

symposium

AT THE ZOOLOGICAL SOCIETY OF LONDON



17 and 18 November 2011

ANTELOPE CONSERVATION IN THE 21ST CENTURY: FROM DIAGNOSIS TO ACTION

Organised by:

Jakob Bro-Jørgensen,
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ABSTRACTS

THURSDAY 17 NOVEMBER 2011

9.20 **Welcome:** **Jakob Bro-Jørgensen**

**SESSION I: INTRODUCTION TO ANTELOPE BIODIVERSITY
AND ITS CONSERVATION STATUS**

**9.30 Diverse descendants. An introduction to the ecological logic behind
antelope radiations**

*Jonathan Kingdon
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The radiation of Antilopinae in Africa can be plausibly interpreted as deriving from the incursion into Africa, from Eurasia, of a single ancestral species more than 20 million years ago.

The broader ecology of the main Antilopine tribes are reasonably well-known and can be listed and analysed in terms of quite early strategic adaptations in putative ancestors. However, phylogenetic relationships remain quite opaque and are still contentious. Nonetheless provisional cladograms can now be presented on the basis of a best fit and tentative tree based on molecular trees published by Hassanin & Douzery in 1999 and 2003, and Hernandez Gonzalez & Vrba in 2005, and morphological/ecological analyses by Kingdon (in press).

Recent trees have agreed in reducing the former 'Neotragini' (once embracing some 13 species) of 'Dwarf Antelopes' to as few as three species in the genera *Neotragus* and *Nesotragus*. These changes have brought into question the relationship of other antelope groups to the now 'Ex-Neotragines'. If small body-size is essentially conservative this has in most cases been combined with specialized (derived) features, such as peculiar hooves in klipspringers and beira, nasal bellows in dikdiks and a barrage of specialized scent glands in oribi.

In addition to these problematic species, there are also species WITHIN the major tribes that offer special insights into the course of evolution specific to that tribe.

Among the many antelopes that are threatened with extirpation in Africa several species are crucial for scientific understanding of Antilopine evolution. Reasons for their special scientific interest can be summarized and appeals can be made for their special consideration in antelope conservation plans.

10.00 The current status of antelopes - a global overview

*David Mallon
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Antelopes occur across all of mainland Africa and in 30 countries in Europe, the Middle East and Asia. Ninety-two species of antelopes are recognised and assessed on the IUCN Red List. Three of these are Extinct and one is Extinct in the Wild. Twenty-five species are classified in one of the three threatened categories. Surviving populations of the three most highly threatened species

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are only 200–500; others are not represented by captive populations so their complete extinction is a real possibility. Several recognised subspecies and distinctive populations are also highly threatened. A recent, radical taxonomic revision of the family Bovidae proposes an increase in the number of antelope species to 204; prominent changes include blue duiker split into 10 species and klipspringer into 11. This revision is based on a different species concept, and if accepted, has significant implications for conservation priority setting. The status of most antelopes is deteriorating worldwide, with reduced ranges and local extinctions leading to unquantified losses of intraspecific genetic diversity. Increasing human populations and their livestock, development of agriculture, construction of roads, settlements and fencing are confining large animals to ever smaller patches of suitable habitat, increasing isolation and impeding migrations. The consequence is a shrinking number of dynamic, fully functioning ecosystems at wide landscape scales, with a concomitant gradual and apparently inevitable shift in the concept of 'wild' antelopes.

10.30 POSTER SESSION (TEA/COFFEE)

**SESSION II: TURNING HABITAT LOSS INTO CONSERVATION-FRIENDLY
LAND USE**

11.00 Challenges of preserving dynamic savannah ecosystems

John Fryxell

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While clearly essential for the long-term conservation of many antelopes species, savannah ecosystems present a unique set of conservation challenges. Growing human population pressure in many countries with substantial savannah coverage inevitably leads to land-use practices that favor human livelihoods, livestock production and arid-land agriculture at the expense of wildlife populations.

Teasing apart the complex mix of positive and negative interactions among wild and domesticated species is therefore of vital importance. Being highly stochastic, savannah ecosystem must be sufficiently large that mobile herbivore populations have unrestricted opportunity to sample habitats across a heterogeneous landscape. While we are now beginning to understand the complex impact of climate variation, the inevitability of future climate change threatens to unravel the ecological fabric of existing savannah ecosystems. Finally, the buffering capacity afforded by diverse ungulate populations may be a key element in maintaining stable food-web interactions in savannah ecosystems. How to maintain wildlife diversity in the face of future land-use and climate change in savannah environments is a key uncertainty.

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11.30 Hands on or hands off? Contrasting approaches to antelope management

*M. H. Knight¹, P. Novellie¹, J. du Toit², S. Ferreira¹, M. Hofmeyr¹, S. Holness¹,
R. Grant¹, M. Herbst¹ and A. Gaylard¹*

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Wildlife is flourishing in South Africa. But why? There are many problems and challenges.

Although South Africa is largely the exception to the rest of Africa when it comes to the conservation of its wildlife, it may offer insights into how conservation could be tackled in a broader changing African landscape. From the turn of the previous century to the 1950s, a combination of factors, such as the power and spread of agriculture (and veterinary services), disease (i.e., epizootic Rinderpest from 1896–1903), destructive ‘sports’ hunting, lack of legislative support, lack of value in wildlife, growth of human populations, fencing, has resulted in the fragmentation of the South African landscape and demise of its once abundant wildlife. These factors are now affecting antelope populations and wildlife in general in Africa.

The establishment of Sabi Game Reserve, that ultimately grew into Kruger National Park, along with a suite of parks, such as the Bontebok, Addo Elephant, Mountain Zebra National Parks, to name a few, were largely seated in a preservationist, species-orientated conservation paradigm. Many early park managers emerged from a military/agricultural background, and a command-and-control, sustainable-use type management philosophy was prominent, which permeated most conservation thinking in South Africa. Furthermore, the development of a suite of small parks created the problem of how to best manage wildlife in confined parcels of land with incomplete predator-prey combinations. The gradual shift in conservation philosophy to a more ecosystems-focused approach within an adaptive management paradigm has challenged the way in which the range of protected areas and wildlife across the diverse South African landscape are managed. In attempting to achieve broad conservation outcomes, such as linked landscapes, habitat heterogeneity, ecological patterns and processes, viable populations, resilience to climate change and economic sustainability, a range of management options are available, such as park expansion, fencing, provision of water, meta-population management, carnivore manipulation, to name a few. How these factors have specifically affected the conservation of antelope within South African National Parks will be expanded upon.

In addition, with the change in legislation regarding the ownership of wildlife after the 1950s, parallels with the burgeoning private wildlife industry will also be explored to provide insights into the pros and cons of trying to ensure the survival of the country’s antelope (and other wildlife) into the future. Game numbers on private land increased from an estimated 600,000 in the 1960s to 18 million in 2007. What can be drawn from these experiences for use in other parts of Africa?

