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NEWS

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STEPS TO BUILDING LONG TERM SEA TURTLE CONSERVATION PROGRAM IN YEMEN

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Keywords: Yemen, sea turtles, conservation, local communities

Yemen is renowned for it's rich biodiversity including both flora and fauna. Among the latter are sea turtles of which three species are now confirmed to nest at different sites along the coasts and at some islands off Yemen (Fig.1). These are the loggerhead *Caretta caretta* at Abalhen beach in the northern coast of Socotra Island; the hawksbill turtle *Eretmochelys imbricata* at Azizi Island, Aden; the green turtle *Chelonia mydas* at Sharma-Jethmoun- Dhargham protected area, Hadhramout; and the green and loggerhead turtles at Al-Fatk , Al-Mahra, east of Yemen.

Abalhen beach, Socotra Island
12°36'59.97" N; 53°46'00.28" E -
12°39'47.36" N; 53°41'46.26" E

Ras Imran and Azizi Island, Aden
12°44'7.51" N;
44°42'8.27" E

Sharma-Jethmoun-Dhargham coast, Hadhramout
14°49'35.88" N; 50°03'03.76" E -
14°49'11.03" N 50°01'26.02" E

Al-Fatk – Hawf coast, Al-Mahra
16°30'59.56" N; 52°41'29.06"
E - 16°38'06" N; 53°01'51.58" E

Fig. 1. Google images of areas under investigation

During their nesting seasons, these turtles are exposed to frequent attacks by people who butcher them for meat and excavate their nests for eggs. Moreover, feral dogs form another source of threat, especially at Sharma-Jethmoun-Dhargham beach, as they feed on the turtles' eggs and hatchlings. No serious action is taken by the Environment Protection Authority to stop threats to sea turtles; hence, the present project was launched.

Two previous initiatives on the protection and conservation of sea turtles were made. The first started in 1998 on Socotra Island by the Environment Protection Authority, and was funded by UNOPS–Socotra Biodiversity Project (Abdullah, 2011). Activities in this project continued until 2007 and stopped when funding was suspended. The second was an individual effort conducted by the late Dr. Abdulaziz Alaamri (http://www.ioseaturtles.org/pom_detail.php?id=54) at Sharma-Jethmoun beach. Dr. Alaamri's activities included two awareness lectures, a meeting with tourists visiting the beach, awareness posters and two excursions for school children. This awareness campaign lasted for two weeks only.

The present project was initiated aiming at building a long term sea turtle conservation program in Yemen, with full involvement of local communities where sea turtles are known to nest. It was planned to achieve this goal through the following activities:

1- Making courtesy visits to Sheikhs and community leaders to explain the initiative (Fig.2.).
2- Contacting environmental NGOs in the identified areas to discuss collaboration possibilities or establish new ones if there are not any (Fig.3.).
3- Conducting intensive awareness programs (lectures, turtle conservation movies, posters, and brochures) in target areas (Fig.4.).
4- Providing training on sea turtle monitoring and standardised survey methods (Fig.5.).
5- Meeting with official environmental \ authorities to gain their trust (Fig.6.).

Fig. 2. Meeting with Sheikh Suleiman Nooh of Salmahu and Community members

Fig. 3. Discussing ways of collaboration with "Friends of Environment Society"

Fig.4. Awareness session at Salmahu, Socotra Island

Fig. 5. Training on taking turtle measurements at Socotra

Fig. 6. Meeting with Environment Protecion Authority at Aden

STEPS TO BUILDING LONG TERM SEA TURTLE CONSERVATION PROGRAM IN YEMEN CONTD.

With three generous awards from US Fish and Wildlife Service, Division of Marine Turtle Conservation Fund, issued in 2011, 2013, and 2014; and with the participation of local communities, this project is ongoing.

Because of its unique biodiversity, and being nominated a world heritage site, Socotra Island was selected to start the project's activities (Nasher and Al Jumaily, 2013). After several meetings with community members and their Sheikhs, they were convinced to collaborate. Activities started with awareness programs, training, and capacity building. By the end of the 2012 nesting season, it was time to establish a community based organisation. Meetings and discussions with community members of Salmahu and Qadama led to the establishment of "Socotra Society for Sea Turtle Conservation" through which monitoring and protection of turtles on Socotra continued to date.

In Hadhramout, contact was established with the "Friends of Environment Society", an NGO that was established over a decade ago in Addees Al Shargia, east of Hadhramout. In the past, members of this society have carried out some activities on sea turtle protection at Sharma, but these activities were discontinued due to shortage of funding. Meetings were also held with communities living near Jethmoun. Because many of them were educated, they immediately welcomed the idea and offered to collaborate. Eventually they established "Halfoon Wildlife Protection Society" which joined the sea turtle conservation project, and proved to be the most active. The next station was Ras Imran and Azizi Island where hawksbill turtles nest. After three meetings with the fishermen in this area, "Ras Imran Society for Sea Turtle Conservation" was established. Finally after two visits to Al-Mahra, collaboration was established with "Al-Fatk Fisheries and Service Association", and sea turtle monitoring started in June 2014.

