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Wildlife Middle East

NEWS

CONTENTS

Wildlife Middle East News is published quarterly. It contains papers, reports, letters and announcements submitted by veterinarians, biologists, conservationists, educators, and other animal care professionals working with captive and free-living wildlife in the Middle East region. Contributions are not refereed, although every effort is made to ensure the information contained within the newsletter is correct, the editors cannot be held responsible for the accuracy of contributions. Opinions expressed within are those of the individual and are not necessarily shared by the editors. Guidelines for authors can be downloaded from www.wmenews.com

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EDITORIAL

As you read this we have completed our 12th issue in three years and would like to thank everyone who has contributed to the Newsletter throughout this time. We have again been very fortunate to be associated with RAK Bank and would like to thank them for their support and encouragement over the last three years as well as for their continued support next year for Volume 4.

One of our stated goals with the Newsletter is "Raising awareness of environmental and conservation issues affecting wildlife in the Middle East" and we believe that we have done this over the last few years. With this in mind it is great to see the efforts of a 12 year old boy, Cameron Oliver, and his campaign to highlight the plight of the UAE's camels and how they are being affected by the ever increasing amount of plastic and other forms of rubbish that are discarded throughout the Emirate's deserts. Cameron was rewarded in December of last year when he received an Abu Dhabi Award for his contribution to building a greater sense of community and social welfare. Anyone who is interested in learning more or supporting Cameron in his endeavours can check out the links on our website.

This quarter we have a series of firsts. Daniel Orenstein describes the first Middle Eastern Biodiversity Network which was held in Aqaba, Jordan, where the survival of the region's flora and fauna was discussed. Poverty, crime, pollution and overexploitation of resources were implicit themes in many of the talks. An Iraqi ecologist described the tragic loss of wetlands in the country's southern region due to the combined impact of drought and dams. One presenter from the UAE described a rate of development on the Arabian Gulf coastline that was so accelerated that all they could do to catalogue local biodiversity was to collect "baseline" ecological data before those habitats were paved over. One has to ask whether one of the few "positive's" from the current economic meltdown will be that the pace of these developments will decrease dramatically. On the other hand, many of these developments were in the infrastructural phase and much damage to the environment has already occurred, so it might be too late! Karl Marx once said that history has a habit of repeating itself, one time as tragedy and the second time as a farce. Let's hope that all concerned can see this as they come out of the crisis and think twice about the sustainability and environmental impacts of their projects.

Nancy Papathanasopoulou describes the significance of Masirah Island off the Omani coast and how work there, utilising radio tagging techniques is helping to understand the life cycle of the Olive Ridley turtle. Another first using radio transmitters is the tagging of rescued Indus River dolphins in Pakistan. This work was co-funded by the Environment Agency in Abu Dhabi. Both of these projects have proved useful in discovering new behaviours and movement patterns of two different species.

As highlighted in Vol 3 Issue 1, animal diets commonly fed in the Middle East are often restricted to grasses, vegetables and high starch compounded feeds. In an article detailing her concerns on the feeding of high starch diets, Elizabeth Koutsos argues that exotic ruminants have evolved to eat diets that are relatively low in starch. In captivity, for browsing and grazing ruminants, high starch diets can cause rumen dysfunction and systemic health concerns. She argues that anytime starch is being added to diets of browsing ungulates, it should be done so slowly.

Following one of our first articles on the distribution of *Gazella gazella* (Vol 1 Issue 1) and the report in Vol 3 Issue 3 showing the differences in sampling methods, Strauss et al use similar techniques to estimate the population size of mountain gazelle in the Arabian Oryx Sanctuary in Oman. They identified a number of issues with an earlier study and corrected these to reveal an over-estimation of the original population census.

Chris Lloyd describes how the electrocardiogram could be used as a useful first step to determining the health status of captive felidae. Although used previously in species such as lions and tigers, no evidence was found indicating it had been used in leopards before this study. Chris suggests that ECG's could easily be included in physical examinations of animals to judge their fitness to join breeding programmes.

A book of veterinary significance to the region "Diseases and Medical Management of Houbara Bustards and Other Otididae" has eventually seen the light of day. John Chitty comments, "I would, therefore, be very happy to advise any veterinary student or inexperienced avian veterinarian to read it as well even if their primary focus was with other avian species".

WILDLIFE MIDDLE EAST NEWS OBJECTIVES

- Raising awareness of environmental and conservation issues affecting wildlife in the Middle East.
- Distributing information to enable better management healthcare and welfare of wildlife.
- Providing a central contact point for practical advice and information on wildlife management in the region.

WARS AND WILDFLOWERS IN THE MIDDLE EAST

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Aqaba, Jordan. The scene in the hotel conference room was not the stuff of usual Mideast politics. Here were Iranian, Lebanese, Saudi and Israeli specialists seated on the same panel, sharing experiences, listening patiently to one another, and even displaying an occasional sign of empathy. These individuals, along with hundreds more like them – Middle Eastern scientists, government professionals and environmental activists – were gathered at the first meeting of the Middle Eastern Biodiversity Network to discuss a common goal: the survival of the region's flora and fauna.

As is the case globally, the future does not look good for the rarest of animals and plants in the Middle East. While most of the participants were attending the conference to refine their methods on how to create inventories of the regions biodiversity – to identify and count what animals and plants are found in our region – the undercurrent throughout the conference was that this was the last chance to observe and learn about many earthly creatures. Extinctions weighed heavily on the minds of many participants.

