LATEST DEVELOPMENTS IN TRANSLOCATION TECHNIQUES OF THE ARABIAN ORYX, *Oryx leucoryx*

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Introduction

An intensive captive breeding of Arabian oryx (*Oryx leucoryx*) was established at the National Wildlife Research Center (NWRC), Taif, Saudi Arabia, in 1986, for the propagation in captivity and reintroduction into the wild of this medium-size antelope[1].

Because of their nervous disposition and their aggressiveness, members of the Hippotraginae family are highly susceptible to stress and capture myopathy syndrome[4]. They are therefore difficult to restraint, to immobilize and to transport[4].

The oryx bred at the NWRC for reintroduction purposes are mother-reared in large enclosures (25 ha). They have almost no contact with human beings, and are handled only rarely. By the time they are translocated, the animals are very wild, nervous, afraid of man and highly sensitive to stress. A high mortality rate (between 9% and 66%), related to capture myopathy, occurred during the first translocations of Arabian oryx from the NWRC to Mahazat as-Sayd, a fenced protected area situated 200 kms from Taif by road.

New techniques based on the boma training and on the use of long-acting tranquillizers were developed to undertake Arabian oryx translocations over longer distances and longer periods of time (up to 9 hours).

Previous Translocations of Arabian Oryx

Description of the different methods of transportation

Between 1991 and 1993, 40 (15.25) oryx, aged between 9 and 16 months, were translocated from the NWRC to Mahazat as-Sayd protected area. The animals were transported by road. The different transportations lasted 2-2.5 hrs and were always carried out in the early morning during winter, when the conditions were cool (5 to 15 °C).

On the day of the translocation, all the oryx were handled, blindfolded, blood sampled, weighed, fitted with ear-tags or radio-collars, and injected i.m. with 2 mg selenium, 10 ml of a vitamin cocktail, 240 mg methylprednisolone and 20 mg/kg body weight oxytetracycline. All were released in a 25 hectare enclosure when they arrived to the reserve.
The translocations were carried out according to three different procedures. The first steps of two procedures were identical; the animals were held with their mother in large

enclosures (15-25 ha) until they were translocated. Twenty-seven oryx were anesthetized with a combination of etorphine (0.05 mg/kg) and xylazine (0.20 mg/kg), administered i.m. via a dart gun (Gut 50, Telinject, Romerberg, Germany).

After handling, 6 (3.3) of the 27 oryx had anesthesia reversed with diprenorphine (0.1 mg/kg) and atipamezole (0.04 mg/kg). They were injected with haloperidol (10 mg i.m. and 10 mg i.v.) before being placed in individual crates and moved to Mahazat. In the second procedure, twenty-one (8.13) oryx were directly loaded into a car after recumbency and then directly driven to the reserve under anesthesia. They were injected with the reversal agents after they arrived at the reserve.

In the third procedure, 13 (4.9) calves 6-month old were separated from their mothers and placed together in a 4 ha enclosure. One month prior to the translocation, the group was enclosed in a corridor (80 m long, 6 m wide). The walls were fitted with plastic sheeting. On the day they were translocated, groups of 4 or 5 individuals were moved into a trailer (2.5 long x 1.8 wide x 2.2 m height) and driven to Mahazat. During the journey, the animals were continuously monitored by video-channel.

Results

Various mortality rates were encountered in the three procedures (Table 1). Different syndromes of capture myopathy were recorded during or shortly after the transportations: two animals died of a peracute form[7], two died of an ataxic myoglobinuric syndrome[8], and two died of a necrolysis of the gastrocnemius muscle. In the third procedure, the animals remained very quiet and frequently recumbent during the journey. However, lameness of a hindquarter, hypercontraction of the gastrocnemius muscle and malposition of the hoof were recorded in four individuals three hours after they were released. Two of them, were injected i.v. with 400 mEq sodium bicarbonate/ 100 kg body weight and recovered. Two of them did not receive any treatment and finally died after two and five weeks respectively. Post-mortem examination showed a necrolysis of the gastrocnemius muscle with loss of substance. Histological findings were mainly located in the muscle tissue: necrotic lesions, focal mineralization, sarcolemnal proliferation and fibrosis.

No capture myopathy symptome occurred when the oryx were moved under anesthesia, but two of them died of septicemia within ten days following the translocation. *Pasteurella haemolytica* and *Streptococcus bovis* were isolated after bacterial culture.

Recent Translocation of Arabian Oryx Involving "Boma Training" Technique and Long-acting Tranquillization

In 1995, Arabian oryx were translocated to Uruq Bani Ma'arid, an unfenced protected area located in the edge of the Empty Quarter, 1200 kms from Taif by road. In view of the preceding results, a new procedure was developed in order to airlift the animals.

