

Population Growth and Establishment of Reintroduced Arabian Oryx in Abu Dhabi Emirate, UAE.

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Introduction

Arabian Oryx reintroduction was started earlier at 2007 in the Arabian Oryx Protected Area (AROPA). The first release involved 98 animals in three different release sites at the eastern part of the Empty Quarter desert (Rubaa Al Khali) in the emirate of Abu Dhabi, UAE. The animals were selected from three different sources in an attempt to carry over the highest possible genetic diversity to the reintroduced herd. The animals were closely monitored since then on daily basis. Monitoring strategy was devised in a way to provide discrete measurable indicators of the progress of the reintroduction. The population had a harsh first year where significant mortalities were recorded especially among new recruits. However, the herd started to cope well with its new habitat and was able to evolve into distinctive social groups. Survival rate was enhanced through the second and third year, and noticeable fertility reflected in high rate of recruitment of new wild born calves. Here we report some of the most prominent indicators in their most updated values by the end of 2009.

Litter Produced: A total of 91 deliveries were recorded in the project since the first release in 2007. These are distributed as 14 in 2007, 36 in 2008 and 41 in 2009. During this period of ,Details of annual births and their distribution over the calendar months are illustrated in Fig (1). These numbers show that more than 45% of the females in the herd are reproducing annually and that the fertility level is in its acceptable limit. However, there was some mortality among these recruits. During 2007, 5 calves were lost out of 30 lost in 2008 and only 2 calves were lost in 2009. These figures means that the current population should sum up to 154 individuals.

Thus, the herd is considered to show a population growth of 21% compared to the previous numbers reported at the end of 2008. Such a steady growth in population and reproductive success is considered as the first indicator of success and that the reintroduced animals are adapting to their new habitat smoothly.

Survival rate: The first Year of reproduction showed low calves' survival rate (71%) as the calves survived their first year and grow into adults. This is a great influence to the survival rates of the reintroduced animals, which is the ultimate survival rate. However, this was greatly enhanced through the years to follow where 77% calves survival was recorded in 2007 and more to 84% of the calves survived their first year in 2008. Adult survival rate was also high since 2007 where a rate of adults survival of 97% was recorded. Adult survival rate was the same more or less for 2008 and 2009 and recorded 97% and 95% in 2008 and 2009 respectively. This is the second indicator of the population establishment and progress towards a wild status.

Population Growth Rate: There was a varying but steadily increasing rate of population growth in the herd. Growth rate was measured using two parameters. The instantaneous annual rate which gives indication of annual individual growth (r) and the second is the overall intrinsic growth rate (λ) that indicates a growth over a period of several years. Table (1) shows that annual rate is increasing annually. The overall rate is also reporting an increase over the cumulative time period. When λ is over 1.00 this is interpreted as increasing population and that available resources is still accommodating for future increase. Figure (3) graphically illustrate the increasing rate of population change rate by increasing the slope of the population growth curve (squares). Increasing population change rate is the third indicator reported for population establishment in the new habitat.

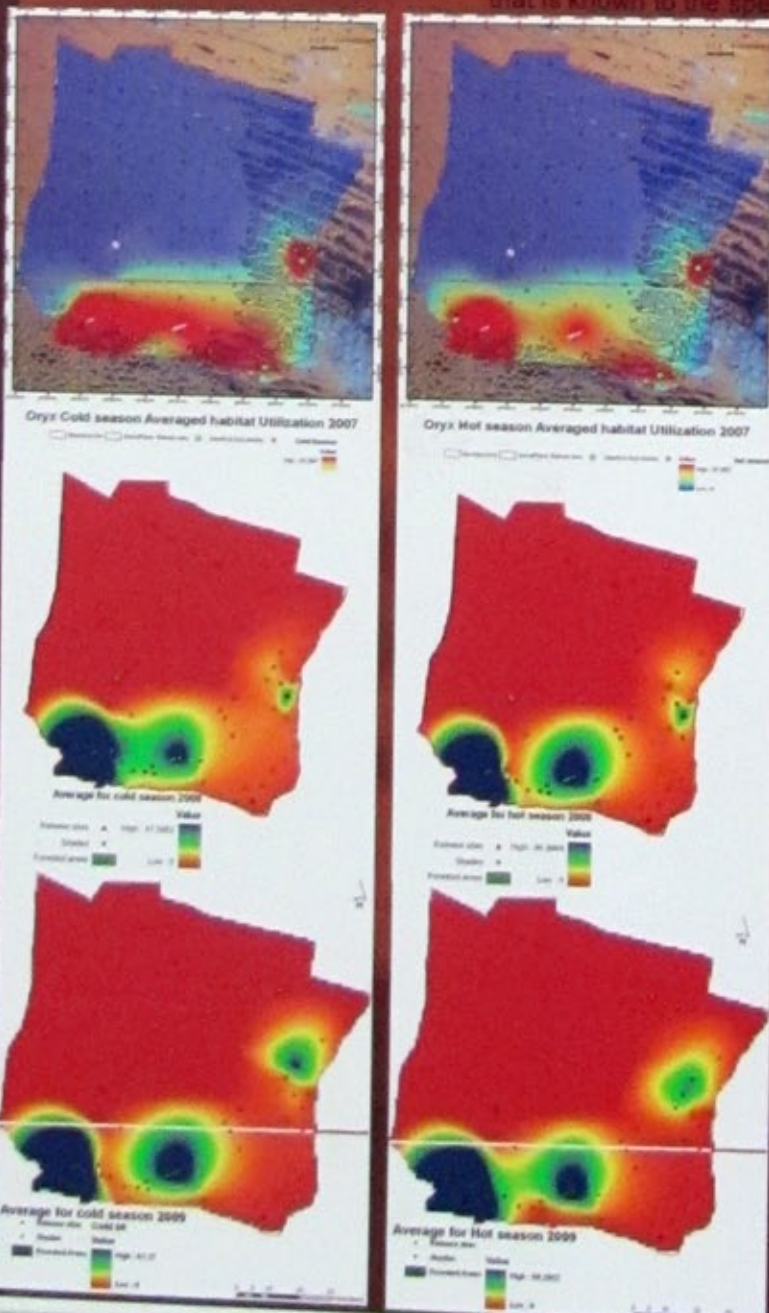
Habitat utilization:

