

VETERINARY MONITORING FOR RE-INTRODUCTION PROJECTS: SCIMITAR-HORNED ORYX (*ORYX DAMMAH*) IN SOUTHERN TUNISIA

D` Alterio, G.L.¹, Flach, E.J.² and Zahzah, K.³, ¹Department of Clinical Veterinary Science, University of Bristol, Langford, Bristol, BS40 5DU, UK; ²Veterinary Science Unit, Institute of Zoology, Zoological Society of London, Whipsnade Wild Animal Park, Dunstable, Beds, LU6 2LF UK ; ³ Medecin Veterinaire Principal, Direction Generale des Forets, Tunis, Tunisia

Abstract

In March 1999, as part of the implementation of the Action Plan for the recovery program of Sahelo-Saharan antelopes (Djerba Declaration, Tunisia, under the auspices of UNEP/CMS, 1998), fourteen scimitar-horned oryx (*Oryx dammah*) were sent from six participating European zoos to Sidi Toui National Park, in Southern Tunisia.

Formerly widespread throughout the arid grassland of the Sahel, the scimitar-horned oryx wild population has declined rapidly due to over-hunting, habitat loss and competition with domestic livestock. The species is listed in CITES Appendix 1 since 1983 and has gained Extinct in the Wild (EW) status in the IUCN Red List of Threatened Species since 1999, which was confirmed in the year 2000 report.

A captive-breeding program was started in the 1960's that, in contrast to the species rapid decline in the wild, has been highly successful resulting in thousands of individuals now present world-wide. Veterinary monitoring represents an essential component of the multidisciplinary approach to re-introduction projects, primarily aiming at preventing disease transmission to and from the re-introduced animals and to safeguard animal welfare at all stages.

The veterinary monitoring protocol established for the oryx re-introduction to Southern Tunisia in March 1999 comprised: a) a co-ordinated pre-export health assessment, b) health and welfare monitoring during transportation from Europe to Sidi Toui National Park, c) pre-release quarantine and acclimatisation period activities d) sedation and monitoring for translocation of animals to other parks and e) post-release health checks in May 2000.

Introduction

The re-introduction of captive-bred species of animals represents a potentially valuable tool in efforts to counter the worldwide loss of biodiversity (Griffith *et al.*, 1989; Kleiman, 1989). Viggers *et al.* (1993), while defining this approach as part of re-introduction biology highlighted how the importance of diseases has often been neglected. More recently Meffe (1999) advocated the application of biomedical expertise to conservation biology to the benefit of both disciplines, and ultimately of biodiversity conservation efforts. The importance of maintaining health and controlling disease during re-introduction projects is formally recognised by the IUCN Guidelines for Re-introduction (1998).

The Scimitar-horned oryx (*Oryx dammah*) (synonyms: Oryx algazelle-French; Wach or Begar al Quach-Arabic) is a large antelope belonging to the Family Bovidae, Tribe Hippotragine. The historical range of this migratory, predominantly grazer ruminant is circum-saharian, the species exploiting resources available in semi-desert steppe and true Sahel during the dry season, and penetrating the true desert during the wet season (Smith, 1998).

The species population decline spans centuries, but has accelerated since the mid 1900s. Hunting with modern firearms and off-road vehicles is considered the primary cause for the more recent decline of the species, with habitat loss, competition with domestic livestock and severe drought in the Sahelo-Saharan region during the 1970's and 1980's representing significant contributing factors (Newby, 1988; Smith, 1998).

The lack of substantiated sighting of scimitar-horned oryx during recent surveys in range States led to the current classification as Extinct in the Wild (EW) by the IUCN, and listing of the species in CITES Appendix 1 (Hilton-Taylor, 2000). The species' rapid decline prompted the start, in the 1960s, of a world-wide captive breeding programme, which has successfully produced thousands of individuals (Hilton-Taylor, 2000).

Tunisia was formerly a range country, but the species became extinct in the 1800's; Ten oryx were returned to Tunisia in 1985 and introduced to the Bou Hedma National Park in the centre of the country

(Gordon, 1991). The population has grown to approximately 100 (Direction Générale des Forêts, unpublished 1999), but is inbred due to the relatedness of the original founders (Gordon, 1991).

The country's National Park network covers a total of 196,869 ha (Kacem *et al.*, 1994), and in March 1999 14 scimitar-horned oryx were sent from six zoos in Europe to southern Tunisia for reintroduction to Sidi Toui National Park and Oued Dekouk reserve, as part of the implementation of the Action Plan for the recovery program of Sahelo-Saharan antelopes (Djerba Declaration, Tunisia, under the auspices of UNEP/CMS, 1998). The pre-export health checks performed before transportation, the post-importation quarantine checks and activities, and the post-release monitoring, including the findings from a subsequent visit in November 2000 are reported here.

Pre-export Risk Assessment and Testing

It was anticipated that captive oryx in Europe might be exposed to, carrying or excreting the following infectious agents: gastro-intestinal parasites, bacteria such as *Mycobacterium* species, *Salmonella* species and *Yersinia pseudotuberculosis*, and viral infections, for instance bovine viral diarrhoea (BVD) and malignant catarrhal fever (MCF). Other diseases that are known to occur in captive oryx include copper deficiency, hoof disorders and traumatic injuries (Kock and Hawkey, 1988). Possible transportation risks included stress-related trauma, myopathy and bacterial septicaemia (Transit fever).