Under the supervision of qualified scientists, monitoring activities were carried out by volunteers from the communities. Their role was to patrol from 6 PM to 3 AM of the next day during nesting season and keep records of nesting females. The presence on the beach of these volunteers, prevents those who intend to slaughter turtles from approaching, thus protection is achieved indirectly. They were doing this for a nominal monthly compensation which covered the cost of snacks and refreshments.

Results obtained so far indicate that Yemeni marine coasts and waters are ideal for nesting and feeding of marine turtles. Of special interest, is Sharma-Jethmoun site (see Stanton, 2008); a 50 km long sandy beach interrupted by several large rocky outcrops. The nesting season begins as early as April, when a few turtles start emerging, and extends to October, with the peak during June to August. Large numbers of green turtles *Chelonia mydas* arrive to nest every year. A few loggerheads *Caretta caretta*, and hawksbill turtles *Eretmochelys imbricata* were also encountered every night during the nesting season. Three Olive Ridleys *Lepidochelys olivacea* were recorded in July 2014, two on the 17th and one on the 24th, but none of them nested.

Turtle species	2013		2014		
	September	October	May	June	July
C. mydas	4,032	1,584	3,456	8,360	15,828
C. caretta	20	10	10	2	8
E. imbricate	11	4	6	6	5
L. olivacea	0	0	0	0	3

In conclusion, with collaborative efforts between government officials and people, sea turtles can be protected and conserved in Yemen, which can be recognized as a globally important region for sea turtle nesting.

ACKNOWLEDGEMENTS:
We would like thank Mr. Earl Possardt, US Fish and Wildlife Service for his continued support. Thanks are also extended to the community members at the project sites for their support and collaboration.

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CYSTICERCUS TENUICOLLIS METACESTODES IN FIVE ORYX SPECIES

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Key words: Arabian oryx, Beisa oryx, *Cysticercus tenuicollis*, Fringe-eared oryx, Gemsbok, Scimitar-horned oryx

Introduction: Cysticercus tenuicollis (*C. tenuicollis*) is the larval stage (metacestode) of *Taenia hydatigena*, a tapeworm parasite of dogs and other canids (Senlik, 2008). The intermediate hosts of *T. hydatigena* are domestic and wild ruminants (Kara and Doganay, 2005). We report incidental findings of *Cysticercus tenuicollis metacestodes* encountered during necropsy examination of dead animals from five oryx species kept in Al Ain Zoo.

Materials and methods; This study was based on a retrospective analysis of post-mortem records covering a four year period (July 2010 to July 2014) in Al Ain Zoo. The zoo hosts five oryx species namely Arabian oryx (*Oryx leucoryx*), beisa oryx (*Oryx beisa*), fringe-eared oryx (*Oryx beisa callotis*), gemsbok (*Oryx gazelle*) and scimitar-horned oryx (*Oryx dammah*).

Results: A total of 12 out of 213 individuals (2 Arabian oryx, 3 beisa oryx, 1 fringe-eared oryx, 1 gemsbok and 5 scimitar-horned oryx) were recorded with *Cysticercus tenuicollis*, over the four year period, accounting for 5.6%. Only adult animals were identified with the metacestode with more females (8) than males (4) recorded but not statistically significant (p value 0.3737). The metacestodes were found attached to different organs as follows: lung (1), liver (1), liver and omentum (4), omentum (4) and mesentery (2).

Discussion: *Cysticercus tenuicollis* has been documented in Arabian oryx, beisa oryx and gemsbok but to the best of our knowledge it is the first time it is documented in fringe-eared oryx and scimitar-horned oryx. In the intermediate host, *C. tenuicollis* invades the liver and abdominal cavity causing considerable damage during larval migration, although in our study no pathology was reported. There is no zoonotic risk associated with this parasite. The mature tapeworm passes out eggs in faeces of the host and are ingested by ruminant intermediate host. We postulate that the antelopes ingested eggs through contaminated alfalfa or hay that may have been contaminated by stray dogs or wild carnivores (fox).

Conclusion: Our study has shown that the five oryx species harboured *Cysticercus tenuicollis* but due to the paucity of information in the UAE wildlife, further research is recommended.

Reference will be available on the website www.wmnews.com

REMOVAL OF RETAINED PLACENTA IN A GIRAFFE 14TH JULY 2013

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INTRODUCTION: One of the giraffe at Ain Wildlife Park & Resort (UAE), gave birth to a calf after a prolonged labour period. 72 hours after calving, she had not dropped the placenta and hence we had to intervene and remove it. Retained placenta on its own is not a problem, but it predisposes the cow to infection (metritis) which sometimes can be fatal if not addressed. When an animal with retained placenta defecates this contaminates the placenta and may be absorbed into the uterus. Also when the animal is lying down the retained placenta gets contaminated with the soil micro-organisms and this may lead to severe metritis and/or tetanus.