No one projected this feeling more than an ecologist from Dubai, in the United Arab Emirates – home of the world's tallest buildings, burgeoning financial markets, and lavish resorts. He described a rate of development on the Arabian Gulf coastline that was so accelerated that all he and his colleagues could do to catalogue local biodiversity was to collect "baseline" ecological data before those habitats were paved over. Under this scale of development pressure, protecting species is nearly impossible; scientists can only hope to learn about them after they're gone.

The many regional conflicts – in Iraq, Lebanon, Israel and Palestine, Cyprus and southeastern Turkey – were not an explicit topic of any talks, but their negative impact on biodiversity weaved its way into many narratives. A Cypriot ecologist described illegal hunting along the border between Turkish and Greek Cyprus. An Iraqi ornithologist quipped that he needed two eyes to identify his birds and two more in the back of his head to avoid being shot. A Lebanese botanist who had just published a popular volume about his country's rare flowers was asked by an Israeli colleague why his country didn't have laws to protect wild flowers as they did in Israel. The botanist responded dryly, "My government is busy dealing with other things."

Fig1. The meeting of wildlife and development. (©Declan O'Donovan).

Poverty, crime, pollution and overexploitation of resources were other implicit themes in many talks. An Iraqi ecologist described the tragic loss of wetlands in the country's southern region due to the combined impact of drought and dams. The Omani park manager shared images of slaughter and poaching of his endangered Arabian oryx, yet he wouldn't (or couldn't?) reveal to the curious audience who the poachers were, saying only "they are a large and well organized group." The decline of the Red Sea corals in the Gulf of Aqaba was attributed by an Israeli marine biologist to a veritable rogues' gallery of causes over the past 50 years, including release of exotic species in ship ballast water, chemical and oil spills, fish farm effluents, smothering by sand brought to tourist beaches, and damage caused by tourists collecting, trampling and dropping anchors on the reefs.

But for all the expertise assembled in the hotel conference rooms – arguably the best naturalists and ecologists in the Middle East – there was little evidence of viable solutions. The flora and fauna in the Middle East, several areas of which are considered to be "biodiversity hotspots" by global environmental organizations, are threatened. But while these scientists are able to document species' decline, they have little power to stop it.

The causes of our biodiversity crisis, like the causes of many of our global environmental problems, are rooted in broad, systemic problems: Wars, military training and arms races in the Middle East directly degrade the natural environment, but also insidiously distract us and divert our limited economic and political resources, from not only caring for our natural heritage, but for people as well. The gospel of economic growth churns up ecosystem after ecosystem, and with them some of the most beautiful natural assets the earth has to offer and a source of wonder and appreciation to people. Population growth places increasing stress on hydrological systems and land reserves that must continue to provide raw materials, food, water and space to an ever growing population.

The solutions will require the expertise and commitment of a larger, global community, including statesmen, policy makers, economic leaders, activists, scientists and other members of civil society. The problems are not insurmountable, but time is not on our side. A promising sign is the increasing realization within the growing environmental movement that peace, social justice and economic equity are likely prerequisites for true environmental sustainability. Another encouraging sign is that 500 scientists from the politically turbulent Middle East can sit down and cooperatively address regional and global ecological challenges. Let's hope, for our sake and the sake of the other species on the planet, that our leaders can do the same.

Article kindly reprinted from Providence Journal. Daniel Orenstein is a post-doctoral fellow at the Faculty of Architecture and Town Planning at the Technion – Israel Institute of Technology, and visiting fellow at the Watson Institute for International Policy at Brown University.

Fig2. Development over the Mediterranean Coastal Dunes in Israel (©Daniel Orenstein).

OLIVE RIDLEY TURTLES OF MASIRAH ISLAND: SECRETS UNRAVELED FOR THE FIRST TIME

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Nestled off the east coast of Oman, Masirah Island is the only place in the Sultanate which hosts nesting grounds of four species of sea turtles, the loggerhead (*Caretta caretta*), the green (*Chelonia mydas*), the hawksbill (*Eretmochelys imbricata*)and the olive ridley (*Lepidochelys olivacea*). Depending on the species, turtles come here to nest at different times of the year. Thousands of loggerhead turtles nest at Masirah Island, making it one of the most important nesting populations in the world (Ross 1978, 1998). Hawksbill and green turtles also nest here, while the olive ridley nesting population is the only substantial one in the Arabian Peninsula, but has been poorly studied. To date, not much information about their pre- or post-nesting migrations is available, making conservation efforts more challenging. However, this mystery is now being unravelled.

A project, attaching satellite transmitters on olive ridley turtles with the purpose of tracking their movements was launched on Masirah Island in March and April 2008. A team of international experts, sponsored by TOTAL S.A. – Muscat Branch and TOTAL Corporate Foundation for Biodiversity and the Sea, and under the auspices of the Ministry of Environment and Climate Affairs, arrived in Masirah in the last week of March and attached nine satellite transmitters to female olive ridley turtles. In May 2006, it was the same sponsors and scientists who carried out the pioneering satellite-tracking project on loggerhead turtles on the island. Their migrations over two years revealed data that now ensures more effective conservation measures can be implemented for these ancient mariners.

