

# Drugs and dosages for capture and treatment of black rhinoceros *Diceros bicornis* in Namibia

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Darting the black rhinoceros *Diceros bicornis* from the air and from the ground is briefly discussed, as are the relevant drugs used in rhinoceros catching operations in Namibia. The same results will not necessarily be achieved in black rhinoceros populations elsewhere in Africa, being dependant on differences in subspecific taxa, physiological responses and/or parasite loads. Black rhinoceros capture operations must only be undertaken by qualified teams who have the necessary experience and skill.

Key words: Black rhinoceros, Namibia, helicopter, darting equipment, immobilising drugs.

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## Introduction

The application of chemical restraint of wild animals has increased notably over the last three decades and has become an important management tool in nature conservation. The development of humane and effective chemical restraint procedures has enabled wildlife managers to capture their quarry in a predictable way. Mechanical methods of capture can also be used. Various species, particularly small antelope are best captured by mechanical means such as nets (Riney & Kettlitz 1964), the antelope such as common duiker *Sylvicapra grimmia* (Linnaeus, 1758), blue duiker *Philantomba monticola* (Thunberg, 1789), and oribi *Ourebia ourebi* (Zimmermann, 1783) being very elusive and too fragile to be injected with a projectile syringe (Harthoorn 1976). Other mechanical capture methods are utilised and are described *inter alia* by Oelofse (1970) (plastic sheeting), and Harthoorn (1976) (box traps).

Black rhinoceros *Diceros bicornis* (Linnaeus, 1758) immobilisation has been more successfully accomplished by darting than by any other methods used to date (Hofmeyr, Ebedes, Fryer & De Bruine 1975; Hitchins, Keep & Rochat 1972). Darting is usually done from a helicopter as the animals are easier to locate from the air, and can be followed closely from the moment the dart is fired until they go down. An added advantage when using a helicopter is that one virtually chooses the site where one wants the animal to go down by guiding it in that direction.

In this paper attention is focused on drugs and dosages used for capture and treatment of black rhinoceros in Namibia.

## Materials and methods

In Namibia darting is usually done from a helicopter. Occasionally black rhinoceros have been darted from the ground and the equipment used for this operation differs from that needed

from the air. A Palmer Cap-Chur long-range gas (CO<sub>2</sub>) projector is used when darting from the helicopter. It is a reliable piece of equipment, quick to load and has more than sufficient power when darting over a short distance (< 20 metres). When darting from the ground over longer distances, a modified Palmer Cap-Chur Extra Long-range (Powder) projector is used. Modifications include a .303 type rear sight with short and long range adaptors Swartklip .22 blank charges (either yellow or green) are used to propel the darts.

Palmer Cap-Chur 2 ml or 3 ml aluminium darts with NCL 3 needles (length 46 mm, diameter 3 mm) are used when darting from the helicopter. Most of the barb is trimmed off leaving a bead with a slight hook. These needles have thick walls and narrow lumens. They rarely block and can be straightened many times without problem. One to four cubic centimetres internal charges are used and the plunger is lubricated with a silicone spray (Silkospray). For darting from the ground either Palmer Cap-Chur darts or Fauncap 2 or 3 ml darts (with a sufficiently long needle) are used. Fauncap plastic darts, being lighter and having less air resistance, have a better trajectory when darting over a long distance. (Suppliers of drugs and equipment referred to in this paper are listed in Appendix A).

The darts are shot into any convenient, large muscle mass. When darting from a helicopter the darts are placed in the rump or buttocks. An attempt is always made to place the dart at right angles to the skin so that the dart contents are deposited deep into the muscle rather than into or just under the skin (Henwood 1989).

Drug dosages vary according to sex and age of the animal. Adult cows are given 4 mg-4,5 mg M99 and 225 mg-250 mg Azaperone. Adult bulls are given 4,5 mg-5,5 mg M99 and 225 mg-250 mg Azaperone. Calves and subadults are given smaller doses. Dart volumes are minimised by using solutions of 9,8 mg/ml M99 and 200 mg/ml Azaperone. Four ampoules of the spreading agent Hyalase (Hyaluronidase, 1 500 I.U./ampoule) are added to each dart to facilitate absorption. The Hyalase is mixed with a small volume of saline ( $\pm$  0,5 ml) and is used to fill up the remaining dart volume. Darts are made up freshly for each animal.

## Discussion

Using the above dosages, the rhinoceros should show signs of ataxia within one and a half to three minutes and should be down within three to seven minutes. An affected animal has a typical "high stepping" gait. It tends to run straight and will blunder through bushes. If the dart is well placed and the rhinoceros does not show any signs of ataxia within eight minutes, an additional dose can be administered.

If a cow with a calf at foot has to be darted, it is best to immobilise the calf first. Once down, someone should stay with the calf, and the cow immobilised as soon as possible. A cow tends to remain with her calf as it becomes affected and is easier to relocate once the calf is down.