The thought of retained placenta and having veterinarians intervene was a major concern, as giraffe anaesthesia is very risky, especially as temperatures were in the high 40's Celcius (1220F). Fortunately, Al Ain Wildlife Park had acquired a new giraffe Tamer that coincidentally was fully installed the same day we wanted to manually remove the retained placenta.

Procedure: **Capture** –The giraffe was not conditioned to the Tamer procedure and as such, it was felt that it would take a long to bring her to the Tamer. Surprisingly, it took less than 3 minutes (Fig 1). Once in the Tamer, she was blindfolded to keep her calm (Fig 2). The exact body weight of the giraffe was taken with the aid of the inbuilt scales, which allowed the veterinary staff calculate the correct drug dosage for the animal.

Manual removal of placenta: To manually remove the placenta, the perineum was thoroughly washed with diluted povidone iodine. Wearing arm-long sleeves the hand was lubricated and inserted through the vagina into the uterus between the placenta and the uterine wall. By gently applying traction using one hand and the other hand into the uterus peeling off the placenta from the caruncle attachment, the placenta was removed carefully to avoid damaging the delicate lining of the uterus (endometrium). Thereafter, a sterile tube was lubricated and inserted into the uterus. Diluted povidone iodine was poured through the tube into the uterus (Fig 4). Then intra-uterine pessaries were inserted into the uterus.

Systemic treatment: Long-acting antibiotics were administered intramuscularly. The animal was also given Vitamin E and Selenium.

Blood taken during examination revealed low calcium levels and low vitamin E and selenium levels suggesting that the cause of the retained placenta was nutritional, mainly due to hypocalcaemia and Vitamin E and Selenium deficiency. Subsequently the animal was supplemented with calcium and Vitamin E and Selenium supplements.

Reference will be available on the website www.wmnews.com

Dr Ahmed Shawki and Dr Tatiana Cavero putting the blindfold.

ASSESSMENT OF TERRESTRIAL SMALL MAMMALS IN DUBAI EMIRATE'S INLAND DESERT

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Abstract

This study investigated the small mammal community of the Dubai Desert Conservation Reserve (225 Km²), Dubai, United Arab Emirates. We aimed to determine the diversity and distribution of rodents in two different habitats: (i) sand dunes and (ii) gravel plains. Using 240 trap-nights, four rodent species were captured.

The most frequent species were *Gerbillus cheesmani* followed by Meriones crassus, *Gerbillus nanus* and *Acomys carhinus*. Indices of species richness (S) and diversity (H') were greatest in gravel plains followed by sand dunes. Some expected species, such as *Meriones arimalius* were not found during the survey. *Acomys carhinus* was found only in one location of the reserve.

Introduction

In arid environments, species have adapted to limited availability of water, and small mammals in most deserts respond positively to rainfall (Previtali et al., 2009; Shenbrot et al., 2010; Thibault et al., 2010b). Long-term biotic responses to rainfall can be confused with changes in shrub cover and in the make-up of small mammal species. Biotic interactions can play key roles in systems that appear largely structured by abiotic influences. (Kelt, 2011) Seed consumption and omnivorous diet is considered to be common in all desert small mammals.

Therefore, the consumption of seeds available in a community is important to get a full understanding of a desert ecosystem. According to Peter and Aspinal (2005), at least 11 species of rodents occur in the United Arab Emirates. Our aim was to complete an intensive systematic survey of rodent populations.

Study Area

The study area is located in the Dubai Desert Conservation Reserve (DDCR: 24° – 25° Latitude and 55° – 56° longitude), in Dubai, United Arab Emirates. The reserve has an area of approximately 225 square kilometres and is located 65km outside of Dubai city, between Margham and Al Faqaa.

Methodology

The study aims to provide a baseline survey of the rodent communities in the DDCR; and to assess the community structure and the distribution of the individual rodent species and species distribution patterns on different habitat types (Sand Dunes and Gravel Plains).

Using Hawth's Analysis Tools© version 3.27 allowed us to generate a total number of random points and allowed the specification of a minimum distance to be enforced between generated points. With the aid of the plot sampling tools random points were generated with consideration to the different habitats.

The Hawth's Analysis Tools randomly selected 40 points which were evenly distributed between the sand dunes and the gravel plains with 20 points for each habitat type. At each site, a circular plot of 50 m diameter was selected giving a total sampled area across the reserve of approximately 78,520 m2. For each plot, 3 traps were placed along the four compass directions (Fig 2). The distance between each trap was 10m, giving a total of 12 traps per site. Trap lines were set for a period of 6 nights at each site.