12.00 Use it or lose it:

Herbert H.T. Prins

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The “use it or lose it” doctrine has long been espoused by organisations like Safari Club International as the only workable precept to guarantee the prevention of extinction of wild (large) species (e.g., Thomson, 1992). The first underpinning of this guideline I found was in the work of Bengt Berg (1942) where he proposes that tigers as a species have to “pay a tax” by “allowing” that a number of them are shot from which the proceeds had to be used to save their fellow

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species the one-horned rhinoceros from extinction. Berg proposed a “cull tax” instead of a poll-tax. Also the Convention on Biological Diversity implicitly embraced the notion that the sustainable use of wildlife could be beneficial not only for people but for wildlife itself too. *Pars pro toto* this must then apply to the preservation of (rare) antelopes too.

It is not difficult to find examples of the successful application of the “use it or lose it” principle. It is the basis of CAMPFIRE in Zimbabwe, which although widely criticized has made an amazing impact on the way the conservation community, local people, and governments view wildlife in Zimbabwe, Zambia but also Botswana, Mozambique, Namibia and South Africa. The principle also has provided to a large extent the marvellous, and perhaps even mind-boggling, expansion of private game reserves in South Africa and Namibia.

Yet from a logical point one has to question whether the success of an operation (e.g., a private game reserve) which is [said to be] based on the application of a guideline (“use it or lose it”) is a proof of the validity of that guideline. Posing this question is not based on scepticism but on the belief that success should be copied: indeed, rare antelopes (and other rare large species such as wild sheep or large cats) are threatened more than ever and need any help they can receive to prevent their extinction.

In this talk I will show (on the basis of examples from Southern Russia and Central Asia) that the “use it or lose it” guideline is misleading since it is incomplete and thus insufficient. Both the precepts of “sustainable use” and of “use it or lose it” need very strict feedback-loops between the benefits for people and those for the wildlife, otherwise these precepts are only providing a cover-up for consumptive use and are thus mere slogans. “No taxation without representation” once had a meaning, whether one likes tea or not.

12.30 LUNCH

13.30 Antelope abundance and distribution: What should we expect with climate change?

J. Grant C. Hopcraft, T. Michael Anderson, Saleta Pérez-Vila, Emilian Mayemba and Han Olff

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Shifts in global climate could result in a mismatch between the location of protected areas and a species' preferred niche. Therefore understanding the factors that regulate herbivores is critical to the long-term management and conservation of ecosystems. In sub-Saharan Africa, the primary response to global climate change is precipitation. High annual rainfall tends to increase the abundance of grass but decrease its nutritional quality, while simultaneously increasing the vegetative cover that conceals predators. We ask how grazers of different body sizes distribute themselves with respect to food abundance, food quality and predation risk. The results from long-term aerial wildlife counts from the Serengeti illustrate that the distribution of small savanna grazers (Thomson's and Grant's gazelle) is constrained by food quality and predation. Large grazers (topi, Coke's hartebeest and African buffalo) are constrained by the abundance of food and not its quality or associated predation risks. Therefore, if global warming leads to less rainfall, the results suggest smaller savanna grazers will be favored over larger grazers (and visa versa). We conclude that regulation of different sized herbivores by food or predation might switch if global warming leads to changes in the rainfall patterns across Africa, particularly if animals are unable to move beyond protected area boundaries.

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**SESSION III: THE CHALLENGE OF CONSERVING UNGULATE MIGRATIONS
IN A CHANGING WORLD**

**14.00 Conserving the great antelope migrations in the nation building process of the
Republic of South Sudan**

*Paul Elkan and Falk Grossmann
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The effects of conflict and civil war on wildlife populations are well documented. However, often these periods are followed by more dynamic and rapid changes in the conservation threat landscape during the fluid transition as states emerge from conflict. Conservation can have an important role in contributing to stability and engaging during this post-conflict period is critical from both a biodiversity conservation and economic development perspective. A key requirement is to develop a comprehensive understanding at the national level of priority conservation assets and dynamics between wildlife, livestock, habitat, and human activity. Obtaining and integrating this information into the nation building process is critical to influencing and guiding natural resource management, land-use planning, and protected area establishment which will have major implications for the successful conservation of migratory species.

Using information from aerial surveys undertaken as part of a nation-wide conservation planning process, conducted in cooperation with the Government of South Sudan, we present an assessment of the status of South Sudan's migratory antelope populations after 22 years of civil war. In combination with other information, we identify key conservation threats and opportunities going forward. These surveys covered some of the largest contiguous areas of savanna and flooded grasslands remaining in Africa. Comparing results with pre-conflict surveys, major declines were registered for many large-bodied sedentary mammal species. Nevertheless, antelope populations associated with large spatial and temporal movement patterns (tiang, white-eared kob, Mongalla gazelle and reedbuck) were found to be in slightly lower but generally similar numbers to pre-conflict estimates, with more than 1.2 million individuals.

Serious challenges to conservation of these migratory antelope species are emerging with the improved security and expanding development process, including decreased connectivity due to fragmentation, increased access facilitating commercial hunting, and competition with pastoralists. Simultaneously, great conservation and natural resource management opportunities are arising at a national level. The natural habitat and wildlife of the Republic of South Sudan represent a tremendous conservation heritage and ecotourism opportunity for the economic development of the new nation. Preservation of the migrations during this nation building process requires a multi-faceted landscape scale approach incorporating protected area management, conservation-security partnerships with local communities, continued disarmament, wildlife law enforcement, corridor designation, land-use and road network planning, extractive industry engagement, community based conservation, particularly with pastoralists, and promotion of tourism.

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14.30 Nomadic long distance movements of Mongolian gazelle

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Mongolian gazelles (*Procapra gutturosa*) are the dominant wild large herbivore in Mongolia's eastern steppe, one of the largest remaining grasslands in the temperate zone. While these gregarious animals still roam Mongolian grasslands in large numbers (at least 800,000–900,000 animals in the study region), the species has experienced a major reduction in range during the past century, and is further threatened by continued habitat loss, fragmentation and excessive hunting.

We studied gazelle movements and tracked a total of 39 gazelles from 2007 to 2011 using GPS-Argos devices. We used a suite of spatial metrics to measure variation in movement within and among individuals and also compared gazelle movements to those of three other ungulate species: Barren-ground caribou in Alaska, guanaco in Patagonia, and moose in Massachusetts.

Gazelles, similar to caribou, moved extremely long distances with annual movements of up to 1500km, while moose, which remained in sedentary home ranges, and guanacos, which were partially migratory, exhibited relatively short annual movements. However, unlike caribou that exhibited regular seasonal migration, gazelle movements were nomadic. Individuals were independently distributed and moved in an uncoordinated manner. Analyses of gazelle movements across years revealed that not only movements among individuals were uncoordinated but that single individuals moved to entirely different areas in different years. Only during calving seasons some (but not all) females revisited calving areas used in previous years.

Finally, we related movement patterns to the underlying landscape vegetation dynamics via long-term remote sensing measurements. Long distance movements were associated with broad-scale variability in vegetation productivity. Compared to caribou, landscapes of gazelles featured unpredictable vegetation dynamics, which indicates that broad-scale landscape unpredictability may lead to nomadism. Nomadic movements have been little studied so far; yet they require distinct integrative conservation strategies that facilitate long distance movements across the entire landscape.