As soon as the rhinoceros goes down professional aid must be at hand. The eyes are covered to protect them from the sun (Henwood 1989). Black rhinoceros usually go down on their sides. If the animal's breathing is shallow or less than 6 inhalations/minute, Dopram (Doxapram HCl) is given at 2 ml/100 kg intravenously into an ear vein, or, if the animal is still lying on its side, into one of the branches of the saphenous vein on the inside of the hind legs. A dose of Narcan (Naloxone HCl) administered at approximately 1/10 of the M99 dose will also help to alleviate the respiratory depression without too much antagonism of the "sedative" effect of M99. A small amount of Nalorphine will also be effective in countering respiratory depression ( $\pm$  10 mg/adult).

An animal that has gone down on its side must be pushed onto its sternum. If the rhinoceros has come to rest in a donga or on rocks it must

be dragged out or off the precarious situation rather than rolling it over for fear of twisting the bowel or uterus.

The rectal temperature is taken and if it is higher than 39 °C the rhinoceros is to be doused with cold water. On hot days, or if the rhinoceros is sweating visibly, it is immediately doused with cold water. Adequate breathing appears to be an important factor in cooling down an animal. Capture operations are not undertaken in the heat of day when temperatures exceed 28 °C.

After the dart is removed the wound is treated with an intramammary preparation (broad-spectrum antibiotic or combination preferably with a corticosteroid such as Special Formula 17900 Forte). The rhinoceros is more inclined than most African mammals to abscess formation at the site of injection (Harthoorn 1976). Superficial wounds and abrasions are treated with an antibiotic spray (Kemispray).

The antidote M5050 (diprenorphine HCl) is administered at 2,4 times the M99 dose into the ear vein. The entire antidote dose is administered at one time. It takes approximately one minute for the rhinoceros to revive, showing no signs of drowsiness. It gets up strongly and quickly and is often aggressive. It is sometimes necessary to lead an animal out of an area before it can be crated (Henwood 1989). About 50 mg nalorphine for an adult rhinoceros is enough to get the animal up and walking but not sufficient to completely antagonise the M99. For additional tranquillisation in animals to be transported, 100-200 mg Azaperone is injected into the muscle just prior to giving the antidote. Once inside the crate, the rhinoceros can be given more Azaperone with a pole syringe or a dart. The motion of a moving vehicle has a calming effect on black rhinoceros (Raath & Hall-Martin 1989).

Rhinoceros which are to be kept in a boma for a while or are to be transported over a long distance are given antibiotics. Under Namibian circumstances a combination of short, medium and long acting penicillins (Penilente LA & Forte) is applied to give a total dose of 16,8 MU for an adult animal (1,8 g sodium penicillin, 3,0 g procaine penicillin and 8,1 g benzethine penicillin).

Pregnant and lactating animals in poor condition, or animals that are to spend any length of time in a boma, are given a vitamin and mineral combination such as Stress-Vitamin.

## **Conclusions**

The drugs and dosages referred to above have been successfully applied for capturing black rhinoceros in Namibia. However, the same results cannot be guaranteed for black rhinoceros in other areas (due to differences in subspecies, parasite load, physical condition and other diverse circumstances). Doses of M99 and Azaperone may seem to be high, but these concentrations and the use of Hyalase result in rapid immobilisation of which the advantages are numerous. The disadvantage is that there is a possibility of respiratory depression. It must therefore be ensured that a reliable person is always present with the rhinoceros from

the moment the animal goes down. This person monitors the respiration and other vital physiological signs and administers antidotes or stimulants if necessary. Obviously, the successful outcome of such an operation can ultimately only be performed by those who are fully conversant with the effective handling of drugs and those who have an awareness of the value of animal life.

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## Appendix A

Suppliers of drugs and equipment mentioned.

- Azaperone: Janssen Pharmaceutica, Private Bag 9, Olifantsfontein, 1665.
- Bacdip aerosol: Bayer SA (Pty) Ltd Veterinary Division, P.O. Box 198, Isando, 1600.
- Dopram: Continental Ethicals (Pty) Ltd, P.O. Box 55307, Northlands, 2116.
- Fauncap darts and Cap-Chur powder projector modifications: Mr M. Maritz, P.O. Box 70, Klaserie, 1381.
- Hyalase: Fison Pharmaceutics (Pty) Ltd. P.O. Box 12084, Chloorkop 1624.
- Kemistry: Panvet (Pty) Ltd, P.O. Box 1884, Kempton Park, 1620.
- M99 and M5050: Game Immobilization Division, R & C Pharmaceuticals (Pty) Ltd, P.O. Box 31069, Merebank, 4059.
- Nalorphine Heptacard, Centaur, P.O. Box 158, Johannesburg, 2000.
- Narcan: Boots Co (SA) (Pty) Ltd, P.O. Box 427, Isando, 1600.
- Palmer Cap-Chur projectors and darts: Photo Agencies (Pty) Ltd, P.O. Box 3916, Johannesburg, 2000.
- Penilente L.A. & Forte: Novo Industries, P.O. Box 783155, Sandton, 2146.
- Silkospray: Willy Rüsich A.G., P.O. Box 1620, D 7050 Waiblingen, West Germany.
- Stress-Vitamin: SWA Vet, P.O. Box 1758, Windhoek, 9000.
- Swartklip Products (Pty) Ltd.: P.O. Box 977, Cape Town, 8000.