Data Analysis

Assessment of Trapping Success

In this survey we adopt the trapping success index which suggests that catch per unit effort or trapping success does not necessarily represent the relative abundance of the organisms being sampled (Kennedy, 1951)

Fig 1. Study site location

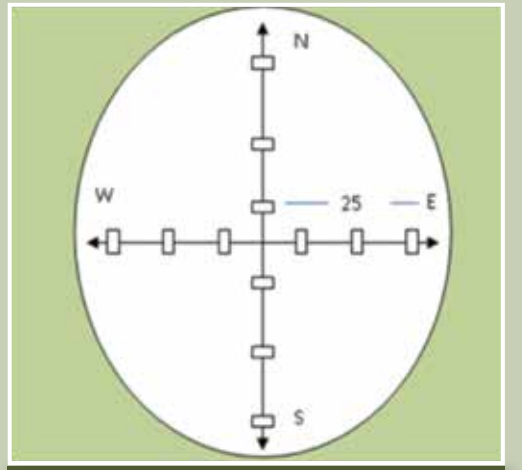

Fig 2. Trap positions for each plot site (n= 40 plots)

This is so if traps are removed from the trapping efforts when they were triggered by, the species under the study, non-target species, as well as when they were triggered accidentally due to other factors like wind storms, rain, etc. Patrick, (1970) when looking at these influences also suggested that insects eating the bait could be considered a limiting factor affecting the catching effort.

In this study, we followed the method to estimate the trapping success proposed by (Simonetti, 1986).

TS=A×100/(TU-NA)

Where TS is the trapping success expressed as rodents captured per 100 trapping units. A is the number of rodents caught. TU is the number of trapping units

TU=P×I×N

where P is the number of trapping intervals (ie. Nights), I is the length of trapping intervals (in meters), N is the number of traps being used and NA is the number of unavailable number of traps for the small rodents.

ASSESSMENT OF TERRESTRIAL SMALL MAMMALS IN DUBAI EMIRATE'S INLAND DESERT CONTD.

Results and Findings

The survey started in May 2011, and continued for a year until May 2012. A total of four different species of rodents (Table 1) were recorded in DDCR representing one family (Rodentia) and one order (Muridae).

Table 1. Species caught during the study at DDCR

Species	Common names	Trapped/Sites	Male	Female	Total
Gerbillus cheesmani	Cheesman Gerbil	24	36	25	61
Gerbillus nanus	Baluchistan Gerbil	3	4	0	4
Meriones crassus	Sundevall jird	4	7	2	9
Acomys cahirinus	Egyptian spiny mouse	1	2	0	2

Trapping Success

The equation used in this report for calculating trapping success gives the highest estimates of trapping success during the different seasons.

Seasonal

September to November had the highest trapping success which was expected as there is an abundance of seeds in the area at this time. The season with lowest capture success was summer which we suggest was due to seed availability in the area.

Moon Phases

One of the major findings during the study was that rodents were less active during that portion of the night when there was lunar illumination (moon up) compared to when there was no illumination (moon down). We hypothesized that this moonlight avoidance strategy has been selectively favoured in rodents because of a reduced risk of mortality, attributed to visually hunting predators during moon-down than during moon-up. During new moon, when nights were darker there was an increased trapping success when compared to trapping success during full moon nights when it was a lot brighter.

Weather factors

The weather condition which we argue had the greatest influence on trapping success was the rain. It was observed that the night just after any rainy days, rodents, especially *G. cheesmani*, were found to be most active when compared to other weather conditions. At night, grasses and seeds are permeated with dew, and rodents will take these food items back to their burrows to improve the humidity (Wikipedia 2012) As an adaptation to living in harsh, dry desert conditions where the annual average rainfall during the survey year was very low (1.02mm of rain across the reserve), one would only expect high bouts of activity during these periods. Cloud and the blocking affect of the clouds