The major diseases which the oryx might potentially carry and transmit to domestic livestock were brucellosis and tuberculosis and, in addition, the Tunisian authorities requested clearance from radioactive contamination. Clostridial diseases and traumatic injuries were identified as likely problems during the quarantine period when animals were at high stocking density and under the stress of adapting to new surroundings, climate, food and new social groupings. Finally, diseases thought to be of importance once the animals were established were ectoparasites, especially ticks, tick-transmitted organisms, notably haemoprotozoa of the genus *Theileria* and *Babesia*, and foot and mouth disease (FMD).

Fourteen animals were selected for re-introduction; eight young females, three pregnant females, one sub-adult and two adult males from six zoos.

Examinations were performed by the veterinarians for each exporting zoo following a standard format. The proposed protocol was: a) an assessment of the body condition of the animal, b) a full clinical examination, c) faecal examination to detect parasitic ova and pathogenic enteric bacterial species, d) blood sampling for (i) haematological and biochemical tests, (ii) a serological test for brucellosis, (iii) serological tests for antibodies to a range of viruses of Artiodactyla, and (iv) storage of serum and plasma for future investigations in the event of an infectious disease outbreak post-release and, finally, e) results of the intradermal tuberculin test.

In addition, vaccination against clostridial toxins, prophylactic treatment against helminth parasites, and treatment with long-acting neuroleptic drugs, for example perphenazine (Trilafon; Sherag), the day before transportation, were advised

No significant diseases were encountered during the health checks, and the few helminth infections were eliminated by anthelmintic treatment (Flach *et al.*, 2000).

Transportation and Quarantine

The animals were transported to Sidi Toui National Park by road and air in individual crates. They journeyed from the six zoos to Oostende, Belgium during the day, and then were flown to D`jerba, Tunisia, and transported by lorry to Sidi Toui overnight. The animals were observed regularly throughout the transportation and were calm at all times, although it was difficult to see them when they were sitting, because the inspection holes in most of the crates were situated towards the top. At dawn the crates were unloaded and the oryx were released into a series of quarantine pens where they stayed for 30 days. The young females from different collections were mixed from the outset, whilst the other females were kept separate initially and mixed gradually. The males were kept apart throughout the quarantine.

The animals were vaccinated on the second day after arrival against foot and mouth disease (FMD) strains A, O and C by remote injection using blowdarts (Telinject). All of the animals quickly adapted to the new environment and management, and there were only three minor clinical presentations observed during the quarantine, none of which required treatment.

At the end of the quarantine four oryx were moved from Sidi Toui. One male was loaded without immobilisation and transported to Bou Hedma National Park, in order to improve the genetic diversity of

the local oryx herd. A male and two females destined for Oued Dekouk Reserve required chemical immobilisation. Two other females were immobilised on two occasions for the fitting, and later readjusting, of radio-collars.

Release and Post-release Monitoring

Ten oryx were released into Sidi Toui National Park on 29th April 1999. They have been monitored by park and reserve staff since release, and a biologist carried out detailed behavioural observations of the animals for 6 months after release.

In November 2000, a follow up visit was carried out. At Sidi Toui, all of the released oryx were observed and found in fair body condition. Five healthy calves, born between December 1999 and September 2000 were also seen. The park wardens reported the disappearance of two additional calves soon after birth, with at least one thought to have been predated by jackals.

The two radio-collared females were chemically immobilised, in order to check the collar, perform a full clinical examination and collect biological samples. Clinical examination was unremarkable for both animals, despite one female showing a poor body condition score not accompanied by loss of body weight, which might indicate that she was in late pregnancy. Faecal samples were negative for parasitic ova, but in one 50 coccidial oocyst per gram were detected.

Haematology parameters were within the normal range, while some biochemistry parameters (e.g. albumin and total protein concentration) were at, or below the reported normal range. This could be consistent with a subnormal nutritional status to be associated with the end of the dry season and reduced grazing availability.

At Oued Dekouk one female died shortly after calving, but the calf was being successfully hand-reared. The male at Bou Hedma was in good condition and had sired one calf.

A further visit is planned for 2002.

Discussion and Recommendations

All of the oryx were transported successfully and came through the quarantine period without significant problems. To date there have been no major health problems. However, it is important to look critically at the process to learn lessons for future re-introductions.

The initial list of diseases to which scimitar-horned oryx are susceptible was adjusted according to likely risk, and infectious agents which were notifiable in the exporting countries were not included in the veterinary monitoring. Currently, it is advocated that any future re-introduction plan should follow the guidelines reported by Woodford (2000).

Unfortunately not all of the source zoos tested for each haematological and biochemical parameter, or for each infectious agent prior to export. One possible reason for this was financial, and projects of this type should include the costs of testing in their budget, and not rely on funding from zoos contributing animals.

Initially, the body-weights and condition indices showed that the animals were in good to slightly fat body condition. Fluctuations in these parameters, as observed during the follow up visit, matched with the variations in biochemical values, were to be expected and are likely to be a reflection of the seasonal variation in pasture availability. The conservation status for scimitar-horned oryx, assessed by IUCN criteria, will now depend on the outcome of this project (Hilton-Taylor, 2000). Assuming that the importance of wildlife disease is now widely recognised in the field of conservation biology (Deem *et al.*, 2001), the positive outcome of the project so far reinforces the need for veterinary health monitoring.

It is hoped that additional funding is allocated to ensure long term monitoring for the re-introduced herd, and for further *in situ* conservation projects concerning the scimitar-horned oryx and related species in Tunisia.

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