It wasn't easy to spot these small turtles on moonless nights. The researchers and volunteers walked for many hours every night along the same south-eastern beach in order to locate a healthy, nesting olive ridley, wait for her to lay her eggs and cover her nest properly and then, finally, attach the transmitter on her shell before letting her go back into the water. This turtle species, smallest of all, weighing up to 45 kilograms and covering its nest with characteristic "thumps" of the shell to compact the sand, is thought to be the deepest diving hard-shelled turtle. Could this be true?

Ali Al-Kiyumi, Director of Nature Conservation at the Ministry of Environment and Climate affairs together with Salim Al-Saadi, a native Masirian and Director of Biodiversity, are following this project very closely and with great interest. Jean-Claude Farina, Group Representative of TOTAL in Oman and a fan of turtles, is also enthusiastic about this sponsorship contributing to better knowledge for the conservation of this flagship species the sea turtle, "which represents the preservation of life in the world's oceans and ensures its long-term survival".

The progress of the turtles can be followed on the Internet by following the link: http://www.seaturtle.org/tracking/?project_id=278.
After 11 months, one turtle is still "online". The nine turtles migrations have shown that some are sedentary, not moving much from their nesting grounds in southeast Masirah for many months, while others take different routes towards the Strait of Hormuz, even towards Pakistan or Yemen. Masirah island has once again revealed itself to be a very important area for a turtle species, as it does not only serve as a nesting area for them, but also serves as a feeding area.

Fig1. Olive Ridley turtle (Noor) with transmitter (© Alan F. Rees/MTCP 2008).

Two depth-measuring transmitters were attached to two individuals, but unfortunately they did not reveal significant information as these particular turtles stayed in shallow waters until their transmitters ceased transmitting.

As fishing is extremely important for Masirah Island, it is clear that a management plan is necessary to take into account the presence of the olive ridley turtles at certain times of the year when fishing is at its peak, in parallel with this turtles feeding and nesting seasons.

Satellite telemetry is, to date, the most important tool for tracking migration routes of turtles and other animal species, on land or in the world's oceans. As it is costly, it is always difficult to obtain the necessary funds to carry out tracking operations on significant numbers of animals. However, research institutions and private companies all over the Middle East, in cooperation with governments, are realizing the significance of this tool and are now employing it more frequently.

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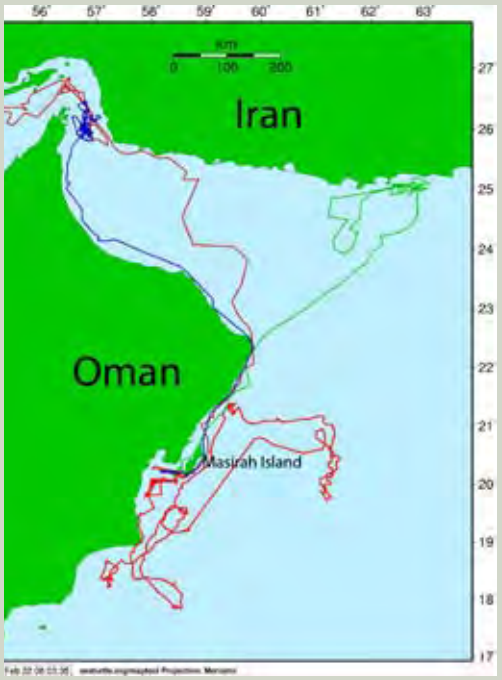

Fig2. Movements of «wandering» Olive Ridleys tagged in March-April 2008 in Masirah Island. Noor is marked in red (© Alan F. Rees/MTCP 2008).

FEEDING STARCH TO BROWSING RUMINANTS

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Introduction

This article summarizes the role of carbohydrates in ruminant nutrition, and the effect of starch in browsing herbivores.

Starch and ruminant nutrition

In the wild, browsing ruminants select diet items including leaves, fruits, forbs and foliage from trees and shrubs, as opposed to grazing ruminants which select grass and roughage. Additionally, browsing ruminants have a relatively larger lower gastrointestinal tract, and their rumen is predicted to have less selective retention and more passage of available carbohydrate and protein to the lower GI tract (Van Soest 1994). Regardless of their type of feeding strategy, browsing and grazing ruminants have both evolved to utilize carbohydrate fractions of plants as energy sources, via anaerobic fermentation by gut microorganisms in the rumen.

The carbohydrate fractions of plants are a very diverse category of compounds, but generally include non-cell wall components (simple sugars, starches and fructans), and cell wall components (pectins, hemicellulose, cellulose and lignin). Starch is the primary storage carbohydrate in plants and is a major component of many common feed ingredients (Van Soest 1994). Starch can be digested by mammalian and microbial enzymes, producing glucose (mammalian enzymes) or lactic acid (microbial enzymes) (Van Soest 1994).

Starch fermentation in the rumen reduces rumen pH, which can result in gastrointestinal disturbances and acidosis (Van Soest 1994). Even brief periods of acidosis can cause inflammations, ulceration and scarring, as well as liver scarring and long term reduction of rumen absorptive capacity (reviewed by Owens, Secrist et al. 1998). Hoof inflammation, bloat, energy balance issues, and bacterial overgrowth are other concerns related to over-feeding starch to ruminants (reviewed by Russell and Rychlik 2001).