15.00 TEA/COFFEE

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SESSION IV: COEXISTING WITH LIVESTOCK

15.30 The evolution and conservation of hartebeest

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Hartebeest, the genus *Alcelaphus*, appear in the fossil record within the last million years and are the most recent genus of antelopes. Hartebeest show a striking ability to extract nutritious components from dry grass swards and they replaced hirola-like antelopes (*Beatragus* and allies), perhaps by competitive exclusion, and radiated across all of the savannah habitats of Africa. As they moved into new areas they diversified into a range of taxa which are currently assigned to eight subspecies of *Alcelaphus buselaphus*. These show variation in body size, horn shape and coat colour reflecting differing patterns of natural and sexual selection; there are a number of intergrades and hybrid zones between taxa suggesting dynamic evolution until recently. Hartebeest compete directly with cattle and their numbers and range have been massively reduced as human populations and their livestock increased; they are often killed for food and some populations have been extirpated either by overhunting or habitat destruction. The fate of the subspecies shows dramatic variation in relation to these various pressures across Africa. Some subspecies have been exterminated (*A.b.buselaphus* and probably *A.b.tora*); *A.b.swaynei* has been reduced to small critically endangered populations; most subspecies have declined substantially, particularly outside protected areas (*A.b.major*, *A.b.lelwel*, *A.b.cokei*); *A.b.lichtensteinii* is probably stable and *A.b.caama* has expanded. Where populations survive they are increasingly confined to protected areas and the prospects for conserving the evolvability of the entire radiation are now remote. The relative survival of the taxa under different national conservation policies has important lessons for practical conservation across Africa.

16.00 Antelope diseases – the “Good, the Bad and the Ugly”

Richard Kock

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The Good. Ecologists observed early on that natural healthy populations suffer disease and in some species, their dynamics were to a great extent determined by the frequency and severity of epidemics. Geneticists have added a further layer of understanding through research on the role disease, and associated morbidity and mortality, plays in maintaining the heterozygosity of populations. There is increasing evidence that disease contributes to maintaining genetic health, through selecting out more homozygous, less immunotolerant or “weak” individuals. In some antelope species, bacterial and viral disease might have played this role historically and its relative importance, particularly in relation to predation and modern antelope conservation and management in protected areas, deserves more attention.

The Bad. Wildlife veterinarians tend to be more focused on the expression of disease from the perspective of individual animal health, immunity, pathogens and ecotoxicology. Vets for some time have argued that, given the highly disrupted ecology in most landscapes today, exposure to pathogens or environmental toxins is not always beneficial to animal populations and constitutes a modern threat to species survival. The evidence for this in antelope populations is illustrated using

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examples and case studies including, for pasteurellosis, tuberculosis, anthrax, morbilliviruses, foot and mouth disease and rabies.

The Ugly. Finally, the concern over multi-host infection and risk of spill-over of pathogens from antelope to livestock and humans is examined critically and expressed qualitatively in terms of risk. This information is vital to persuading decision-makers on the best future policy on disease control, separation or integration of species on rangelands and which is supportive of biodiversity conservation, ecological integrity, food and economic security.

16.30 Feature speaker

Challenges to the survival of the giant sable antelope, *Hippotragus niger variani*

Richard D. Estes

*First/Founder chair of IUCN Antelope Specialist Group; Research Associate,
Smithsonian Institution Research and Conservation Center*

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Prior to the outbreak of Angola's civil war in 1975, 1000–2000 giant sable lived in the Luando Natural Integral Reserve (9600 sq km); another 100 lived in Cangandala NP (~600 sq km). A 1982 visit found Cangandala's population safeguarded and reassuring reports of Luando's population. But following peace in 2002, helicopter flights found hardly any mammals in Luando, and tracks of one sable (or roan) herd in Cangandala. Camera trap photos taken by Pedro Vaz Pinto in 2005 finally proved that giant sable were not extinct. However, photos revealed presence of sable x roan hybrids. Absent a sable bull, a lone roan bull had bred the surviving sable cows; only hybrids were born for nearly 5 years. In 2009, a team captured the nine surviving cows and released them via helicopter, together with one of eight bulls darted in Luando, into a large fenced enclosure inside the park. In 2010 only three of the old cows produced calves. A second survey and capture exercise carried out in August 2011 spent over 100 helicopter hours searching for sable. Only four herds and three single males were sighted in Luando, suggesting no >60–70 survive in this reserve. The team collared 20 sable in Luando and Cangandala, including all nine hybrids -- two adults and one subadult were castrated. Eight Luando sable, including young-adult and yearling females, one male yearling, and an eight-year old bull were released in the enlarged enclosure (2400 ha). Challenges to survival of giant sable are enumerated.

17.00 Facilitated Discussion

17.30 POSTER SESSION with cash bar

18.30 End of day one

19.00 SYMPOSIUM DINNER – tickets to be booked in advance

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FRIDAY 18 NOVEMBER 2011

SESSION V: HOW TO COUNTER OVERHARVESTING

9.00 Importance of antelope bushmeat consumption in Africa

John E. Fa

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Human consumption of wild animals ('bushmeat') is escalating in many parts of sub-Saharan Africa, and may not be sustainable for many species. This has been brought about by increased commercial hunting, especially within the moist forest areas. Hunting for trade rather than for subsistence has been promoted by increased penetration of remote forests by logging roads and by the greater access to modern weapons by hunters. Ungulates, particularly antelopes, contribute a very large proportion of the bushmeat biomass hunted in many sub-Saharan countries. Duikers are the main prey for hunters in moist forests whereas other antelopes are hunted in more open habitats. The paper first describes the factors determining abundance and biomass of ungulates in Africa. I then review levels of extraction of antelope bushmeat in the different habitats and by species. Using data from the estimated potential production of the different African antelope species I then calculate whether hunting levels are likely to be sustainable in the long term. I raise several discussion points arising from this analysis that are relevant to the broader debate about improving conservation outcomes for species of importance to many people in the continent as a protein source.

9.30 Evaluating the feasibility of alternative bushmeat management options

Noëlle Kümpel

Zoological Society of London, UK

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Over a million tonnes of bushmeat are taken from the forests of the Congo Basin each year, and the bushmeat trade, driven by a growing and more accessible urban market, is increasingly unsustainable. Predicted regional declines in bushmeat production will have severe consequences for food security, livelihoods, ecosystem services and the viability of wildlife populations.

Standard bushmeat management tools, such as trade bans and protected areas have performed poorly to date and in light of this, conservation organisations and governments have increasingly invested in projects which include components focused on generating alternative sources of income and/or protein for local communities. However, to date the few such projects implemented in Central Africa have tended to apply a time-limited, 'top-down' approach with insufficient planning, follow-through and monitoring of impacts, and as a result they have largely failed to demonstrate local buy-in and long-term positive benefits.