Constitution of the groups to be translocated

Oryx calves were removed from their mothers when 6 months old and placed in bachelor herds, held in 0.2 ha enclosures. They were to be translocated when between 10 and 24 months of age. Three months prior to the translocation, groups of four animals of similar age and size were placed in a pre-transportation enclosure. A social hierarchy was promptly established within each group. When fights were too frequent during this period of adaptation, the most aggressive animals were removed and placed in another group. After the social relations were eventually determined, the composition of each group remained unchanged until the animals were released.

Description of the facilities

-Pre-transportation enclosure: each group of 4 oryx was placed in a pre-transportation enclosure. This enclosure was divided in two different parts:

-indoor pen: 15 square meters (5 m x 3 m) with wooden walls and shade cloth cover roof. Food and water were provided *ad libitum* in this part.

-outdoor pen: 60 square meters (6 m x 10 m), fenced with chain-link mesh. A sliding gate separated the two pens.

-Off-loading ramp and passageways: the outdoor pens were connected with a off-loading ramp 2.5 m wide and 3 m long. This ramp formed a funnel directed to a corridor 1 m wide, 8 m long. The passageway conducted to the loading platform and was used to move the oryx from the outdoor pen to the mass crates. The walls of the passageway were wire-mesh fences fitted with tarpaulin.

-Mass crates: the mass crates used for transportation were made in wood and the floor was covered with woven rubber mats. The size of the crate was 2.5 m long x 2 m wide x 2 m height; it was large enough to hold one group of 5 oryx. The ventilation was provided with 3 lines of circular openings running the length of the crate along the upper half of the four side walls. The crates were in close connection with the loading platform when placed on the carrier truck.

Boma training

During the first six weeks of the training, each group was enclosed every two days in the indoor pen for increasing periods of time, ranging from 2 to 24 hours. Progressively, the oryx became accustomed to being moved into the passageway and into the crate by the keepers who utilized pieces of canvas to gently push the animals. The oryx were closed into the mass crates and the horns of the more aggressive animals were fitted with plastic pipes. Twice a week, each group was driven around the NWRC for durations of 30 min to 2 hours. Each group was released in the pre-transportation pen after the driving. One week prior to the translocation, each group was closed in the mass crate over night every other day.

Use of long-acting tranquilizers

The biological effects of perphenazine enanthate (Trilifan, Shering-Ploungh, Levallois, France) in Arabian oryx were studied in previous experiments carried out at the NWRC with 15 individuals. When administered i.m., the effective dosage of perphenazine enanthate averaged 3 to 3.5 mg/kg body weight. The first signs of tranquilization were recorded 24 hours following the i.m. injection. The animals were quiet, they remained standing and the flee distance decreased. The best state of tranquilization was achieved between 3 and 4 days following the injection and lasted for approximately 24-36 hours. However, the animals were still able to run away when approached by keepers. The effects of the tranquilization with perphenazine had totally disappeared one week after injection. Food intake was unchanged during all the tranquilization period. Side-effects were recorded with higher dosages; akathisia, dyskynesia and parkinsonism. These side-effects spontaneously disappeared.

Three days prior to the translocation, all the oryx to be transported were handled, weighed and injected i.m. with 2.5 to 3 mg/kg body weight perphenazine. The horns were fitted with plastic pipes and cotton swabs were placed in the ears of all the animals. Then, they were released in the outdoor pen.

Translocation

Each group of tranquilized oryx was closed in the mass crate on the evening before the journey. In the early morning the animals were driven to the airport. The crates were loaded within a C 130 military plane. After a one hour flight, the plane landed 150 kms from the reserve. The crates were off-loaded from the aircraft, placed on trucks and transported by road to the reserve.

Release of the animals in the reserve

At their arrival, the oryx were placed in small pens. Water was provided *ad libitum*, whereas dry alfalfa and hay was given only the following day. After three days, the animals were handled and fitted with radio-transmitters; plastic pipes and cotton swabs were removed. The animals were released together in a 4 ha enclosure five days after the transportation.

Results

Seventeen (8.9) oryx were boma trained and prepared for the air transportation (Table 1). One female showed signs of gastrocnemius necrolysis during the training, after having been handled at the beginning of the training period. She was administered i.v. with bicarbonate but complete recovery took more than six months. She was not translocated to the reserve.

One male showed extra-pyramidal iatrogenic symptomes (dyskynesia) two days following the i.m. injection of trilifan. Ten mg diazepam (Valium, Roche, France) injected half i.v. and half i.m. immediately halted the symptoms.

Sixteen (8.8) young oryx were airlifted in two different shipments from the NWRC to Uruq Bani Ma'arid. The journeys lasted 9 and 7.5 hours respectively. During the transportation, the oryx were very quiet, without any fighting. No real signs of excitation, fear or stress were recorded during the flight.