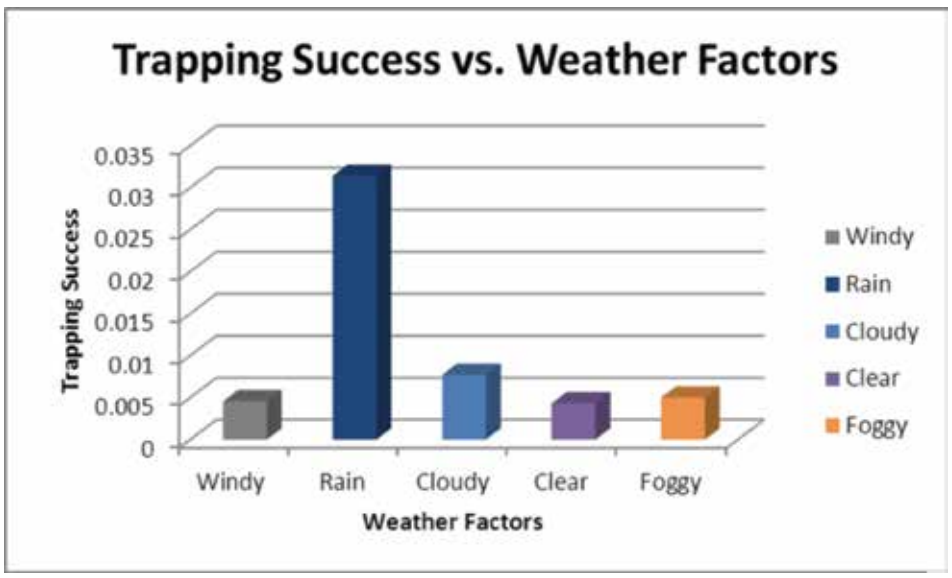

Fig 4 Trapping success compared to weather factors.

Fig 3. Trapping Success (animal per trap-night) compared to moon phases.

proved to be the second greatest factor affecting trapping success. Clouds would reduce or eliminate the majority of the moon phase allowing the rodents more concealment from predators.

Summary and Conclusions

During the yearlong survey a total of 61 *Gerbillus cheesmani* were caught of which 36 were males and 25 were females. This is probably one the most common gerbil species in the whole of the Arabian Peninsula. *Meriones crassus*, had not been captured or identified prior to this survey so this was a new record for the DDCR species list. A total of 9 individuals were trapped, which comprised 7 males and 2 females. *Gerbillus nanus* captures were four which comprised of four males, 0 females. *Acomys cahirinus* was an unexpected species that we caught as it had not been seen before in the DDCR, so was another new species, which was added to the species list for the reserve. This species is extremely habitat specific hence only been caught at one location "Rocky Outcrop" in the reserve. A total of 2 were caught both being males.

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CAMERA TRAPPING RESULTS FROM JABEL HAFIT, ABU DHABI, UNITED ARAB EMIRATES

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Key words: Arabian Tahr, camera trapping, Jebel Hafit, Human and natural threats

INTRODUCTION

Through history and local knowledge it was known that the Arabian tahr (*Arabitragus jayakari*) occurs on Jebel Hafit Mountains of Al Ain in the Abu Dhabi Emirate with other mammals such as red fox, feral goats, and Blanford's fox. With new camera trapping technology and efforts of the Environment Agency – Abu Dhabi (EAD) Terrestrial Marine Biodiversity Sector team, we are carrying out a study from 2011 to present. This paper describes our experiences with a terrestrial mammal monitoring system on Jebel Hafit and the results showing the occurrence and threats to the critically endangered mammal species in this particular habitat in Abu Dhabi which is Jabel Hafit. For the first time, the camera traps enabled us to collect baseline and population data on mammals and we now have a clearer picture of what species are present on the jebel. For the first time EAD re-confirmed the presence in 2012 of Arabian Tahr on Jebel Hafit, and the last confirmation of the Arabian Tahr was in 2004, by the Arabian Tahr Conservation Group, Sharjah (ATCG)

METHODS

Choosing suitable sites to set the camera traps is one of the most important criteria to figure out the absence and presence of the animal. In our study we set the camera traps based on the historical range, local knowledge on animal routes, water points on the mountain (pools in wadis during the rains) and vegetated areas to maximize our opportunity to capture any mammals in the area. Jebel Hafit is the only mountain, and certainly the most prominent landscape feature, within the Emirate of Abu Dhabi. It is aligned in a north to south direction and is approximately 17 km long, with its highest altitude being 1,300 m above-sea-level. Jebel Hafit is the south most, and by far the largest series of mountain ridges which run north-south in the vicinity of Al Ain (Richard, 2004). The exact camera trap locations were recorded using a handheld GPS unit. Also recorded the following information: camera trap ID number, date, time, temperature, moon phase, and when camera trap starts to operate it also gives us a description of the macro- and micro-habitat around the camera trap. Based on our study there is no correlation between the Arabian Tahr and moon phase; however, it gives us an idea of what the animal feeds on when the camera captures the macro-habitat and in some instances when Tahr can be seen feeding on a bush.

Six Camera traps were set in different places on Jabel Hafit and these places were also dependent on accessibility, restricted areas, etc.. The cameras were set up for more than 165 nights combined. Eight visits has been conducted to Jabel Hafit to retrieve the data, we try to minimize our activities in the Arabian Tahr area to avoid any habitat disturbance and causing them to move away as they are known to be territorial animals, especially the males.

RESULTS AND DISCUSSION

Altogether 14 different sightings of Arabian Tahr have been captured on the camera traps and they were 4 males, 5 females, and 5 unknown (it is highly probable that some of these images could have been the same individual(s) recorded multiple times). We can estimate that there are at least 6 individuals and we have also recorded a female Arabian Tahr with a kid. This estimate is based on the dates and times of the year that the individuals are recorded on the camera traps.

