Black rhinoceros *Diceros bicornis* capture, transportation and boma management by the Natal Parks Board

R.R. HENWOOD

Henwood, R.R. 1989. Black rhinoceros *Diceros bicornis* capture, transportation and boma management by the Natal Parks Board. — *Koedoe* 32 (2): 43-47. Pretoria. ISSN 0075-6458.

The procedure used by the Natal Parks Board in the capture of black rhinoceros *Diceros bicornis minor* (Drummond, 1876) is outlined. It is emphasised that a successful capture operation requires careful planning and should not be attempted by the uninitiated or by parties who have little or no experience. Dosages of drugs are given, the darting and actual capture procedures highlighted, and aspects of transport and practical boma management are described.

Key words: Natal Parks Board, black rhinoceros, immobilising drugs, dosages, capture, boma management.

R.R. Henwood, Hluhluwe Game Reserve, P.O. Box 25, Mtubatuba, 3935 Republic of South Africa.

Introduction

By means of effective management procedures implemented by the Natal Parks Board (NPB), the populations of rhinoceros have increased significantly in numbers during the last three decades, necessitating the development of a translocation technique, in order to relieve the population pressures built up in the small Natal game reserves (Anon. 1976).

Over the past three decades there has been an ever increasing demand for land in Natal. The claimants are diverse in their interests, ranging from political pressures to sociological requirements and organised agriculture. Such land use has resulted in diminishing available habitats for the white (or square-lipped) rhinoceros *Ceratotherium simum* (Burchell, 1817) and the black rhinoceros *Diceros bicornis* (Linnaeus, 1758), which occur naturally in Natal.

Suitable rhinoceros habitat also decreases in the rest of the Republic of South Africa, and the position has now been reached where natural and significant populations of both species are restricted to national parks, game reserves, and larger game ranches. A survey of the white rhinoceros translocated to private land is given by Buys & Anderson (1989).

Information on the development of capture and translocation of white rhinoceros can be gleaned from the publications by Harthoorn (1962), Rochat & Steele (1968) and Keep (1971). These efforts were directed primarily to reducing the rhinoceros population in Zululand's Umfolozi Game Reserve where this species had become too numerous for the area of land available, and to ensure a safe future for the species by distributing the surplus individuals as widely as possible. An impressive number of 482

white rhinoceros were captured and exported from the Umfolozi Game Reserve from 1 January 1961 — 31 May 1968 (Anon. 1968).

Immobilisation and translocation techniques applicable to the black rhinoceros were described by Keep, Tinley, Rochat & Clarke (1969), Hitchins, Keep & Rochat (1972), Keep (1973), and Hitchins (1984). The present paper presents an overview of black rhinoceros capture, transportation and boma management as developed by the Natal Parks Board in recent years.

Materials and methods

The successful capture and translocation of a black rhinoceros requires detailed planning and the following prerequisites are of vital importance to ensure success. A helicopter with air-to-ground radio communication and a reliable follow-up vehicle (preferably a 4×4) in radio contact with the helicopter and other crew members on the ground are required. A suitable loading vehicle with radio contact is also needed. The team responsible for the entire capture operation should consist of seven to eight well-trained people. At least three nylon ropes (22 mm in diameter) and at least 10 m in length are required, as are hessian bags and/or old blankets to cover the animal's head and eyes. A functional dart gun plus one spare is required, as is at least 25 l of water. A spare dart containing a full dose of antidote is to be carried in the helicopter in case of an emergency. The drugs, tranquillisers, antidotes and antibiotics required in the final stages of the capture operation, are listed in Appendix A.

As with all potent drugs, the best dose is the lowest dose that will produce the desired effect. The animal should not be subjected to unnecessary stress, but the effect of the drug should be sufficient to let the animal lie relaxed without trying to get to its feet. The following dosages are recommended:

	Drug	**Antidote**
Adults:	1,00 mg M99 + 30 mg Fentanyl + 200mg Azaperone	6,0 mg M5050
Subadults:	0,50 mg M99 + 20 mg Fentanyl + 100mg Azaperone	3,0 mg M5050
Juveniles:	0,25 mg M99 + 10 mg Fentanyl + 50mg Azaperone	1,50 mg M5050

When M99 is used without Fentanyl trembling and occasional sweating occurs and the animal also takes a little longer to go down. The M99/Fentanyl combination in adults produces a relaxed response.

Darting the animal

The best injection site is the upper hind leg or rump. Care must be taken to avoid the root of the tail and the vertebral column. The shoulder area can also be used although absorption of the drug tends to be slow. The neck can be used for short range tranquillisation, especially if the animal is already in captivity. The dart must be lodged at a right angle into the muscle and not at an oblique angle. The needle of the dart must preferably be longer than 5,0 cm and without barbs. A bead on the needle is sufficient to hold the dart in place.

Darting must be undertaken in the early part of the morning, avoiding the midday heat. Capture should not be done in the late afternoon, for if unforeseen problems arise, one would then be working against time before nightfall.