The animals appeared tired (reluctant to walk, ears down, dehydrated) when they arrived to the reserve, but fully recovered within a few days. They did not display symptoms of capture myopathy, and no pathological problems were encountered during the acclimatisation period in the 4 ha enclosure. The 16 animals were successfully released into the wild three months after the transportation.

Discussion and Conclusions

The Arabian oryx bred at the NWRC and intended for release operations, are very sensitive to handling and physical restraint. Under the stress of translocation, they are prone to develop a muscular necrolysis, particularly affecting the gastrocnemius muscle. A treatment with i.v. infusions of 400 mEq sodium bicarbonate/100 kg body weight is prone to treat the affection, but the recovery process can take several months.

Boma training aims to tame down and to accustom the animals to the conditions they will face during translocation: movements between enclosures, pens and crates, confinement in a close space for a long period of time, sounds, sights, smells and disturbances associated with human presence and activities[5]. The best results are achieved when training is initiated at least four weeks prior to the translocation[3]. In order to achieve the best results, it appears essential to not interrupt the boma training after it has been initiated, and not to handle the animals on the day they are translocated.

The use of long-acting neuroleptic aims to reduce anxiety and motor activity for a prolonged period. The most noticeable effects in wild ungulates are a modification of the animal's attitude towards its surroundings (indifference to captivity, decreased aggression), a loss of fear of humans and a general relaxing effect, so the animals are better able to cope with captive conditions[2]. Nevertheless, food consumption remains unchanged during the period of tranquilization. Compared to the other species of wild ungulates in which perphenazine has been utilised[2], the Arabian oryx needed a relatively high dosage to achieve a good state of tranquilization. It seems essential to study the specific actions, the effective dosages, the side-effects of long-acting tranquilizers for each species before transportation.

The combination of boma training and long-acting tranquilization gave very good results when Arabian oryx were translocated over long distances. The animals were relatively insensitive to stressful situations and did not develop any pathological problems following a 9 hour road-air-road transportation.

LITERATURE CITED

1. Abuzinada, A.A., K. Habibi, and R. Seitre. 1988. The Arabian oryx program in Saudi Arabia. *In:* Dixson, A. and D. Jones (eds). Conservation and Biology of Desert Antelopes. Christopher Helm, London. Pp. 41-46.

2. Ebedes, H., and R.E.J. Burroughs. 1992. Long-acting neuroleptics in wildlife. *In:* Ebedes, H. (ed.). The use of tranquillizers in wildlife. Proceedings of Wildlife Tranquillizer Symposium, Agricultural Information, Pretoria, South Africa.

3. Harthoorn, A.M. 1980. Exertional myoglobinaemia in black wildebeest, and the influence of graduated exercise. J.South Afr. Vet. Assoc. 51: 265-270.

4. Hoyfmer, J.M. 1981. Developments in the capture and airlift of roan antelopes under narcosis to the Etosha National Park. Madoqua: 37-48.

5. Openshaw, P. 1993. Transportation of wild herbivores. *In:* Mc Kenzie, A. (ed.). The Capture and Care Manual. Wildlife Decision Support Services CC, Lynwood Ridge, South Africa. Pp. 194-199.

6. Pienaar, U de V. 1973. The Drug Immobilization of Antelope Species. *In:* Young, E. (ed.). The Capture and Care of Wild Animals. Human and Rousseau Publishers Ltd., Cape Town, South Africa. Pp. 35-50.

7. Spraker, T.R. 1993. Stress and capture myopathy in artiodactylids. *In:* Fowler, M.E. (ed.). Zoo and Wild Animal Medicine, Current Therapy 3. W.B. Saunders Co., Philadelphia, Pennsylvania. Pp. 481-488.

8. Vassart, M., A. Greth, S. Anagariyah, and F. Mollet. Biochemical Parameters following Capture Myopathy in one Arabian oryx (*Oryx leucoryx*). J. Vet. Med. Sci. 54 (6): 1233-1235.

Table 1: Results of transportation of Arabian oryx according to the different procedures.

	Boma training	Transportation technique	Sample size	Mortality (number of deaths within two weeks following the transportation)
Procedure 1	No	1- Anesthesia with etorphine / xylazine 2- Injection of reversal agents 3- Tranquillization with haloperidol 4- Individual crate 5- Two hours by road	6	66 % 2 animals died of peracute capture myopathy 2 animals died of ataxic myoglobinuric syndrome
Procedure 2	No	1- Anesthesia with etorphine / xylazine 2- Two hours by road 3- Injection of reversal agents	21	9.5 % 2 animals died of septicemia
Procedure 3	No	1- Small groups placed in a trailer 2- Two hours by road	13	15 % 2 animals died of a necrolysis of the gastrocemius muscle
Procedure 4	Yes	1- Tranquillization with perphenazine 2- Mass crate 3- Nine hours by road/air/road	18	0 %