Out of the 6 cameras we have only recorded Arabian Tahr, Feral Goats, Red Foxes, and Feral Cats in our 4 cameras which were on the east side of the mountain. Both cameras on the west side did not capture any animal activities. This could be due to the human actives on the foot hills. Other important natural threats that the Arabian Tahr might face is competition for food and resources and disease transmission from feral goats. The only medium-sized carnivores we have detected are red foxes though we did not see any direct evidence of predation from this species.

Figure 1 Map Showing the locations of the Camera Trap deployed during the Study (© EAD –Abu Dhabi)

Figure 2 Figure showing the Capturing of the Camera Trap and inset RECONYX camera Hyper Fire Professional IR (PC800) ©Soorae

In conclusion, the data gathered throughout our survey on Jebel Hafit shows the terrestrial mammal activity at the site – data relevant to public awareness and long-term conservation issues. We do not consider the survey to be exclusive to provide a comprehensive analysis but feel there is a strong motivation for further research into a satellite tagged monitored programme for Arabian Tahr to deduce their home range size, movements on the mountain and whether they undertake any cross-border movements.

Figure 3 Camera Trapped Image of Arabian Tahr at Jebel Hafit

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SAVING THE ARABIAN LEOPARD IN YEMEN: HARNESSING THE POWER OF MOBILE TELEPHONY FOR CONSERVATION

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Keywords: Arabian Leopard, Conservation, Yemen, Mobile, Technology

Conservationists have much to gain from partnering with mobile telecoms operators. As devices become ubiquitous and network coverage expands to reach more remote populations, mobile technology could become the conduit of choice to increase conservation awareness and collect information from the ground.

This is particularly true in Yemen, where the Foundation for Endangered Wildlife (FEW) is facing an uphill battle for the survival of the Arabian Leopard (*Panthera pardus nimr*). With less than 200 individuals estimated to remain in the wild throughout the Arabian Peninsula, it is categorized as critically endangered by the International Union for Conservation of Nature (IUCN), and at risk of imminent extinction unless drastic measures are taken for its protection across its limited range. Major threats include rampant human population growth leading to fragmentation and loss of leopard habitat; uncontrolled hunting from a heavily armed society; and poaching for purposes of addressing the demand for live leopards from GCC states, where wild cats provide a status symbol to those who own them. A lack of basic environmental consciousness among the population, and above all more pressing needs to deal with in an economically and politically difficult context, mean that wildlife conservation remains at the low end of priorities for people and government alike.

In the last years, FEW has conducted numerous camera-trap surveys in areas which have historically been leopard habitat. In 2011, this led to the first photographic evidence of leopards in the wild, when two different individuals were spotted in southeast Yemen, adjacent to the Omani border. Further traces of scats (animal droppings) and footprints have been recorded since then, providing hope that there is still time to prevent the leopard's extinction. Unfortunately, however, leopard presence in Yemen has been more forcibly confirmed through press reports of kills or captures. In July 2014, various Yemeni and international newspapers (Gulf News 2014) and websites reported the killing of two leopards around Sha'ib mountain in the area of Al Dhale', publishing pictures of the hunters proudly exposing their trophies. Despite being Yemen's national animal and protected by law, no effort has been made to arrest the perpetrators. The government's tenuous control of Al Dhale' province has not helped, the area being a hotbed of militancy.

It is in this context that FEW has initiated discussions in view of forming a partnership with a leading mobile operator in Yemen. In addition to being a conduit for communicating with end-users, mobile operators have access to a slew of data from subscribers, including information on user location, call records, billing information, and more or less accurate user directories, which can all provide a valuable contribution for conservation efforts. While private subscriber information is protected unless required by judicial authorities, the possibility to reach and interact with a large number of individuals throughout the territory can already address significant conservation needs.

These discussions have centred on a number of areas, including awareness raising through bulk messaging. At almost no cost to the operator, SMS messages can be sent to a selected subset of subscribers which are known to inhabit areas where research indicates that leopard presence is likely. These communications would include educational and awareness messages on the plight of the Arabian leopard. More importantly, interaction with subscribers can be initiated for crowd-sourcing purposes, in which SMS-based surveys of animal sightings can be conducted, recording responses in a database, and running a statistical analysis of the results. Such an analysis can eliminate the outliers, and provide an indication of past leopard presence, both chronologically and geographically. In turn, the analysis can be followed by more focused and more geographically specific camera-trap surveys, improving FEW's operational efficiency and reducing its costs. Interactions with subscribers can also help understand how the animal is perceived by them, and shed further light on the apparent reasons behind leopard persecution. For instance, where there are records of leopards posing a threat to a farmer's livestock, this can help the Foundation direct its efforts in lobbying for adequate legislation, in view of compensating farmers for any loss incurred due to leopard attacks.