Recent research commissioned for a joint meeting of the CBD and CITES bushmeat working groups and ZSL's project in Equatorial Guinea have combined desk-based literature reviews with key informant interviews to evaluate prospective alternative livelihoods and other mechanisms to

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manage the bushmeat trade more sustainably in terms of feasibility, cost and likely social and environmental impacts. Mechanisms reviewed include regulating the bushmeat trade, improving marketing and sourcing of non-animal protein, domestication of wild species, improved production of fresh fish, domestic meat or non-timber forest products, and improved or alternative methods of forest management. Projects from countries across Africa and further afield provide useful lessons in terms of requirements for project implementation and general policy recommendations for donors and governments in Central Africa.

10.00 Engaging local people to counter overharvesting: The case of the saiga antelope

E.J. Milner-Gulland

Imperial College London, UK

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The saiga antelope experienced one of the fastest population reductions ever recorded for a mammal, around 95% in 10 years, following the social and economic disruption engendered by the break-up of the Soviet Union. Poaching by poor, unemployed local people was the principal cause, both for meat for local consumption and horns for export to China. Since 2006 I have been involved in a range of interventions aiming to reduce poaching levels through cultural activities, saiga festivals and educational materials aimed at children, media campaigns, participatory monitoring and small-scale alternative livelihood projects. Our research suggests that local people range-wide feel very positively towards saigas, and that they are willing to donate time or money to conserve the species. Our results also suggest that the public engagement activities enhance knowledge, improve attitudes and increase willingness to help. However, local people throughout the range also report feeling powerless to prevent poaching, or to change their own behaviour, and consistently suggest that improved law enforcement is the best way to curb poaching. Law enforcement is in the hands of government, although external organisations can support governments both materially and through capacity-building. Based on these findings, I consider how public engagement projects can best contribute to reducing overharvesting by local people, and reflect on the difficulties and importance of robust impact evaluation for public engagement interventions.

10.30 POSTER SESSION (TEA/COFFEE)

SESSION VI: SPORT HUNTING AND GAME RANCHING - THREATS OR SOLUTIONS?

11.00 Wildlife ranching: promoting best practices for enhancing conservation benefits

Philippe Chardonnet

Fondation IGF, France/Co-chair IUCN Antelope Specialist Group

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Benefits of wildlife ranching are not restricted to production services and generation of income. Wildlife ranching also sets aside extensive tracts of land as wilderness areas, which are powerful tools for (1) conserving biodiversity as a whole, and (2i) guaranteeing the functioning of ecosystem services at local and global levels. In Southern Africa for example, the wildlife ranching industry has dramatically enlarged natural ecosystems and increased wildlife abundance over the past

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decades. However, careful attention should be paid on how this achievement is performed and a number of issues are a matter of concern, especially in relation to genetic management:

- genetic erosion, divergence and drift due to compartmentalization by wildlife proof fences;
- homogenization of taxa as a result of intentional movements at country level with little consideration for local taxa;
- globalization of taxa by intentional movements beyond borders;
- creation of new taxa by hybridizing species or by crossing subspecies/strains or by intentional inbreeding within taxa for selecting particular traits to express recessive characters or to develop peculiar characters;
- genetic pollution of free-ranging populations exposed to captive-bred genetically modified animals;
- distortion of natural genetic processes and loss of diversity weakening the capacity of adaptation to environmental changes in terms of health, ecosystem, climate, etc.

The wildlife ranching industry, which contributes so much to nature conservation at local and global levels, is not well served by such dangerous practices. On the contrary, the general adoption of best practices in this field - such as the IUCN principles and guidelines for introduction, reintroduction and translocation - would enhance the role and value of the industry. Private interests should never jeopardize public interests, in particular related to the value of conserving biodiversity and allowing for adaptation to climate change: reinforcing public interests at local and global levels would help private interests of wildlife ranchers to strengthen and develop the whole industry.

11.30 What is the scope for trophy hunting in antelope conservation? Opportunities and pitfalls

Nils Bunnefeld
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The conservation value of trophy hunting is currently hotly debated by scientists and managers alike. This is due to recent studies showing declines of some iconic species such as African lions, even though theoretical models have also shown the potential for sustainable strategies. Research into trophy hunting has focused on the roles of monitoring and precautionary approaches to set sustainable quotas and has often overlooked the role of institutional constraints and multiple decision-makers. Here, we explore how framing trophy hunting as a social-ecological system with multiple objectives and using an adaptive harvesting approach can balance off-takes and population size with incentives of stakeholders in order to maximise stability and reliability. Our study species is the mountain nyala, an endangered antelope endemic to the Bale mountains in Ethiopia where the government aims for an increase of population size and income from trophies, safari companies aim for high and stable quotas and local people depend on the land for agriculture and (illegal) hunting. We compare an adaptive approach to a more static, proportional harvesting approach and find that at realistic levels of uncertainty, the adaptive approach leads to a more sustainable strategy allowing higher and more stable off-takes. Using an adaptive approach in a coupled social-ecological system enables us to balance ecological, social and financial objectives, and this is found to be more robust to uncertainties about monitoring and poaching than a more static quota system. We conclude that an adaptive approach is more likely to find solutions for trophy hunting that are accepted by real world decision-makers and thus increases long-term sustainability of managed systems.

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SESSION VII: NEW TECHNIQUES IN ANTELOPE CONSERVATION

12.00 Genetic tools for antelope conservation

Helen Senn, Ross McEwing, Rob Ogden
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The use of genetic information is increasingly being recognised as essential when making conservation decisions. Used in conjunction with other relevant information, genetic analysis can prove to be a powerful tool for conservation. Unfortunately a knowledge-transfer gap often exists between the academic conservation genetic researcher and the end user, the conservation practitioner. The mission of the WildGenes Laboratory, at the Royal Zoological Society of Scotland, is to act as a bridging unit by providing conservation practitioners with appropriately tailored conservation genetic analysis to support their captive population management, wild population research and reintroduction programs. An overview of the main conservation genetic tools will be given (mitochondrial DNA sequencing, microsatellite profiling, SNP genotyping), this will be followed by case studies, taken from the work of the WildGenes Laboratory, where genetic analysis has been used to support the conservation of *Nanger dama*, *Oryx leucoryx*, *Oryx dammah* and *Panholops hodgsonii*.

12.30 LUNCH

13.30 The use of camera-trapping to monitor threatened duiker species

Olivia Needham, Andrew E. Bowkett, Samuel Andanje, Tim Wachter and Rajan Amin
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Duikers are small-bodied antelope that inhabit the forests and woodlands of sub-Saharan Africa. Monitoring duiker populations is important as they are a primary target for hunters and the trade in bushmeat. Together with habitat loss, this has resulted in population declines and some species being listed as threatened on the IUCN Red List. However, duikers are difficult to monitor using traditional survey methods for forest mammals as many species are solitary and inactive during the day, while all species are shy and spend long periods concealed in dense vegetation. Yet duikers and other forest antelopes are amongst the most frequently photographed species by remotely triggered camera-traps and many of the statistical frameworks employed for camera-trap data can be applied to these species to provide useful indices of population trends and conservation status. Here we use examples from recent publications and a case-study from the coastal forests of Kenya to illustrate different approaches to analysing camera-trap data, including rapid surveys for determining species presence, photo-capture event rates as an index of abundance, detection probability and occupancy from systematic camera arrays, and the potential for modelling antelope movement and camera detection zones to estimate population densities when individual identification is not possible. Our case-study focuses on Africa's most threatened duiker species, the critically endangered Aders' duiker (*Cephalophus adersi*). Camera-trapping results for this species have led directly to further research and advocacy for improved habitat conservation while also providing a powerful tool for long-term population monitoring.