Capturing the animal

Once the animal is located, the follow-up ground crew moves into the area before the animal is darted from the helicopter, to ensure that the vehicles can get into the capture zone and are not cut off by rough terrain such as dongas or rocky ridges. Once the animal is darted a stopwatch is activated and controlled by the person who darted the animal. At the same time he directs the follow-up vehicle by radio to the area where he anticipates the animal will go down. This precaution is to ensure that the animal has help close at hand when it starts losing its co-ordination, as it may get entangled in the branches of a tree, or fall into a hole. Help must be at hand to either prevent these mishaps occurring or to improve the animal's physical position as soon as possible thereby improving its chances of survival. It must be

brought into sternal recumbency with minimum delay, taking care that no obstacles impair the animal's breathing.

The rhinoceros should go down within 5-7 minutes of being darted using the dosage given above. If little or no effect is observed after 15 minutes, it can be re-darted and the stopwatch restarted. Once the animal is down, a rope is tied to the hind leg as a means of control should it regain its senses before completion of the procedure. A blanket is placed on the rhinoceros' head, covering the eyes to protect them from dust, grass seeds and the sun. The eyes are open and unblinking under the effect of the immobilisation. A team member in the follow-up vehicle is made responsible for monitoring the breathing rate and blood pressure of the rhinoceros. Monitoring of the breathing rate can be done by placing a hand loosely over the nostrils taking care not to block the intake of air. The breathing rate should be slow and deliberate and between 11-15 exhalations per minute, and not shallow and erratic. The blood pressure can be checked by inspecting the veins behind the ear. These veins should be prominent at all times. If the blood pressure is low, i.e. veins losing prominence, and the breathing is erratic, shallow, and too slow, then 25 mg of nalorphine hydrobromide is injected intra-venously. This should ease the situation within a minute or two. The breathing rate and blood pressure must be monitored closely for the first 20-30 minutes after darting, after which time the animal should have attained the required level of unconsciousness.

Whilst breathing and blood pressure are monitored the eyes are treated with a suitable eye ointment, and 20 ml of a long-acting antibiotic such as Compropen or Penimycin are administered intra-muscularly. Superficial wounds are sprayed with Kemispray aerosol, and the dart wound is treated with Streptopen Milking Cow ointment.

Should it be necessary for the rhinoceros to be down for more than 20-30 minutes, it should be rolled over onto one side for about 30 minutes before being rolled back again.

A second person prepares the loading site and places the vehicle into position for the loading. A rope is tied on the head behind the posterior horn, ensuring that it is around the jaw bone and not around the throat, which will restrict breathing. The crate is positioned as close to the head of the animal as possible, with the head rope going through the crate and being secured to a vehicle which is used to help pull the rhinoceros into the crate. The M5050 is then administered intra-venously, and when the animal begins to stir (approximately 40 seconds later), a cattle prodder is used to encourage the animal to stand. The rhinoceros is then led into the crate using the vehicle pulling the head rope. The leg rope, head rope and blanket covering the eyes are removed only once the animal is safely inside the crate, with the door firmly locked into position. Should the animal venture alongside instead of into the crate, the leg rope should immediately be anchored around a tree or stump and the animal is re-aligned with the crate and allowed to walk in.

Occasionally a black rhinoceros does not react well to M5050. The animal recovers but within a short time suffers a relapse. It often breaks out in a sweat, breathing becomes laboured and the animal either pushes against something or sinks down into a recumbent position. If this occurs, nalorphine should be administered intravenously. If intravenous injection is not possible an intramuscular dose will be adequate, but it takes a little longer to take effect. The dosage of nalorphine used is as follows: Adult: 200 mg; Subadult: 100 mg; Juvenile 50 mg.

Walking an animal

If it is impossible to get the loading vehicle near the recumbent animal because of thick bush, dongas or other physical obstacles, the animal can be walked to the waiting crate. A path from the animal to the crate is cleared, and all obstructions removed. The head rope, leg rope, and the blanket covering the eyes are left in position. One person is placed in charge of the leg rope to keep it taut and to prevent it from slipping off. The leg rope is used to stop the animal, if necessary, by anchoring the rope to a tree. Three persons are placed in control of the head rope to pull the animal forward whilst a fourth carrying the the cattle prodder is placed near the rhinoceros' tail. A fifth person, together with the truck driver, is positioned at the shoulders of the animal to help guide it.

Thirty-five to 50 milligrams of nalorphine hydrobromide are administered intravenously depending on how deeply the animal is judged to be immobilised. After about two minutes following the injection, the animal is prodded into a standing position while the head rope is pulled. Experience has shown that the rhinoceros can now be walked to the waiting crate where it is given its full complement of M5050 antidote.

Translocation from the field

The animal is translocated as quickly as possible after capture, providing that its final destination can be reached within 8-10 hours. If this is not possible, it should be held in a suitable boma for 3-4 weeks before being transported. Ideally a suitable enclosure should also be built at the animal's final destination to allow it to recover from the translocation for a few days before being finally released.