Factors that can mitigate the effect of starch in the diet include dilution of the starch-rich diet with roughage, or modulating the intake of starch (Owens, Secrist et al. 1998). Additionally, dietary rumen buffers such as monensin, probiotics, bicarbonate and dietary protein level can modulate the incidence of rumen acidosis (Owens, Secrist et al. 1998).

Effects of starch on browsing ruminants

Domestic ruminants (generally grazing ruminants) are routinely fed substantial quantities of starch-rich cereal grains. In response to the potential health concerns related to feeding starch to browsing ruminants, commercially prepared, low starch diets have been introduced. Several research trials have determined that these diets are more suitable for browsing ruminants. For example, mule deer fawns fed a low starch diet (4%) had lower propionate and butyrate, and higher acetate: propionate ratios in their blood compared to animals fed higher starch levels (12-24%) (McCusker, Shipley et al. 2008). Since higher forage based diets are associated with higher acetate and lower propionate, and reductions in propionate are associated with reduced acidosis, these data support the hypothesis that low starch diets promote more optimal rumen physiology than do high starch diets. Similar results were obtained using in vitro culture systems with mule deer rumen fluid to examine a variety of dietary components (Brooks, Koutsos et al. 2008). Finally, giraffe fed a low starch diet for 3 years have had correction of previously inverted blood calcium: phosphorus ratios, suggesting that rumen function and acid-base balance was improved (Koutsos, Armstrong et al. 2007).

Fig1. Giraffe eating browse silage (©Declan O'Donovan)

Fig2. Bongo eating foliage (© Tom Bailey).

Conclusions

It is clear that exotic ruminants have evolved to eat diets that are relatively low in starch. In captivity, for browsing and grazing ruminants, high starch diets can cause rumen dysfunction and systemic health concerns. Therefore, any time that starch is introduced into the diet of a captive ruminant, it should be done very slowly to allow for adaptations of the rumen environment, in order to prevent acute acidosis. Additionally, a diet low in starch is the best option for feeding captive browsing ruminants, and alleviates many of the concerns presented in this paper.

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STATUS OF THE MOUNTAIN GAZELLE POPULATION IN THE ARABIAN ORYX SANCTUARY OF OMAN

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Introduction

The mountain gazelle, *Gazella gazella*, is an Arabian endemic, which inhabits an area stretching from the coastal plains to the mountains around the western and southern periphery of the peninsula (Vesey-Fitzgerald 1952). In Oman, as elsewhere in the peninsula, mountain gazelles are under threat due to the rapid development of the country since c. 1970. The mountain gazelle population in the Arabian Oryx Sanctuary and the coastal areas to the east is the largest in Oman, and until recently this population was thought to number around 10,000 individuals (Insall 2001). We undertook the first comprehensive population survey of mountain gazelle in the Arabian Oryx Sanctuary to generate a more recent population estimate and to determine whether distance sampling could be used to monitor population trends.

Methods

Following a pilot survey we randomly selected placement of our first transect, where after an additional 14 transects of variable length were systematically placed at 5 km intervals in a north south pattern. Surveys were carried out between sunrise and 13:30 by 2-man teams, a driver-observer and an observer-recorder, in 4x4 vehicles driving at 40km/h or less. Perpendicular distances to gazelle groups were measured to the nearest 1 m on the animal in the centre of the group, using rangefinders. Population density was calculated using the software "DISTANCE" Version 3, and the general guidelines of Buckland *et al*. (1993) were followed in data preparation and analysis.

Results

The total transect length surveyed was 1,882 km and our survey area amounted to 12,420 km2. Each transect was surveyed only once and 78 different mountain gazelle groups were observed. The mean observed group size for all observations was 2.3 ± 1.1 gazelle. The half-normal cosine model fitted the distance data well (x^2 = 1.9693, d.f = 6, P = 0.92250). The density of gazelle in the survey area was estimated at 0.224 gazelles/km2 (CV = 18.00), the equivalent of a population estimated at 2,787 mountain gazelle.

Discussion

We have shown that the mountain gazelle population in the Arabian Oryx Sanctuary is more than three times smaller than the 10,000 previously reported by Insall (2001). It is believed, however, that this previous estimate was inflated. There are two main reasons for this. Firstly, inspection of the survey routes previously used indicated a high probability of double counting of animals, and sampling was concentrated in those areas where gazelles would be found. This resulted in the size of the gazelle population being over-estimated. Our use of a more robust survey design, making use of non-overlapping, randomly placed, straight-line transects as well as an analysis technique where the potential recounting of animals does not pose serious problems (see Buckland et al. 1993) have resolved these problems. Also, during the period 1992-1997 the Arabian Oryx Sanctuary frequently recorded above average rainfall (Fig. 1). Consequently, the survey in the late 1990's on which the previous population estimate was based, was initiated at a time of near optimal conditions. Nevertheless, we do believe that there has been a substantial and real decrease in mountain gazelle numbers in the Arabian Oryx Sanctuary. While environmental variability has contributed to the decrease in mountain gazelle numbers - as illustrated by the more recent climatic conditions in the study area (1999 onwards) – poaching of gazelle is believed to have been the main contributory factor. Lastly, our survey resulted in a Coefficient of Variation of 18%. This is lower than the required 20% that is needed for monitoring purposes (Buckland *et al.* 1993), indicating that Distance sampling can be reliably used for monitoring the mountain gazelle population in the Arabian Oryx Sanctuary.