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14.00 The application of landscape genetics in the conservation of the endangered mountain nyala (*Tragelaphus buxtoni*) in the southern highlands of Ethiopia

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Habitat fragmentation is an increasing threat to wildlife species across the globe and it has been predicted that future biodiversity may not sustain without the intervention of scientific management. Mountain nyala (*Tragelaphus buxtoni*), an endangered antelope endemic to southern highlands Ethiopia, is one of the many antelope species facing increasing habitat fragmentation threat. In this study, we applied a landscape genetics approach in order to determine a network design to maintain the connectivity among populations of the mountain nyala in the fragmented highlands. DNA was extracted from pellet samples from 328 individuals and genetic population structure and gene flow were estimated using 12 microsatellite markers. In addition a 475-bp segment of the mitochondrial control region was sequenced for 132 individuals. Potential dispersal corridors were determined from least-cost path analysis based on a habitat suitability map. 'Relative weight of the corridors' was quantitatively estimated from sum of the resistance of a chain of pixels of the corridors. The genetic data suggested limited gene flow among the nyala populations of the Bale Massif and the Arsi Massif. 'Cost-weighted distance' made a better predictor of the pattern of genetic differentiation than the pure geographic distance indicating that dispersal is indeed hindered by habitat fragmentation. Maintaining three dispersal corridors of a total of length of 207 km should be prioritized to avoid the adverse effects of loss of genetic diversity and inbreeding in the mountain nyala populations.

14.30 From molecules to management - using population genetics in the conservation of sub-Saharan savanna antelope

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Genetic studies have been published on >15 species of sub-Saharan African savanna antelope. In this talk, I will go through the basics of how we can use population genetics in a conservation context, using some of our studies on antelope as examples.

I will also summarize the major patterns that have emerged from the work published so far, and explain how we are able to infer concordant patterns of evolution across species and trophic levels from our genetic data.

15.00 POSTER SESSION (TEA/COFFEE)

SESSION VIII: REINTRODUCTIONS - WHEN AND WHEN NOT?

15.30 The fall and rise of the scimitar-horned oryx

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The scimitar-horned oryx (*Oryx dammah*) has the contradictory status of being classified Extinct in the Wild (IUCN Red List) and yet one of the most abundant species held in captivity across the world. Once occurring in large numbers across vast tracts of the Sahara, the species suffered catastrophic declines due to over-exploitation, habitat fragmentation and competition with domestic livestock. Hence, by the early 1990s there was no evidence for the persistence of scimitar-horned oryx in nature.

The current global population of scimitar-horned oryx are almost entirely derived from a single capture in Chad in the 1960s with animals becoming distributed across Europe, North America and the Middle East, and eventually elsewhere around the world. With rapid reproductive rates in captive and semi-captive environments, the species now numbers in excess of 15,000 animals. At the same time that the oryx was disappearing from the wild, reintroduction efforts began in Tunisia, and have since been followed with projects in Morocco and Senegal. So far these initiatives have been confined to relatively small, fenced protected areas. However, the conservation community is now exploring the feasibility of re-establishing true, free ranging populations in countries such as Chad and Niger.

There remain a number of challenges. Biologically, it is difficult to see how genetic variation and adaptive traits of scimitar-horned oryx can be conserved in captivity over time based on current approaches to population management. Hence, the race is on to establish large populations of oryx in their natural habitat as soon as possible. Within limited protected areas, populations must be maintained below carrying capacity to avoid density dependent growth and detrimental impacts on the local environment. Meanwhile, overcoming the original causes of extinction to enable the re-establishment of truly free-ranging, migratory populations will prove difficult in countries with limited capacity and broader socio-economic and environmental pressures.

16.00 Desert antelopes. Where there's life there's hope

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The crisis facing the desert antelopes of the Sahara and neighbouring Sahel has been underlined for many years by organisations such as the Convention on Migratory Species, the IUCN Antelope Specialist Group, the Zoological Society of London and more recently, the Sahara Conservation Fund (SCF). And while the situation is dire for most species, recent and on-going research carried out by SCF, ZSL and their partners in Niger and Chad is providing room for optimism, with results clearly pointing to opportunities for significant conservation gains. For the first time in this vast and difficult-to-travel area, good wildlife population estimates are being generated alongside contemporary wildlife distribution and human land-use data that will help conservation planners to develop concrete action to stabilize and hopefully reverse current trends at selected key sites.

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The approach adopted, taking an inclusive look at both wildlife and livestock numbers, contributes to a better understanding of dynamic situations and points to the need for balanced solutions which recognise the need to ensure that both wildlife and human populations benefit from improved and well thought out management of natural resources.

16.30 Re-introduction as an antelope conservation solution

Mark Stanley Price
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Reintroduction can mean many things and is often seen as a conservation panacea for antelopes. Is this a legitimate conclusion based on experiences? A review across antelopes will indicate the prevalence and factors that have disposed or not disposed species to reintroduction attempts. The range of known antelope reintroductions will be presented with observations on what constitutes success and the factors promoting it. Fenced enclosures are a common feature of antelope reintroduction efforts and the implications of this will be explored, in terms of the infrastructure costs covering construction, maintenance and breach in different terrains and climates, and in relation to what constitutes 'the wild' in the future world. Finally, after considering the role of reintroduction in antelope conservation, a case will be made that much large carnivore conservation could be well-served by encouraging the recovery of antelope populations to reduce the wide-spread and lethal consequences for carnivores of stock-killing.

17.00 The way forward (facilitated discussion)

17.30 *End of Symposium*

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POSTER PRESENTATIONS

The reintroduction of Arabian oryx to the AlWusta Wildlife Reserve, Oman: 30 years on

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Arabian Oryx (*Oryx leucoryx*) is the largest endemic antelopes in the Arabian Peninsula that used to freely roam the entire region, and is uniquely adapted to survive in extremely harsh and arid environment. Recently, it has been re-classified as Vulnerable by the IUCN Red List. The final disappearance of this species from the wild in 1972 represented a significant loss for biodiversity worldwide, but the event also galvanized conservation efforts. These efforts have become a classic conservation success and serve as a model for similar programs worldwide. The first ever successful reintroduction of Arabian oryx to the wild took place in Oman in 1982 as an initiative from His Majesty Sultan Qaboos bin Said (Stanley-Price, 1989). The wild population at the AlWusta Wildlife Reserve thrived to more than 400 individuals in mid 1990s. Such increase seemed to attract poaching that lead to serious collapse of the wild population. Therefore, a captive breeding program was established in 1998 (Spalton, 1999). The captive group has increased to more than 380 individuals. As a measure to control poaching, the government decided to fence the reserve of an area about 2824 km². In early 2011, more than 60 individuals have been released into the fenced area and more herds are planned to be released in the near future.