Mobile technology can also be used in the context of law enforcement for the purpose of prosecuting individuals involved in the hunting and poaching of Arabian leopards. Phone or SMS-based tip-offs by informants, eventually against compensation through airtime credit, is a relatively straightforward mechanism which has been implemented with success in Eastern Africa (African Wildlife News 2014). However, mobile technology has more to offer. In the latest reported leopard killing of July 2014 in Yemen, local newspapers and social media published photographs of the hunters, clearly showing one of them placing a call (Yafa News 2014). Considering the knowledge that the killing happened around Sha'ib, and the time-stamp of the picture, it would be relatively easy for a government agency to analyse the operators' call records, and identify the subscribers who placed and received calls from the base transceiver stations located (BTS) in the area. By cross-referencing this information with user directories, the full details of the individuals could be obtained, and prosecution could effectively begin. The individual's location could be further identified with triangulation, leveraging information from the BTSs which indicate in real time the mobile numbers which are currently associated to it. By analysing the historical call records of the identified individual (numbers dialled and called from, along with time-stamps), the prosecuting authorities could then proceed to identify and understand the extent of the network involved, eventually leading back to higher profile persons which may have instigated the hunt for various reasons, or which may have purchased the trophy. Finally, legal provisions for the lawful interception of telecom conversations could further help authorities build the case and gather further evidence of the suspected hunters' involvement.

With careful planning and the forging of strong partnerships, leopard conservation efforts in Yemen could stand to benefit greatly from mobile technology. This should come at no or negligible incremental cost to operators, while allowing them to expand their social responsibility activities. As importantly, it could enable Yemeni operators to have a pioneering role in putting to use cellular technology for the benefit of conservation in the Middle East. Although the current political context does not lend itself to a focus on conservation by government, raising awareness and conducting leopard spotting surveys based on SMS could go a long way. FEW Yemen's nascent partnership with an operator is a first step in the right direction.

African Wildlife News, Summer 2014, "Closing the Technology Gap", available at http://www.awf.org/sites/default/files/media/Resources/Member%20Newsletters/AWN_Summer_2014.pdf

Gulf News, August 24, 2014, http://gulf-news.com/news/gulf/yemen/call-to-protect-arabian-leopards-in-yemen-1.1375757

Yafa' News, 7 July 2014, available at http://www.yafa-news.net/archives/107510

THE RAS AL KHAIMAH BIODIVERSITY PROJECT

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PROJECT AIMS

This project funded by RAK bank follows a double aim: wildlife research and public education.

1) Terrestrial biological surveys as an element of biodiversity protection.
Biodiversity and ecological surveys will give valuable data on wildlife populations. The first year of the program will focus on mammals (i.e.: Caracal, Arabian Tahr); amphibians; reptiles; insects; and birds species.

2) Education: Public awareness and data sharing. Long-term wildlife protection must include all levels of society. The project will include stakeholders from traditional land users to their leaders.

Using the information collected during the field surveys a series of fact sheets in English and Arabic will be produced. Focusing on one specific species per month, these fact sheets will be distributed to the universities, tourist attractions, Governmental agencies, community leaders and the public in general as well as all free magazines.

SCIENTIFIC OUTLINES OF THE PROJECT

Faunal Survey of the Ras Al Khaimah (RAK) Mountains

The complexity of food webs and food chains are generally poorly understood the World over, and especially in the UAE. Currently we have built up an insect inventory through a variety of work that has been carried out (e.g. Howarth and Gillett, 2008; van Harten, Vol 1-5, 2008-2014). With every new study, species new to the UAE and new to science are being discovered, meaning that we are still working on baseline data. Without good knowledge of all the species present, it is exceedingly difficult to strategically plan conservation projects as the ecological requirements and interactions have yet to be studied, and the inventory completed.

Mountain areas are usually rich in biodiversity as they hold a variety of more ancient undisturbed habitats and areas difficult to reach. Therefore, the value of a detailed biodiversity survey of the RAK mountains is an important addition to the knowledge so far gained, which will then lead to further in depth studies of ecosystems and their diversity.

To most accurately capture species biodiversity, it is essential to use a variety of techniques as the behaviour and niche utilization of each species varies. The techniques outlined below would be used over a period of a year, with some passive traps left in place throughout the year and visited once a week by the team leader.

A survey of the terrestrial ecological resources would include an assessment of the geomorphology and habitats on the site, identification of flora and fauna present and a qualitative assessment of their status in terms of abundance and diversity. Also essential are night surveys for nocturnal animals, and various trapping surveys for small mammals, insects and other arthropods. Any rare or endangered species of special conservation interest that are likely to be impacted by the development will be identified.

FLORA

All plants will be identified to species level where possible, a digital photographic record would be maintained including GPS coordinates recorded for all survey positions visited. Plant associations and dominant species would also be recorded.