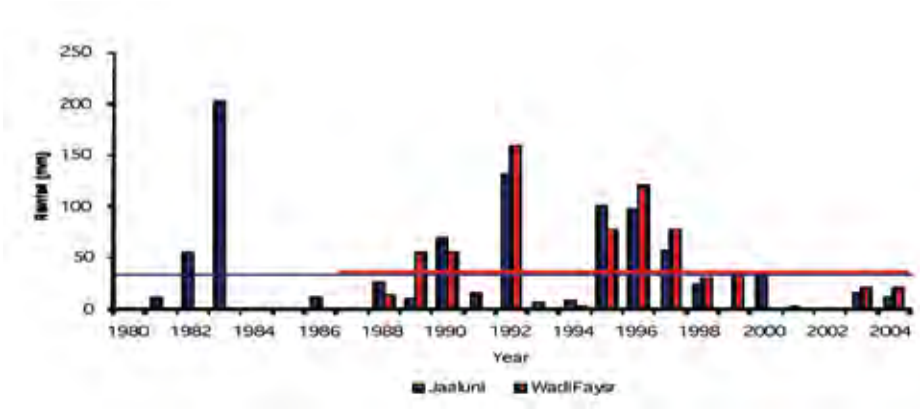

Fig1. Long-term rainfall patterns and the mean annual rainfall (solid lines) at two weather stations within the Arabian Oryx Sanctuary, central Oman. Note that, at Wadi Faysr, records have only been kept from 1987 onwards.

Across their range the mountain gazelle population is believed to total less than 15,000, and the overall decline in numbers has been estimated at more than 30% over the last 18 years (IUCN 2008). It is therefore essential that reliable population estimates are generated in all range states, so that appropriate conservation measures can be initiated and/or maintained.

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Fig2. Mountain gazelle (©Tom Bailey).

FIRST TAGGING WITH A RADIO-TRANSMITTER OF A RESCUED INDUS RIVER DOLPHIN NEAR SUKKUR BARRAGE, PAKISTAN

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The Indus River Dolphin (*Platanista minor*) is one of the four obligate freshwater dolphin species which is endangered and is endemic to the Indus River, Pakistan. The minimum abundance of the species is about 1,341 according to the last comprehensive survey conducted in 2006 (Pakistan Wetlands Programme, WWF – Pakistan, unpublished data).The highest density is currently observed in the Sindh Province, mainly between Guddu and Sukkur barrages. In 1974 an area of about 200 km between Guddu and Sukkur barrages was declared as a Dolphin Reserve by the Government of Sindh. This Reserve is also a Ramsar Wetland.

The existing population of the Indus River Dolphin is threatened by water pollution, commercial fishing, and degradation of the habitat. Moreover, there are accidental dolphin deaths when they are trapped in irrigation canals. WWF - Pakistan is working with the Sindh Wildlife Department for the conservation of the Indus River Dolphin since 1998. The project component on conservation of this species includes translocation of trapped dolphins from irrigation canals to the Indus River. As part of a scientific research programme one of the objectives of the project is to document the natural history of the species through non-invasive research methods such as remote-telemetry.

Rescue of an Indus River Dolphin: An Indus river dolphin was spotted by the staff of the Sindh Wildlife department on 11th January 2009, trapped in the Mirwah irrigation canal, at Patna regulator, emanating from the Sukkur Barrage (GPS location N 27°3825.9, E 68°5149.5). After making the assessment of the stranding site a rescue operation was organised on 13th January 2009, by WWF - Pakistan in collaboration with the Sindh Wildlife Department and the Environment Agency, Abu Dhabi. The objective was to rescue and tag the stranded dolphin and return it back to the Indus River.

Capture and handling of the animal: After the assessment of the stranding site, nets were placed by a team of community-based swimmers to encircle the dolphin. The nets were then pulled towards the shallow water close to the canal bank. The dolphin was caught as it swam close to the shallow water by a team of swimmers. Soon after capture, the animal was moved on a stretcher with foam mats and was weighed, sexed and body measurements were taken. This method has been adopted from marine mammal rescues (Geraci and Lounsbury 1993) and refined later by Khan (2005). During transportation, the animal was closely monitored for any signs of stress. To avoid hyperthermia, the animal was covered, (except the blowhole), with wet towels. The rescued dolphin, named Musafir (traveller), was a 2.5 years old, 18 kg male, measuring 118 cm in length. It was successfully transported to the release site (Indus River) close to the Sukkur barrage (N 27°4128.0, E 68° 5254.7). The rescue operation lasted a total of three hours.

Radio transmitter tagging: Technical support for fixing the transmitter and training of staff to conduct radio-tracking was provided by the Environment Agency, Abu Dhabi. Before Musafir was released, a VHF radio-transmitter was fixed to its dorsal fin. It was the first time this species had ever been radio tagged. The biggest challenge in fixing the transmitter was the size of the dorsal fin. Unlike marine dolphin species the size of the dorsal fin is very short in river dolphins. A 17.6 gram external mount radio-transmitter (Model F2060 - Advance Telemetry Systemic, Inc, USA) powered by a Lithium battery giving a life expectancy of 654 days was selected for the study. Two sterile hypodermic needles were passed through the base of the dorsal fin. Two plastic coated wires (external attachments) attached to the transmitter were then pushed through the hypodermic needles. Both the needles were pulled out leaving the wire (external attachments) in place. A disc was slid down through each wire on the opposite of the transmitter and was locked with the help of sleeves. To avoid injury to the delicate skin, a padding of Neoprene (synthetic rubber) was placed between the transmitter and the disc. After fixing the transmitter the dolphin was released back into the mainstream and the location of the release site was recorded with GPS (Map Figure 2).