Arid Land Antelope Research and Conservation at Al Ain Zoo, Abu Dhabi, United Arab Emirates

Lisa Banfield¹, Arshad Toosy¹, Mike Maunder¹, Andrea Putnam², Rob Ogden³ and Helen Senn³
¹Al Ain Zoo, Abu Dhabi
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Al Ain Zoo's Arid Land Antelope Collection

Desert antelopes are the key focus of the collection, conservation and research activities at Al Ain Zoo, Abu Dhabi. We will describe the species maintained in the collection and provide information on herd sizes and historical origins.

Developing Herd Demography Management Tools

A joint post doctoral position with San Diego Zoo Global is developing and testing strategies for managing herd or group-managed species. We describe the preliminary results of comparing population management strategies when pedigree information is unknown or uncertain using the Arabian oryx as a model.

DNA Research

Al Ain Zoo is working with the Wild Genes Laboratory at the Royal Zoological Society of Scotland to assess the genetic diversity of captive antelope stocks. Samples of Arabian oryx, scimitar-horned oryx, addax and dama gazelle (mhorr and dama subspecies) have been sequenced. We

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present the results obtained so far; for example, that previously unrecorded haplotypes were discovered in scimitar-horned oryx and addax. This was the first known study of haplotype diversity in dama gazelle.

Active Conservation

Al Ain Zoo is working with Sahara Conservation Fund and the CBSG to plan the reintroduction of scimitar-horned oryx from Al Ain Zoo's herd to the Sahara/north Africa. The Zoo also provides Arabian oryx for release as part of the Environment Agency Abu Dhabi's strategy. Over 50 animals have been released in the UAE, Jordan and Oman to date. These conservation activities will be described.

The value of participatory monitoring in the conservation of migratory ungulate: a case study of Saiga antelope

Henrietta Chilton
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Effective and economical monitoring methods are required in biodiversity conservation. Monitoring of migratory species can be especially costly. A participatory monitoring scheme, as an economical monitoring technique, is initiated in West Kazakhstan for the monitoring of the Ural population of Saiga antelope, *Saiga tatarica*. The presence data collated from the participatory monitoring scheme is evaluated and analysed alongside presence data from wildlife rangers in the region and an annual aerial survey using a maximum entropy habitat suitability modeling approach. The participatory monitoring data performs well with an improved model fit than the ranger data and of similar fit to the aerial survey data. Additionally the deterministic value of the environmental variables impacting saiga habitat selection, are analysed. The normalized difference vegetation index (NDVI) is shown to have the greatest effect on saiga habitat selection. Human factors and distance to water are also demonstrated to have deterministic value. Improvements to the monitoring techniques covered are discussed. Participatory monitoring is found to be an effective tool for monitoring the saiga antelope.

Genetic assessment of the Arabian oryx founder population in the Emirate of Abu Dhabi: an example of evaluating unmanaged captive stocks for reintroduction

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Since being declared extinct in the wild in 1972, the Arabian oryx has been the subject of intense and sustained effort to maintain a healthy captive population and to reintroduce the species to its ancestral range. Previous reintroductions and associated genetic assessments focused on the release of closely managed zoo animals into Oman and included observations of inbreeding and outbreeding depression. Here we describe the use of multiple unmanaged herds as source populations for a new reintroduction project in the United Arab Emirates, allowing a comparison between studbook management and uncontrolled semi-captive breeding approaches to the conservation of genetic diversity. Results of mitochondrial control region sequencing and 13-locus microsatellite profiling highlight a severe lack of diversity within individual source populations, but a level of differentiation among populations that supports the formation of a mixed founder herd.

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The combined release group contained a similar level of diversity to each of the intensively managed captive populations. The research includes the first genetic data for animals held on Sir Bani Yas Island, a former private reserve which until recently held over 50% of the world's Arabian oryx and scimitar-horned oryx and is recognised as having huge potential for re-establishing endangered antelope species in the wild.

Decline of dorcas gazelle in Sinai, Egypt

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Dorcas gazelle is one of four antelope species still surviving in Egypt. The species is under many threats across its range in Egypt. The population size and density is also variable in different parts of the species range in Egypt. Sinai is part of this range and is of special significance for the species because it is the most eastern extent of the range and it has been cut off from the mainland by the Suez Canal, so the population is believed to be isolated. A monitoring program has been in place since 1999 to establish the population size and density of gazelle using distance sampling. The estimates calculated during this time reveal a steep decline of the population and shrinkage of range. The current population size has shown significant reduction since it was first surveyed. The current population is believed to be as small as only 6% of the size estimated in 1999. The range is also reduced, as dorcas gazelles have not been recorded in the southern part of the study region and there are very few recorded in the northern part of the study region.

Present and future of the Western Derby eland

Karolína Koláčková^{1,2,3}, Pavla Hejčmanová^{1,2}, Magdalena Žáčková^{1,2}, Pavla Vymyslická^{1,2} and Pavel Brandl^{1,3}

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The last herds of the critically endangered Western Derby eland (*Taurotragus derbianus derbianus*) remain in the Niokolo Koba National Park in south-eastern Senegal. In 2000 one male and five females were captured and these individuals are the founders of a semi-captive breeding population, housed in two fenced nature reserves in western Senegal. Between 2000 and 2011, this back-up population has increased to 75 individuals maintained in six herds. The semi-captive population within the conservation programme is managed using the minimising kinship strategy. All individuals are uniquely identified by the pattern of stripes on their flanks. Demographic and genetic parameters have been published in the studbook every year since 2008. In 2011, 13 and 2 calves were born in the Bandia and Fathala Reserves, respectively. The deterministic annual population growth rate reached 32% and overall mortality was only 18.5 %. Genetic diversity has grown to 78.8% owing to proper management, but the inbreeding coefficient has increased to 0.1255. For the survival of the Western Derby eland, the integrated management of the wild and semi-captive population seems to be essential. We highly recommend carrying out captures of new founders in the wild, the selection of new localities for conservation breeding and radio-collaring of wild individuals. In 2012 we plan the organisation of the Population and Habitat Viability Assessment Workshop in the Fathala Reserve in Senegal. A Conservation Action Plan should be adopted from the meeting in the general agreement of all respective stakeholders.

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The phylogeography of Saharan and Arabian dorcas gazelles: implications for the conservation of a threatened taxon

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Many species of gazelles (*Gazella* spp) are threatened by hunting, poaching, habitat loss and habitat deterioration. Conservation efforts for this group not only face the problem of maintaining remnant populations but often natural populations have been extirpated from the wild. In some cases though, captive breeding programmes exist that might provide a valuable source for future reintroductions. A major problem for reintroduction is that phylogeographic relationships among different (potentially locally adapted) populations, and even basic phylogenetic relationships between species, are only poorly understood, thus hampering the assignment of management units, breeding groups, or stocks for reintroduction projects. Our study focused on dorcas gazelles (*G. dorcas* and '*G. saudiya*') from the species' entire distribution range, with samples originating from western Saharan Africa into Saudi Arabia. In stark contrast to previous studies reporting on pronounced genetic structure in taxa such as mountain gazelles (*G. gazella*), we detected only low genetic diversity and no evidence for major phylogenetic splits when analyzing two mitochondrial genetic markers. Using a coalescent approach we inferred a steep population decline that began approximately 25,000 years before present and is still ongoing, which coincides with pre-historic human activities in Saharan Africa. Our phylogenetic analyses, statistical parsimony network analysis and inferred colonization patterns shed doubt on the validity of various described subspecies of *G. dorcas*.

