted environmental crisis. The climate change issue dominates in media, politics, and the public, while loss of biodiversity, land cover change, depletion of water resources, or threats to food and health security (except COVID-19) have a lower priority. IPCC prognosis on the atmosphere temperature increase near the earth surface up to 3.5-5.7 °C till the end of the century (in unfavorable scenarios), and studies on its impacts on environment and biodiversity are mobilizing. Based on the Paris Agreement and European Green Deal numerous strategies and measures are adopted to mitigate and adapt to climate change. However, underestimating the living world complexity is a problem, leading to deepening the crisis, e.g., the UK and EU orientation on bioenergy as a substantial renewable resource. Consequences include massive wood burning in power and heating plants. Europe already consumes an exceptionally high proportion of the global wooden pellets production. Half of the EU palm oil import ends as "biodiesel ". The necessity to increase food production questions also growing crops for "biofuels ". In the contribution, we analyze the mistakes in the EU climate policy, increasing threats to biodiversity, and diminishing ecosystems regulation services. We analyze the fundamentals of the current crisis and its drivers. Based on the system approach, ecosystem services, and limits of human activities, we outline the transformation of current society direction towards a sustainable society.

WOODEN CITIES OF THE PAST FOR FUTURE SUSTAINABLE PLANNING

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The reinforcing of population in distant territories in the Americas, from postcolonial (19th century) to modern times produced wooden cities and towns with modernization paradigms. Case study Southern Chile, offers a set of examples that merged small or medium scale. Considering timber is playing a notorious role in reevaluating towns and buildings, they open the discussion on the relation of settlements and the forests in the past and today where timber plays a major role, but scarcely identify what values the wood add. Considering regional southern Chile's historical timber architecture and Coastal Templated Rainforests (CTR) eco-region, their urban infrastructure and specific species harvested, it merged a contrast between few and small protected urban areas and the majority of the settlements. The question arises as how to plan sustainable, urban and regional, regarding to the production and use of native wood as an active part of local development reformulated in the present, including restorations beyond of what is today protected and before these complementary elements between past and future and building service-life are destroyed. The overarching research produces empirical evidence and addresses the problematic in a mixed methodology in the field of human geography, landscape and cultural heritage studies. The sharp georeferentiation forest type of CTR and it references to timber trees in its classification, allows to conceive now a practice for traceability of buildings timber and have a variant understanding of the territory. The name wooden cities is proposed as the interdisciplinary and socially bottom-up approaches needed.

GENETIC DIVERSITY AND DEMOGRAPHIC HISTORY OF TWO ENDEMIC SHRIMP SPECIES

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The project is focused on two shrimp species, *Dugustella Valentina* and *Palaemon zariquieyi*, endemic to the Valencia region, Spain. A mitochondrial Cytochrome c oxidase subunit I (COI) marker was sequenced from individuals of both species collected at multiple localities, and the DNA sequences will be deposited into the Barcode of Life Database (BOLD) for conservation purposes in the future. We aim to evaluate demographic patterns of these species based on nucleotide diversity, haplotype diversity, and haplotype networking, assess the connectivity between populations from different localities, and compare the level of genetic diversity with samples from previous years. Preliminary results suggest that genetic diversity is relatively high in both species and that the gene flow between localities is substantial, possibly mediated by birds or humans. It can help us understand the population structure and changes due to anthropogenic effects of these understudied species and implement appropriate management plans for their conservation.

UNLOCKING THE POTENTIAL OF SMALL-SCALE FARMERS IN POST-COVID TANZANIA

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In the last few decades, small-scale farmers have faced the adverse effects of climate change. Changing climate puts them under enormous pressure to adopt various adaptation strategies. However, financial constraints, lack of relevant skills, and lack of technical knowledge held many of them back in their effort. Since the onset of Covid-19 pandemics, the situation has worsened as farmers must also cope with the impact of various government restrictions. The presentation will be about small-scale farmers' adaptation and coping strategies in Africa, emphasizing Tanzania and policies that can help small-scale farmers in the post-Covid world.

ARE GREATER FLAMINGOS EQUALLY PROTECTED BETWEEN BREEDING AND MIGRATION SEASONS?