Fig1. Dolphin translocation and tagging team (©Uzma Khan).

Fig2. Map showing the location of the rescue and release site (©WWF-Pakistan).

Conclusion: Our first experience of tagging an Indus River Dolphin has been successful. The dolphin is being tracked twice daily by boat and its GPS locations are being recorded by the field staff. So far, very interesting telemetry data on its movement have been collected. The dolphin has been able to cross the Sukkur barrage during the low water flow at 14,000 cubic metres of water a second, moving both ways downstream and upstream. This provides the first scientific proof of the movement of the Indus River Dolphin across the barrage. In future, the possibility of fixing a Satellite GPS transmitter will be explored.

Acknowledgements

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ELECTROCARDIOGRAPHIC PARAMETERS OF CAPTIVE ARABIAN LEOPARDS (*PANTHERA PARDUS NIMR*) IMMOBILISED WITH MEDETOMIDINE AND KETAMINE

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Introduction

The Arabian leopard (*Panthera pardus nimr*) is a critically endangered subspecies endemic to the Arabian Peninsula. The establishment of baseline physiological data is vital for the management of captive endangered species both to avoid the use of sub-optimal animals for breeding and to ensure captive specimens enjoy a successful reproductive lifespan. The electrocardiogram (ECG) can be used as a rough guide to evaluating the heart myocardium, rhythm, size and electrolyte imbalances. Standardisation of ECG parameters in the Arabian leopard would be a useful first step in identifying possible cardiac abnormalities in this species.

Five adult, healthy, captive Arabian leopards (3 males / 2 females) from a collection in the United Arab Emirates were anaesthetised on one day for clinical evaluation, genetic sampling, haematology, biochemical and serological examination and electrocardiogram measurements. Animals were starved for 24 hours prior to anaesthesia and darted by blowpipe with medetomidine (Domitor 1mg/ml, Pfizer) followed 10-15 minutes later by ketamine (Ketamil 100mg/ml, Ilium). On completion of the procedures an equal volume of atipamezole (Antisedan, Pfizer) to that of domitor was given intramuscularly to reverse anaesthesia. Average dose rates and details are presented in Table 1

Table 1: Dose rates and response time of Arabian Leopards anaesthetised with medetomidine and ketamine

Average dose (min-max) medetomidine (mg/Kg)	Average time (min-max) to sternal recumbancy (minutes)	Average dose (min-max) ketamine (mg/Kg)	Average procedure length(min-max) (minutes)	Time from atipamezole administration(min-max) to head up (minutes)
0.075 (0.066-0.092)	3.8 (2-7)	3.6 (3.1-4.6)	54 (50-58)	11.6 (10-16)

The ECG traces were recorded by the standard procedures recommended for domestic animals. The animals were placed in lateral recumbancy and leads attached to forelimbs (just proximal to olecranon) and hindlimb (over patellar ligament). The trace was recorded on a Cardiostore digital ECG recorder (Vetronic service, UK) and measurements taken on associated software after downloading to a personal computer. All leads were examined for rhythm and lead II was used to take measurements of duration and amplitude of deflection. Results are described in Table 2

Table 2: Average ECG measurements from five Arabian leopards taken from lead II

Lead II Measurement	Heart Rate (beats per min)	P wave duration (msec)	P amp (mv)	PR interval (msec)	QRS duration (ms)	Q amp (mv)	R amp (mv)	S amp (mv)	T amp (mv)	QT interval (ms)	ST interval (ms)
Average	70.4	63.20	0.08	141.00	71.80	0.03	0.84	0.04	0.28	292.47	149.47
Standard deviation		6.72	0.02	15.86	13.48	0.03	0.15	0.04	0.10	17.75	18.67

These findings are similar to those found in lions and tigers (Larsson et al 2008) although the PR interval was slightly shorter in the leopards as would be expected due to the comparatively lower cardiac muscle mass of this species. In lead II the P wave and QRS complexes and the mean electrical axis was always positive. In two animals the S wave was present and in three the Q wave was present. In all cases if the Q wave was present the S wave was not and vice versa.

The cardiac depressant and stimulating effects of medetomidine and ketamine respectively will have an effect on the normality of the ECG trace, however, it is impractical to obtain measurements in non domestic carnivores without anaesthesia. For instance, the leopards' heart rate was compatible to that of lions and tigers anaesthetised with xylazine and ketamine (Larsson et al 2008). According to allometric scaling, a higher heart rate should be expected in the leopards. It may be that this is due to the lower doses of ketamine used in this study compared to the dose used by Larsson et al. (2008).While this is too small a sample size from which to come to any final conclusions on normal ECG values for Arabian leopards, the author is not aware of any other published values in this species. We hope this data will encourage others working with this endangered cat to gather and share data on ECG and other parameters.