Population genetic analyses refute the species status of Farasan mountain gazelles (*Gazella gazella*)

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Mountain gazelles (*Gazella gazella*) rank among the most critically endangered mammals on the Arabian Peninsula. The number of animals living in Saudi Arabia has been estimated as only 1,700, with more than 1,000 animals occurring on the Farasan Islands. Two, not mutually exclusive hypotheses regarding the origin of these Farasan gazelles have been forwarded: (1) colonisation of the islands during the LGM following sea-level changes and (2) introduction by man, who may have moved animals to and from the islands. We established population genetic markers for mountain gazelles using more than 120 specimens from the Farasan Islands and the Arabian Peninsula. We made use of 11 nuclear microsatellite markers and found a close genetic connection of Farasan gazelles to populations occurring in the south of Saudi Arabia and in Yemen. Some of the island animals formed a separate cluster (which may be explained mainly by genetic drift); still, overall genetic distinctiveness to mainland specimens was weak. Furthermore, a considerable proportion of the Farasan gazelle population was clearly assigned to the mainland.

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Thus, we propose that populations from Farasan islands did not evolve in isolation and gene-flow—albeit reduced—is still ongoing, following a classical ‘island-mainland model’. Therefore, mountain gazelles from Farasan Islands would neither be a distinct species or subspecies, nor a separate management unit.

The Tora hartebeest (*Alcelaphus buselaphus tora*): notes on the appearance and conservation status of this little known and possibly extinct subspecies of hartebeest

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The Tora hartebeest (*Alcelaphus buselaphus tora*) is the least known and rarest of all hartebeest subspecies. This poster will highlight concern about the unknown and most probably critical status of the subspecies in the wild. Preliminary results of recent investigations reveal that this subspecies may even be extinct. In addition to these alarming facts, as far as we are aware there are probably no photographs of living specimens at all. Taxidermic specimens are occasionally presented in museums and collections or rarely have been published in older hunting literature. The examples of specimens from the British Museum, the National Museum in Prague and various collections presented at castles in the Czech Republic are included. The authors also provide the reconstruction of the physical appearance and comment on the coloration of this antelope. As a possible explanation of the different colour variants of the Tora, the authors consider the presence of darker specimens in the hybridisation zone of the southern Blue Nile region, similar to the present situation in the Laikipia hartebeests of Kenya (natural hybrids of Lelwel x Kongoni). We also present an overview on results of a 2007 field survey to assess the status of this potentially critically endangered subspecies. This field investigation revealed no reliable evidence of the existence of the subspecies in the surveyed areas of western and northwestern Ethiopia. Will the Tora hartebeest be the second subspecies to go extinct without any knowledge or appropriate documentation of the subspecies or species?

Matching observations and reality: the effects of observation error on monitoring of an harvested antelope community in the Serengeti, Tanzania

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Planning for conservation success requires identifying effective and efficient monitoring strategies. Despite its importance to detect changes in wildlife populations, evaluate conservation interventions and inform management decisions, monitoring is often inadequate. Insufficient statistical power, lack of goal and hypothesis formulation and faulty survey design are common problems affecting monitoring schemes worldwide. Among the multiple sources of monitoring error and uncertainty, the effects of undercounting or making estimation errors have received particularly limited attention, despite being discussed in the scientific literature for half a century.

Multiple issues affecting monitoring may occur simultaneously and discerning their impacts from data may be difficult and/or complicated to subject to scientific experimentation. Using a simulation

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modelling approach with model parametrization and process delineation based on empirical information, we explicitly considered the effects of observation error on wildlife monitoring by incorporating changes into population models of wildebeest (*Connochaetes taurinus*), impala (*Aepyceros melampus*) and topi (*Damaliscus lunatus*) (which represent the "true state") and the observation procedure ("monitoring") in order to investigate how the quality of collected data ("observed state") may be improved, and particularly how monitoring decisions and assumptions affect its deviation from the true population size ("bias and accuracy"). Our results show that potential biases should be given full attention in order to understand how these may affect our wildlife assessments and our ability to detect population changes at the short and long-term, thus allowing to reliably inform management decisions.

Filling the gaps: linking *ex situ* research and *in situ* conservation

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Small antelope (Cephalophini and Neotragini) are notoriously difficult to study *in situ*, and despite considerable recent advances in technology, many species remain poorly known. This lack of knowledge about basic biology and ecology impacts negatively on the conservation and management of wild populations. However, there are opportunities to reduce this poor state of knowledge, through the use of captive animals maintained under semi-natural conditions. Relatively few institutions registered with ISIS (International Species Information System) maintain multiple species of small antelope in sufficient numbers to allow robust research to be carried out. Dambari Wildlife Trust in Zimbabwe maintains a research collection of seven species of small antelope and at present has sufficient numbers of three species to enable replicated and repeatable experiments. Over the past decade, Dambari has hosted a number of studies to answer questions that cannot readily be elucidated *in situ*. Through reporting on results from selected studies, we will demonstrate the value of established *ex situ* populations in reducing the knowledge deficit for topics that have direct relevance to *in situ* management, such as feeding ecology, niche partitioning, population estimation methods, territorial behaviour and reproductive biology. We will also highlight opportunities for further research and collaboration.

Addax conservation in the wild: status update in Niger

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The addax (*Addax nasomaculatus*) is an impressive 100kg+ spiral-horned antelope, symbolic of the remote Saharan interior. As one of the largest wild mammals of the Sahara it is an excellent indicator of ecosystem health. It is able to survive without drinking water, exploiting sparse, ephemeral vegetation of the sand seas and sandy plains. Formerly found in great numbers over immense arid areas, its population has crashed to a few hundred individuals in isolated pockets since the advent of modern weapons and transport. The species is now listed as Critically Endangered on the IUCN Red Data List of Threatened Species. The only wild population being studied has found a refuge in the Tin Toumma desert in Eastern part of Niger. Until recently this

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huge region of rolling fixed dunes was almost devoid of human presence. Traditional caravan routes (trading salt and dates between hand dug wells) defined its outer margins. Within the area the distribution pattern of addax was based on the variability of good pastures according to seasonal rainfall with shade trees (*Acacia raddiana* and *Maerua crassifolia* at the massif, relict *Salvadora persica* in the dunes) also providing important resources in season. Since 2009 oil exploitation has completely changed the known distribution pattern. This poster reports monitoring results from the last known viable wild population of addax (about 200 animals) and highlights the different options of potential distribution according to the new challenges the addax has to face for its survival.