FAUNA (large)

Fauna, particularly mammals (including bats)and reptiles, would be surveyed by direct and indirect observation with identification to species level wherever possible. Small mammals would be assessed by setting a trap line of Sherman live-catch traps, with trapped mammals being released at their capture point after identification. Bats would be recorded using a bat detector and direct observations. Indirect survey will involve identification of tracks and signs, such as droppings, burrows and carcasses.

FAUNA (small)
INVERTEBRATE SURVEYING

Arthropod groups would also be surveyed by direct and indirect observation. A powerful mercury vapour light running off a portable generator would be employed to sample nocturnal insects. The light is sited on a tripod about one meter above two white cotton sheets laid out on the ground. An automated climate station recording wind speed, relative humidity and air temperature would also be set up in the vicinity of the light.

Insects are attracted to the light and land on the sheets where they can be observed. Most would be photographed and a sample would be collected for pinning and identification.

Diurnally, a malaise flight interception trap would be erected to collects insects in flight as well as a SLAM trap. This combination will ensure that insects that fly near the ground as well as those in the canopy of trees are accounted for. Two malaise traps would be deployed for the whole year and regularly visited. This would also add value to understanding seasonal changes.

Diurnally, sweep netting from vegetation would also be employed. This often complements the fauna collected by the flight interception trap.

Other incidental observations of insects and other invertebrates would also be recorded during diurnal and nocturnal searches, with the occasional use of complementary techniques such as pitfall traps and/or water traps.

16TH INTERNATIONAL CONSERVATION WORKSHOP FOR ARABIA'S BIODIVERSITY:

Human-wildlife conflict, electronic data capture, wild herbivore veterinary management, & marine turtle conservation

Philip Seddon, Mike Knight, Gerhard Steenkamp & David Mallon

The Sixteenth Annual International Conservation Workshop for Arabia's Biodiversity (ICWAB) was held at the American University of Sharjah, from the 2nd to the 5th of February 2015. This regional forum is hosted by the Environment and Protected Areas Authority (EPAA) of the Government of Sharjah, under the patronage of His Highness Sheikh Dr Sultan bin Mohammed al Qasimi, Member of the Supreme Council and Ruler of Sharjah.

Organized by the Breeding Centre for Endangered Arabian Wildlife (BCEAW) the 16th Workshop in 2015 brought together over 150 participants representing UAE, Qatar, Jordan, Saudi Arabia, Bahrain, Kuwait, Yemen and Oman, as well as experts from the UK, South Africa, Hungary, and New Zealand; who participated in four themes.

The protected areas and planning theme raised the important regional issue of human-wildlife conflict, in particular discussing concerns around predation of livestock by native carnivores. In a series of sessions facilitated by Dr Brandon Anthony of the Central European University, Budapest, Hungary, working groups looked at case studies relevant to the Arabian Peninsula, including livestock predation and perceived threats to humans by leopard, wolf, hyena, caracal and jackal; commensalism by Hamadryas baboons; and issues concerning goats in and around protected areas.

During sessions the working groups looked at: identification of stakeholders; environmental and social risk factors; the perceived and real costs of the conflict; policy and management options; contextual challenges; monitoring and evaluation; and research needs.

The species assessment theme conducted a review of the conservation status, threats and management of marine turtles in the Arabian Peninsula region; covering the status and conservation of the five species of marine turtles (four of them breeding) in the Arabian Peninsula. Topics covered included identification of key nesting and foraging sites, a threat assessment at regional and national levels, research needs, identification of stakeholders, and a review of recent and current turtle conservation projects. A vision and a goal for marine turtle conservation were developed along with a set of objectives to provide a conservation strategy framework for integration into existing initiatives, such as the CMS IOSEA (Indian Ocean and South-east Asia) Memorandum of Understanding.

First introduced in 2014, the veterinary theme's main focus was herbivore healthcare and in particular the state of emerging and re-emerging diseases in the region. To this end Prof. Moritz van Vuuren, an eminent veterinary virologist and Dr. June Williams, a pathologist, from the faculty of Veterinary Science, University of Pretoria, gave succinct presentations of these diseases and disease outbreaks in the region which were followed by lectures and interactive sessions on post mortem examination and cytology (Fig 3). The veterinary theme closed with presentations on biosecurity and primary healthcare as well as some pointers on chemical capture.

The Workshop also included a technical theme facilitated by Ms Chenay Simms of the SANParks Scientific Services, South Africa, which examined aspects of electronic data capture including hands-on exercises, regional case studies, and equipment assessments relating to the selection and application of electronic data capture, such as smart-phone apps, GPS, remote sensing, and drones.

Fig 1. Attendees at the 16th International Conservation Workshop for Arabia's Biodiversity.

Fig 2. Participants discussing the important regional issue of human-wildlife conflict.

Fig 3. Attendees participating in the post mortem and cytology workshops.

Fig 4. Presenters at the electronic data capture presentation.