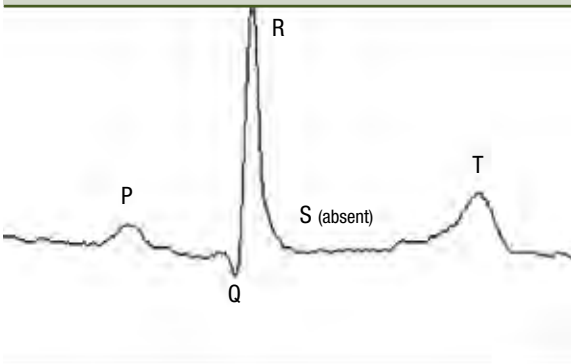

Fig1. Typical ECG trace with waves labeled. This leopard had no S wave.

Acknowledgements

I thank Lucy Hives VN, for her assistance in gathering this data.

References

Larsson, MHMA; Coelho MA; et al (2008). Electrocardiographic parameters of captive lions (*Panthera leo*) and tigers (*Panthera tigris*) immobilized with ketamine plus xylazine. Journal of Zoo and Wildlife Medicine 393): 314-319. 2008

Fig2. Arabian leopard (©C Lloyd).

DISEASES AND MEDICAL MANAGEMENT OF HOUBARA BUSTARDS AND OTHER OTIDIDAE

Tom Bailey
ISBN 978-9948-03-562-6
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494 pages

It is de *rigeur* when reviewing textbooks to criticise. After all, in the majority of reviews, it is the reviewers duty to tell prospective readers why they should buy that particular book over its rivals. This is not the case for this book. It is unique. While bustards are included in Jaime Samour's excellent "Avian Medicine" they are largely ignored in other texts as the majority of veterinary practitioners in the US and Europe (the major marketing areas for publishers!) will probably never work with them.

Therefore this book has no competition and even if very poor the reviewer would have to recommend it! Fortunately this reviewer faces no such dilemma! The book is excellent and contains a vast amount of knowledge on these species.

There were, I thought, grounds for complaint. My main area of interest is the Great Bustard not the Houbara. As I read through the pages I had a growing feeling that this was not a book about bustards but about the Houbara. Yes, I did then read the title! The title beautifully describes the contents of the book yet, even though the vast majority of the book is devoted to the Houbara, there is an awful lot for those working with other bustard species.

However, it is still a little sad that the chapters on captive management and breeding couldn't contain more on the successful Kori breeding programme in the United States or the Little Bustard in France. Minor complaint – the book is large enough already and there are plenty of references to much of this information.

The veterinary sections are, again, complete. They contain much in-depth knowledge on the medical problems of these species as well as diagnostic techniques, anaesthesia and surgery. This information ranges from the basic through to very advanced. I anticipated a book that would assist an experienced avian veterinarian about to work with novel species. Instead this is a book that will not only do this but will also be eminently suitable for those with little general avian experience and who do not have easy access to other sources of information – ie it will be perfect for use in the field (although a large rucksack will be needed!).

The picture quality is very good and there are plenty of them. I am sure that if I made a huge effort I could unearth many minor criticisms or some facts with which I disagree (this is actually unlikely – the authors have included so much of what is published on bustards that few arguments are not well covered!), however, I do not see the need – it is clearly a labour of love and to nitpick a text that represents huge amounts of work by all authors seems simply unjust.

The book is excellent and will be indispensable to the veterinarians as well as biologists and all involved in the captive management, conservation, and field studies of this and other bustard species.

It is hard to recommend it for those not directly working with bustards, although it is a well-written and interesting book and, to be honest, it is a book that covers the basics of clinical sampling, anaesthesia, surgery and therapeutic techniques very well. I would, therefore, be very happy to advise any veterinary student or inexperienced avian veterinarian to read it as well, even if their primary focus was with other avian species.

Congratulations to Tom and all the authors – this is an impressive work and I know that my copy will be very well-thumbed!

Reviewed by John Chitty BVetMed CertZooMed MRCVS

The Table of Contents of the book are available as a download on the WMENews website. Copies of Diseases and Medical Management of Houbara Bustards and Other Otididae are available from Tom Bailey. Contact: tom.bailey@dfh.ae

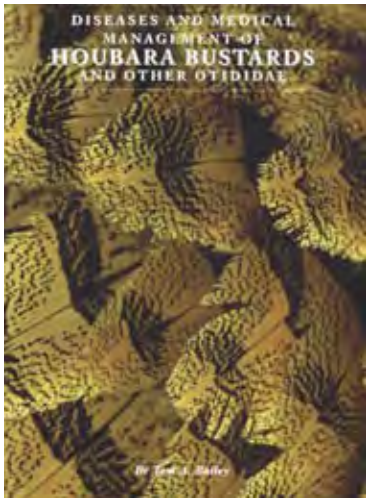

Fig1. Front cover of Diseases and Medical Management of Houbara Bustards and Other Otididae.

Fig2. Great bustard (© Nature Conservation Bureau)

Fig3. Marked distortion of the right leg of a kori bustard. This is due to a rotation of the tibiotarsus.

Fig4. A houbara bustard prepared for endoscopy in a surgical facility.

Fig5. Tube feeding is an important part of the management of anorectic bustards.

Fig6. Conjunctivitis in a white-bellied bustard caused by the eye fluke Philophthalmus distomatosa.