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The study represents an analysis of the Mediterranean population of the Greater flamingo (*Phoenicopterus roseus*) movement during breeding and migration seasons. The study aimed to test the level of flamingos protection ringed in Italy during different phenological seasons to identify the places with the lowest and highest vulnerability degree for the community. The analysis showed that the main factors influencing species' vulnerability are phenological periods, the country where the individuals are located, and the sex of species. The season under the biggest protection is flamingos found in Italy, France, Spain, and Tunisia. However, the lowest species protection is in such countries as Algeria, Greece, Libya, Turkey. During the breeding period, flamingos are primarily protected in Europe, specifically in the Mediterranean basin, and during the winter period, such places as Africa, Greece, and Turkey are the most dangerous. According to the statistical analysis, during both breeding and non-breeding periods, males are more prone to be found outside the protected areas, therefore, are more exposed to the danger. Most non-protected sites belong to North Africa, Greece, and Turkey. They represent a vast conservation gap in Greater Flamingo protection. Ecologists could further apply these results for the development of conservation strategies.

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TREE TRAITS AND METEOROLOGICAL FACTORS INFLUENCING THE ORTHOPHOSPHATE CIRCULATION AND DEPOSITION IN ISOLATED TREES CHARACTERISTIC OF THE MODIFIED TROPICAL HUMID FOREST IN COLOMBIA

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Phosphorus (P) is the most common nutrient limiting primary productivity in ecosystems. Soils of tropical ecosystems have a higher P limitation due to the depletion during long-term pedogenesis, sufficient to limit productivity in old and eroded soils that characterize part of the tropical biome. This limitation is exacerbated by forest fragmentation and forest loss which is higher in tropical ecosystems. Generating changes in biophysical, hydrological, and biogeochemical processes ultimately affects biodiversity and ecosystem functions. Atmospheric deposition represents an input of P to the ecosystem, primarily when related to hydrological processes such as precipitation. Forest canopies affect mass and energy exchange between the surface and the atmosphere, regulating the biogeochemical cycle of the Earth's surface. In this study, we evaluated the partition of precipitation and concentration of PO4-P in throughfall and stemflow. We determined the association between plant functional traits and PO4-P movement from the canopy to soil in 16 individuals of 4 tree species Isolated in a modified landscape. We found higher concentrations of PO4-P in stemflow and throughfall than in precipitation, where the leaf area, epiphytes coverage, and branch angle show significant relationships with the concentration PO4-P. That potentially facilitates biogeochemical exchange and improves ecological functions associated with the early stages of forest recovery. Overall, our results highlight the complex biogeochemical interactions in these highly biodiverse ecosystems where functional traits of plants can help describe ecosystem function at the landscape scale.

UNDERSTANDING COMMUNITIES IN OAUDÍ RIMÉ OUADÍ ACHIM RESERVE FROM ENVIRONMENTAL EDUCATION PROGRAMMING TO SOCIAL BEHAVIOURAL CHANGE

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Residents and their livelihoods are a pillar of natural resources management and conservation, therefore understanding their attitudes and perceptions of protected areas are crucial to identify barriers to behavior change in the context of nature conservation. The Project Ouadí Rimé- Ouadí Achim was initiated in 2016 to establish a management plan infaunal reserve in Northern Chad. As an integral part of this project, the environmental education program and community strategy will be developed. We applied the approach combining on-job training of local team with evidence-based and target group-specific approach responding to environmental problems and needs of communities residing within the reserve. The ongoing "validation phase" (n= 263) suggests that while general attitudes towards the protected area appear favorable, there is a gap in interpersonal communication about the benefits of the faunal reserve. The local team confirmed the main problems perceived by people living in the area of a protected area. This allows "Cellule de sensibilisation" to tackle each problem in the environmental education program under development. The team has initiated site visits with a preliminary version of the environmental education program with strengthened security measures while further data collection and materials development have been in process.

CHANGES IN THE MIGRATION BEHAVIOR OF EURASIAN CRANES (*GRUS GRUS*) BREEDING IN THE CZECH REPUBLIC

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We have been monitoring the migration of Eurasian Cranes (*Grus Grus*) in the Czech Republic using color rings (since 2002) and also GPS-GSM transmitters (since 2017). A total of 69 banded cranes have been using the Western European migration flyway leading through Poland and Germany to France and Spain. Since 2017, the cranes have begun to overwinter in the Czech Republic regularly.

One young crane was marked with color rings on July 17, 2010, at the Novozámecký pond in the Českolipsko region. This crane was repeatedly observed during its first winter in the Arjuzanx reserve in southwestern France, proving that its parents taught it to migrate to this wintering ground. It was also observed at the same place the next winter. Its young was tagged with a transmitter on July 19, 2020. On August 21, the young and its family flew north to a gathering place in Saxony, Germany. After about two months, on November 4, they returned to the Czech Republic, where they spent the whole winter. It proves that the young parent has stopped migrating to France and has not taught its young the traditional route.