Genetic diversity of Arabian oryx

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Arabian oryx (*Oryx leucoryx*), native to the Arabian peninsula, became extinct in the wild in 1972. As a result of reintroduction programmes around 1000 animals are now estimated to exist in the wild, mostly in Saudi Arabia^a. In the Emirate of Abu Dhabi, a reintroduction programme was initiated at Um El Zumool in 2007. In this study we investigate the genetic diversity of 167 animals introduced to Um El Zumool and integrate our results with those from the few published genetic studies^{b-d} to provide a picture of all that is known of Arabian Oryx mitochondrial and nuclear genetic diversity so far. We present a network of the twelve known control region haplotypes and also demonstrate that the microsatellite genetic diversity of the Um El Zumool herd is similar to that found in a study of the Saudi Arabian populations^d.

References:

- a. IUCN red list, <http://www.iucnredlist.org/apps/redlist/details/15569/0>
- b. El Alqamy, Senn, Roberts, McEwing & Ogden (online early). Genetic assessment of the Arabian oryx founder population in the Emirate of Abu Dhabi, UAE. *Cons. Gen.*
- c. Khan, Arif, Shobrak *et al.* (2011). Application of mitochondrial genes sequences for measuring the genetic diversity of Arabian oryx. *Gen. & Gen. Sys.*, **86**: 67–72.
- d. Marshall, Sunnucks, Spalton *et al.* (1999). Use of genetic data for conservation management: the case of the Arabian oryx. *An. Cons.*, **2**: 269–278.

Using modelling to identify potential reintroduction sites for scimitar-horned oryx

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Scimitar-horned oryx (*Oryx dammah*) were widely distributed across all Sahelo-Saharan countries, but populations started to decline ~50 years ago. As recently as the 1980s, the species could still be found in its last strongholds in central Niger (Termit) and central Chad (Batha, Ouadi Achim), but scimitar-horned oryx crossed the brink to extinction during the 1990s due to war, poaching, droughts and loss of suitable habitats. Fortunately there are substantial reserve populations at zoos and in private collections which allowed for the development of promising initiatives to re-establish semi-wild managed populations in large fenced enclosures in several countries

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(Senegal, Morocco, and Tunisia). Before proceeding to full reintroduction to the wild, it is pertinent to identify current potential suitable habitats throughout the species' historical range. This poster presents successive processes for delineating potential reintroduction sites using spatial analysis based on ecological variables and historical observations. We integrated last sighting records with a range of ecological variable (in 1980s) to identify the best predictor variables and map potential reintroduction areas. Then, we used maximum entropy model (MAXENT) to fit predicted distribution with climate variables and biomass productivity measurements from satellite (NDVI based on AVHRR). MAXENT allowed us to identify the ecological niche and geographic distribution of scimitar-horned oryx. Using current data from General Circulation Models (GCMs) and Modis, we adjusted this prediction and delineated possible regions for reintroducing this species. Other factors including human density have been taken into account in the model to highlight potential areas on the basis of historical and current ecological and human parameters, creating an efficient decision-making tool for scimitar-horned oryx reintroduction.

Determinants of diet selection in critically endangered Western Derby eland in the conservation breeding enclosure, Fathala Reserve, Senegal

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Diet selection is a crucial mechanism for nutrient and energy intake, and consequently for the fitness of individual animals. Browsers are considered concentrate selectors, seeking a digestible diet rich in nitrogen and minimum fibre. We aimed to reveal the role of nutrients and high-quality supplement (*Acacia albida* pods) in the diet selection of Western Derby eland. Diet selectivity was determined at plant species level by direct observation of six animals in the conservation breeding enclosure, Fathala Reserve (Senegal). Observations were carried out when food was and was not supplemented. Thirty-two woody plant species were recorded in the diet of the eland and 10 were analysed for nutrient content. The most preferred species were *Acacia ataxacantha*, *Terminalia macroptera* and pods of *Piliostigma thonningii*; *Icacina senegalensis* was the most avoided species. Supplemental food decreased selectivity for *Saba senegalensis*, *Terminalia laxiflora*, *T. macroptera* and *Piliostigma thonningii* pods; selectivity was increased for *Combretum paniculatum*. Why did the antelopes prefer these species and why were some species marginalized when supplement was offered? Selectivity for plant species was positively correlated with phosphorus and kalium content and negatively correlated with content of nitrogen, magnesium and calcium. No significant role of fibre content was found. Diet selection is therefore complex, and not driven by only two factors. When the Western Derby eland received the food supplement both positive and negative relations to nutrients were reduced, and animals spent less time foraging in favour of resting. Food supplement can be therefore used as a key managerial tool in special conservation situations.

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Catastrophic die-off of globally threatened Arabian oryx and sand gazelle in the fenced protected area of the arid central Saudi Arabia

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A large number of die-off of globally threatened Arabian oryx (*Oryx leucoryx*), and Arabian sand gazelle (*Gazella subgutturosa marica*) were recorded from 1999 to 2008 in fenced Mahazat as-Sayd Protected Area (PA) in western-central Saudi Arabia. Mortalities of animals have been recorded during summer months when the rainfall is negligible or insignificant. Deaths were due to starvation because of reduced availability, accessibility and quality of food plants in the area. In total, 560 oryx and 2815 sand gazelle deaths were recorded since the reintroduction projects began till the end of 2008. Mortalities of animals were higher in 1999–2001, 2006, 2007 and 2008. Grazing of oryx habitat depends on rainfall and animals move over great distances in response to rain. The fence around Mahazat as-Sayd PA prevents natural movements of animals, and artificially concentrates the ungulate populations into possibly unfavourable habitat. The sand gazelle is a highly gregarious and migratory species, moving long distances in search of good quality pastures. Populations of sand gazelle in Central Asia are also known to migrate over large distances, covering several hundred kilometers. It is therefore likely that by preventing natural movements of sand gazelles and oryx, fencing may have reinforced the effects of stressful conditions such as drought. To reduce the catastrophic effects, a Strategy and Action Plan was developed in August 2008 to manage oryx and gazelle within the reserve and with provision for food and water at the five camps in the reserve as an emergency plan to minimize mortalities.

Re-introduction of threatened Mountain gazelles in central Saudi Arabia

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The Mountain gazelle or idmi (*Gazella gazella*) is classified as “Vulnerable” (A2ad: A2) by IUCN (2011). Most recently the total population of *G. gazella* – which shows a continued downward trend – is less than 15000 animals worldwide, with an estimated 1500 to 1700 occurring in Saudi Arabia. Historically idmi occurred in Mahazat as-Sayd Protected Area but were exterminated by anthropogenic and other pressures. We successfully released a group of captive-bred Mountain gazelles in Mahazat as-Sayd Protected Area in April 2011. This project is particularly significant as it is the first successful release for the species in over 20 years in the central part of the country. On 14 March 2011, 17 (4m:13f) idmi were transferred from KKWRC to Mahazat by road. Most of the animals were 2–6 years old but ranged between a 3 month old calf to a 10 year old female. For the first 2 months animals were kept in a 500 x 500 metre pre-release enclosure, and were gradually released by opening the gate. Five (1m:4f) idmi were recorded dead in the field from 10 April to 10 August 2011; the rest are still surviving. In January 2012, more than 20 animals will be released as a part of Strategy Plan by Islam *et al.* (2008).

ABSTRACTS

A plan to reduce the risk of mass mortalities of reintroduced animals in the Mahazat as-Sayd Protected Area in Saudi Arabia

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