Boma management

The boma should be a stoutly constructed enclosure using 100 mm (top width) diameter poles that have been tannalised but not creosoted. The poles are planted in an upright position with a 75 mm space between them. If they are placed horizontally, the animal tries to use the poles as a stepladder when attempting to escape. The enclosure should be 10 m^2 with rounded corners. Any protruding objects such as bolts or wires which could injure the animal are removed. Water is provided at ground level and browse should be hung from the sides of the boma prior to the animal being introduced into it, and the rhinoceros is fed in this manner for the first few days. Later, good quality lucerne can be introduced and mixed with browse and placed on the floor of the boma.

The crate (or one very similar) in which the animal is to be transported is placed at the entrance to the boma. Once the rhinoceros has calmed down and is eating the lucerne and browse mixture readily, the feed is placed near the entrance to the crate, and finally, inside the crate. This will accustom the animal to the crate and to moving into confined areas. The browse can then be withdrawn gradually from the perimeter of the boma and only the feed in the crate left to eat.

Fresh fodder is placed in the crate twice daily whether the animal has eaten or not. It is not advisable to withdraw browse altogether and feed lucerne only as this appears to be an unbalanced diet for the black rhinoceros. The quality of lucerne should be high and inspected daily and any food of an inferior quality is discarded. Staff movement around the boma area continues normally and the animal usually calms down within a few days.

Loading from boma into travelling crate

In order to load a black rhinoceros into the travelling crate without undue stress and trauma, the animal is darted, preferably in the neck, with 0,25 mg M99 for an adult and subadult, and 0,125 mg M99 for a juvenile. Staff movement around the boma area is minimised and a piece of cloth is quietly waved near the entrance to the crate. Within 15-20 minutes the animal will slowly walk towards the movement and can then be led into the crate. The crate can now be closed behind the animal, the dart removed, and the wound treated.

M5050 is only administered if the animal sinks down into a lying position. Usually the animal will recover within an hour. After boma training for 3-4 weeks the application of a tranquilliser is normally not required for a crated animal.

Conclusion

Black rhinoceros capture should not be undertaken by inexperienced people. The species is classified as endangered on an international level, and it is not worth losing a single individual simply because a capture team is too inexperienced to cope with unexpected problems. Black rhinoceros capture must be embarked upon by professional capture operators only, with suitable experience, proper equipment and with a good track record. All others must be prevented from attempts to capture a black rhinoceros until they have gained the necessary experience under the guidance of an acknowledged professional team.

References

ANON. 1968. Editor's note on movement of square-lipped (white) rhinoceroses *Ceratotherium simum simum*. *Lammergeyer* III (9): 23-25.

ANON. 1976. Twenty-eighth Annual Report. Natal Parks, Game and Fish Preservation Board. 1 April 1975-31 March 1976.
BUYS, D., and J. ANDERSON. 1989. White rhinos on private land in South Africa. *The Rhino and Elephant Journal* 2: 26-31.
HARTHOORN, A.M. 1962. The capture and relocation of the white (square-lipped) rhinoceros *Ceratotherium simum simum*, using drug-immobilizing techniques, at the Umfolozi Game Reserve, Zululand, Natal. *Lammergeyer* II (2): 1-9.
HITCHINS, P.M. 1984. Translocation of black rhinoceros *(Diceros bicornis minor)* from the Natal game reserves 1962-1983. *Lammergeyer* 33: 45-48.
HITCHINS, P.M., M.E. KEEP and K. ROCHAT. 1972. The capture of black rhinoceros in Hluhluwe Game Reserve and their transportation to the Kruger National Park. *Lammergeyer* 17: 18-30.
KEEP, M.E. 1971. Etorphine Hydrochloride antagonists used in the capture of the white rhinoceros *Ceratotherium simum simum*. *Lammergeyer* III (13): 60-68.
KEEP, M.E. 1973. The problems associated with the capture and translocation of the black rhinoceros in Zululand, Republic of South Africa. *Lammergeyer* 18: 15-20.
KEEP, M.E., J.L. TINLEY, K. ROCHAT and J.V. CLARKE. 1969. The immobilization and translocation of black rhinoceroses *Diceros bicornis* using Etorphine Hydrochloride (M99). *Lammergeyer* 10: 4-11.
ROCHAT, K and N. STEELE. 1968. Operation Rhodesian rhino. *Lammergeyer* III (8): 15-24.

Appendix A

The following immobilising drugs, antidotes and antibiotics with proprietor names are used by the Natal Parks Board during its black rhinoceros capture operations.

Azaperone	(Janssen)
Compropen	(Glaxovet)
Diprenorphine Hydrochloride M5050	(R & C Pharmaceuticals)
Etorphine Hydrochloride (M99)	(R & C Pharmaceuticals)
Fentanyl Citrate	(Janssen)
Kemispray	(Panvet)
Nalorphine Hydrobromide	(Centaur Laboratory)
Penimycin	(Panvet)
Streptopen Milking Cow	(Glaxovet)