The locations and numbers of animals are monitored and recorded on daily basis. Since the beginning, The herd was seen to divide into three main big groups with some other individuals remaining either solitary or in a small isolated groups. The biggest group is the one in Al Arbaeen forest. This group has grown now to about 67 animals and is inhabiting the forest on permanent basis for about 3 years now. Movements of some individuals for considerable distances away from the forest is recorded but seasonal and are not so frequent. The second group is in Quessiwra forest and it consists of about 32 individuals now. Movement of this group is more readily happening and observed. Movements are also confined to the colder months of the year and not of big span. But it is significantly going towards the center of the first group.

The third big group is found in the area of the northern shades and this group is of about 29 animals. This group of animals are more active in their movement and show more active spread among several shades. However, there is a great reduction of their spread during to summer time. Though this group is considered much active compared to the other two and this may be attributed to the lack of forested areas in the vicinity and thus more actively looking for more disperse resources of food and shade.

This heat regulated pattern of spread is evident in all big groups of the herd. However, the northern group is thought to be isolated from the southern other bigger 2 as no crossing between the two concentrations is noticed.

The movement was quantified and assessment was done using regular interpolation methods to document and visualize the pattern on maps. Maps 1 to 6 of the period 2007 to 2009 show the active movement between eastern (Quessiwra) and western (Al Arbaeen) concentrations in the southern part of the region and small isolated concentration in the northern shades area in the middle of the maps. As being the fourth indicator assessed to monitor the reintroduction process, habitat utilization is not yet fully achieved by the reintroduced oryx as movement patterns still ambiguous with no large span travels that is known to the species as wide desert antelope.



Maps (1 & 2) Utilization maps of 2007 including on the left the average utilization of hot season. These maps indicate of the groups with minimal or no movement across to happen them due to heat. In hot movement of individual animals. On the left the average movement pattern in the cold months shows significant movement of animals and active movement across between animal groups.

Maps (3 & 4) Utilization maps of 2009 including the same maps mentioned pattern of heat utilization on previous maps and noted however, there is a significant difference in that of big groups of animals being located in isolated sites, now the big groups are concentrated in the wooded areas as a result of their spread in 2007. The northern group of animals remain isolated from the southern groups with only local movements among the northern shade and wooded sections.

Maps (5 & 6) in 2009 the same pattern of movement between the two groups, which is evident in the previous maps. However, there is a significant difference in that of big groups of animals being located in isolated sites, now the big groups are concentrated in the wooded areas as a result of their spread in 2007. The northern group of animals remain isolated from the southern groups with only local movements among the northern shade and wooded sections.

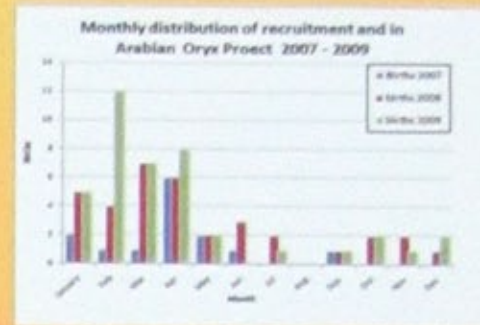


Fig (1) distribution of mortality and birth events in the Arabian oryx herd during the first 3 quarters of 2009

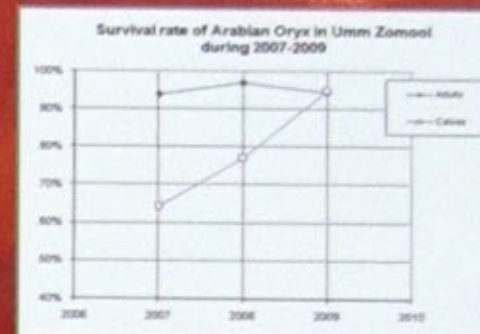


Fig (2) Survival rates of adults and calves in the reintroduced Arabian oryx during the period of 2007 to 2009

Year	Reintroduced No.	Recruits	Loss
2006	98		
2007	103	0.040	1.020
2008	127	0.239	1.036
2009	154	0.199	1.143

Table (1) values of instantaneous annual growth rates and overall intrinsic rate including the period 2007-2009

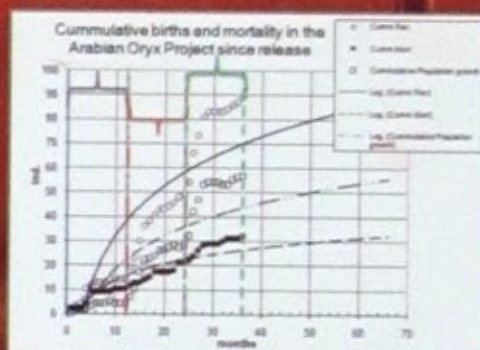


Fig (3) Cumulative population change rate (squares) in the reintroduced Arabian oryx herd during the period of 2007 to 2009