Cranes do not have an innate migration route: they learn it from their parents in their first year of life. When cranes stop migrating to traditional wintering grounds, it affects all subsequent generations. Therefore, the number of cranes overwintering in gathering places or returning for winter to nesting areas in the Czech Republic is expected to increase.

BIODIVERSITY OF POST-MINING HEAPS – HELP OR "LEAVE IT TO THE NATURE"?

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Mining activity is an integral part of human history, which helps meet the basic material needs of humanity. The contribution aims to compare the biodiversity of vascular plants in two historically significant Slovak mining areas – Cu-heap Podlipa near Ľubietová village, which is developing by spontaneous succession, and Hg-heap Veľká studňa near Banská Bystrica partially reclaimed by terrain corrections, loading of the new soil layer and by sowing of grass mixture. We identified 20 habitats with 335 taxa of vascular plants on Veľká studňa and nine habitats with 111 vascular plants on Podlipa. The succession at both sites follows a similar trend along the moisture gradient.

Each spoil heap was evaluated in terms of its species richness, index of diversity, and the representation of invasive species, synanthrophytes, and native non-apophytes. This representation is based both on their numbers and abundance and its ratio towards all taxa abundance. The species richness is reflected in several indicators, called indexes of synanthropisation and naturalness of the vegetation composition and indexes of invasive taxa and native-non apophytes proportion.

After the reclamation process, more synanthropisation and an increased occurrence of invasive and native non-apophytes species were recorded on more eutrophic soils.

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DISTRIBUTION OF CORVIDS ALONG A GRADIENT OF URBANIZATION WITHIN EUROPEAN CITIES

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Urbanization is one of the significant threats to global biodiversity. More anthropized areas replacing natural ecosystems threaten native, local, and endemic species by altering, fragmenting, and destroying native habitats. Few species, mainly synantrophs and generalists, can adapt to anthropogenically modified environments and replace the natives. Practical biodiversity conservation efforts necessitate understanding the links between urbanization and both urban dwellers and avoiders. Corvids are known for their advanced innovation and intelligence. Unsurprising then, many corvids could penetrate cities and increase their urban populations to the point of becoming a nuisance. In this study, we aimed to assess the distribution of five corvid species along a gradient of urbanization in European cities to understand their urban tolerance levels and their process of urban colonization. Fifteen European cities were surveyed during the spring of 2018. In each city, approximately 100 observation points were randomly distributed among three levels of urbanization. At each observation point, the presence of corvid species was recorded within a radius of 50 meters. Generalized Linear Mixed Models with a binomial distribution were used to assess the distribution of each corvid along the gradient of urbanization (low, medium, and high). *Corvus corone* was significantly more likely to be present at a low than a high level of urbanization. *Corvus frugilegus* did not vary significantly along the gradient of urbanization. *Corvus monedula* was significantly more likely to be found the higher the urbanization level, while the opposite was true for *Garrulus glandarius* and *Pica pica*.

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THE ROLE OF NON-INVASIVE GENETIC SAMPLING IN WILDLIFE RESEARCH

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Due to the rapid biodiversity loss worldwide, it is imperative that animal and plant populations are being monitored so that efficient conservation measures can be designed and implemented. With new technologies and improved methods being developed and implemented during the last decades, genetic assessment, in particular, is increasingly being used for biodiversity monitoring. Typically, DNA for genetic analysis would be collected through invasive or lethal sampling from blood or tissues. But concerns about animal welfare and striving for efficiency have led to the development of techniques allowing genetic assessment from non-invasively obtained material, such as feces, hair, saliva, or the so-called environmental DNA. However, the scientific evidence on the efficacy, cost-, and time-effectiveness of non-invasive genetic assessment in wildlife research is currently limited, and the implementation rate of non-invasive genetics remains relatively low. Therefore, I conducted a review assessing relevant studies that compared the efficacy of non-invasive genetic assessment with another method (e.g., invasive genetic sampling, camera traps, or field visual or acoustic survey) in different types of studies. The majority of relevant studies (94%) reported that non-invasive genetic assessment has equivalent or superior efficacy when compared with another research method. It can perform better, particularly in population size estimation, species detection, or species identification studies. The non-invasive genetic assessment might also be cheaper and more time-efficient than other methods. In summary, non-invasive genetic assessment is a highly influential research approach, and its implementation across different types of studies on wildlife can be highly recommended.