REVIEWS AND NEWS

What's new in the literature

Sher Shah, M. & Cunningham, P.L. (2008) **Fences as a threat to Sand Cats, *Felis margarita* Loche, 1858, in Saudi Arabia**. Zoology in the Middle East 44: 104-106. We report on female Sand Cats becoming trapped in diamond mesh fences – probably because of their bigger scull dimensions – and the potential threats of such fences to the movement of these cats in central Saudi Arabia. (Figure 1).

Cunningham, P.L., Sher Shah, M., Ul-Islam, Z., Robinson, R. & Boug, A. (2008) **Adaptive management a prerequisite for re-introduction of sand gazelle in Saudi Arabia.** GNUSLETTER 27(1): 19-21. This note refers to a study on the ecology of reem, *Gazella subgutturosa marica* initiated in the Mahazat as-Sayd Protected Area in central western Saudi Arabia; the importance of determining a realistic stocking rate and carrying capacity and the value of an adaptive management strategy for best management results. (Figure 2).

Cunningham, P.L. (2008) **Group structure and condition assessment for Gazella subgutterosa marica (Reem) during spring 2008 in the Mahazat as-Sayd Protected Area, Saudi Arabia.** GNUSLETTER 27(1): 21-23. In this note the group size and composition of reem, *Gazella subgutturosa marica* during spring and the effect localized rainfall has on changes in group structure is presented from the Mahazat as-Sayd Protected Area in central western Saudi Arabia. Significant group structure changes 1 to 3 days after rainfall events with mass congregations and movement towards the rains indicate the migratory nature of reem associated with rainfall.

Cunningham, P.L. (2008) GEKKONIDAE, **Ptyodactylus hasselquistii, Egyptian fan-footed gecko, Donndortt 1789 – Diet.** African Herp News 45: 6-8. This short communication comments on the foraging behavior away from naturally accepted habitat for *Ptyodactylus hasselquistii* in times of plenty – termite activity – and the potential cost-benefits associated with such activity as observed in central Saudi Arabia. (Figure 3).

K. Zylan, T. Bailey, H.V. Smith, C. Silvanose, J. Kinne, R. K. Schuster, K. Hyland. (2008) **An outbreak of cryptosporidiosis in a collection of Stone Curlews (*Burhinus oedicnemus*) in Dubai. Avian Pathology.** 37: 521-526. We describe an outbreak of cryptosporidiosis in Stone curlew kept in a mixed species rearing unit in Dubai. Cryptosporidium was the predominant intestinal pathogen detected. Nineteen of 29 birds had catarrhal enteritis associated with histopathological findings of numerous Cryptosporidium developmental stages at the mucosal surface.

UNESCO WORKS ON A NETWORK OF BOTANIC GARDENS IN THE ARAB REGION, IN COOPERATION WITH BGCI ABD APSG

UNESCO is engaged assisting the formulation of a network of botanic gardens for education, scientific research, and conservation in the Arab Region. There is a lack of botanic capacity throughout the region, and UNESCO and partner organisations hope to make significant contributions towards botanic capacity building, and the conservation of the Arab flora. This is based on UNESCO's Main Line of Action on enhancing linkages between cultural heritage and biodiversity conservation. The main aim is the ex situ conservation of the indigenous Arabian flora. Significant achievements include the production of a proposal on a Quranic Botanic Garden network, hosting international advisory committee (IAC) meetings in Doha and Sharjah, as well as the production of two master plans, and the participation and presentation of UNESCO's activities at the 2nd International Conference on Arab Botanic Gardens in Jordan, 2007. The latest important step was the external evaluation of the Doha and Sharjah projects by Botanic Garden Conservation International (BGCI), which sheds additional light on the importance of botanic networking in the Arab Region.

The Quranic Botanic Garden philosophy is to establish centres of excellence for botanic research, education, and conservation, and based on the teachings of the Holy Quran, calling for the respect of life, plants, animals, creatures, as well as water. The gardens will also pay homage to the holy book, and focus on symbolism related to Islam, and messages on the conservation of water and plant life. This philosophy has been applied in the cases of Sharjah and Qatar, where Quranic Botanic Gardens are currently being established, and the master plans have been produced.

From Jordan, Palestine, and Lebanon there are concrete requests to assist them with the establishment of botanic gardens, and it was the UNESCO Beirut Office that requested inter-cluster cooperation with the Doha Office, and this materialised, and a planning meeting was organised in Beirut in November 2008. Here the philosophy will also focus on the establishment of a place for research, education, and conservation primarily of the Lebanese flora, and under consideration of the national cultural and natural heritage. The potential gardens in Palestine and Jordan need much more discussion, however, there is already an ongoing dialogue between UNESCO Doha and the concerned authorities, and UNESCO is ready to assist, and hopes this will be major contributions to the conservation of Arab flora.

UNESCO will work under close cooperation with other authorities in this networking process, and will also seek the close cooperation of Kew Gadens-based Botanic Gardens Conservation International (BGCI), as well as with the Riyadh-based Arabian Plant Specialist Group (APSG), that was established in 1996, and with the support of the World Conservation Union (IUCN). More information can be obtained from Dr. Benno Böer, UNESCO, Qatar.

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Fig1. Sand Cat dead in diamond mesh fence (© Declan O'Donovan).

Fig2. Female reem (© Peter Cunningham).

Fig3. Ptyodactylus hasselquistii (© Peter Cunningham).