THE CAPTURE OF BLACK RHINOCEROS (*Diceros bicornis*) AND BUFFALO (*Syncerus caffer*) ON LAKE KARIBA

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INTRODUCTION

The rising waters of Lake Kariba have caused thousands of animals to be trapped on islands. The majority of these creatures have been caught either by hand or in nets, transported to the mainland and released.

The reactions of mammals to being trapped on an island varies widely with different species. Some animals take readily to the water and can swim large distances with little or no difficulty (Junor 1961). The black rhinoceros (*Diceros bicornis*) is one of the species which will only enter water to belly depth, and only on one occasion was one known to swim a short distance.

The capture of the first rhinoceros on lake Kariba was recorded by Harthoorn (1960). Since that date a total of 46 have been rescued, most of which were immobilised for translocation by means of Gallamine triethiodide. This drug has the disadvantage of necessitating the administration of the antidote, physostigmine, as soon as possible after paralysis has occured. Failure to give this antidote has resulted in several deaths, particularly in those adminals which have run some distance from where they were "shot".

Harthoorn (1962a) described the use of a mixture of three drugs for immobilising white or square lipped rhinoceros (*Ceratotherium simum*), and in another report suggested that the black rhinoceros is more susceptible than white rhinoceros to the action of phencyclidine (1962b).

In the experience of the author there is a considerable difference between the reaction of black and white rhinoceros to Chlorpromazine.

It is, therefore, worth recording the use of Harthoorn's mixture in the capture of black rhinoceros and buffalo in Southern Rhodesia.

MATERIALS

The drugs used consisted of varying amounts of the following:

Themalon (diethyl-thiambutene)
Morphine hydrochloride
Hyoscine hydrobromide
Chlorpromazine hydrochloride
Phencyclidine.

Lethidrone (Nalorphine hydrobromide) was used to antagonise the action of Themalon or morphine.

METHOD

The immobilisation mixture in the projectile syringe was shot into the animals concerned by means of a Palmer Cap-chur gun, always at a very short range, due to the density of the bush and doubtful accuracy of the gun over a distance of 40 feet.

RESULTS

The amount of drugs used, the immobilisation time, i.e. from the time of darting to the time they were approachable, and the times the animals were down, are recorded in Table 1. Other details are as follow:

RHINOCEROS

Case 1. This young black rhino calf, whose mother had died on the island, was living by himself, and was in good condition. He was hit at 4 p.m. in the left rump and ran off for three quarters of a mile where he was found 30 minutes later, lying down unconscious.

Heart beats were 44 per minute, respirations were deep but steady at 7 per minute. The Lethidrone was administered intravenously. He was loaded into a boat and transported to another island one mile away where he was penned. During the boat journey he was noticed to be recovering and because of his increasing strength no further Lethidrone was given. The following morning he was fully recovered and eating browse bush (*Diplorhynchus condylocarpon*). That same day he took to lucerne. After four weeks in a pen he was transported to Wankie Game Reserve and released.

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apparently having hallucinations. He was seen to viciously attack a baobab stump, 3 times

his eyes occasionally, died not much. He died at 6 45 pm.

TABLE I.

	Estimated wt in lbs.	Themalon gms.	Hyoscine mgms.	Phencyclidine mgm.	Morphine gms.	Chlorpromazine cc of 5% soln.	Lethidrone mgms.	Immob. time mins.	Time down hrs.
(1) Male rhinoceros	600	1	—	200	—	3	400	30	2½
(2) Female rhinoceros	1300	—	100	200	1	10	800	15	5
(3) Aged male rhinoceros	2000*	3	100	400	—	—	400	120	died
(4) Adult female rhinoceros	1800	—	100	—	1	10	320	30	3½
			75		½	5		20	
(5) Adult buffalo bull	1300	—	75	300	½	5	100	11	4
							100		
(6) Adult buffalo bull		—	50	200	⅓	5	200	45	2½
(7) Young buffalo bull	700	—	50	200	⅓	5	nil	30	3½

* The true weight was found to be 2550.

Case 2. This young female black rhino was darted in the edge of the vulva at 10.30 a.m. She ran off and 15 minutes later in crossing some shallow water, was unable to rise out of a submerged antbear hold. After 10 minutes struggling, during which time logs were put under her chin to prevent drowning, she lay still. Two c.c. Lethidrone were given intravenously at 11.10 a.m. after she had been pulled onto a raft. Heart beats were 60 per minute and respirations 8 per minute. At no time during the period she was down were tail or ear reflexes not normal. The tail was held for considerable periods in the "fright" position (see Plate I).

On penning at 12.30 p.m. she was given a further 2 c.c. Lethidrone. On her feet at 4 p.m. and noticed to be picking at browse at 6 p.m.

Case 3. This aged bull with a broken anterior horn was darted 5 in. below the spine in the region of the tenth thoracic vertebrae. One and a half hours later was seen staggering and hitting it with his horn stump and staggering back after the impact. He then attacked a large fallen branch, tossing it in the air twice, snorting frequently. One and three quarter hours after darting, he ran off along the island shore line 600 yards where he was found lying in shallow water with his hind legs in a submerged antbear hole. 200 mgms. Lethidrone were administered, two and a quarter hours after darting. He was tied up, pulled into a crate and at 11.45 a.m. began viciously attacking the side of the crate till he succeeded in getting his head through. In view of the danger of the situation it was decided to try Phencyclidine alone as a tranquiliser at 2 mgm. per kilo. Accordingly 2.8 gms. were given intramuscularly and 15 minutes later he quietened down and lay on his side, lapsing into a state of deep narcosis. Respirations were deep but regular (6 per minute) and he was seen to blink occasionally. Tail and ear reflexes were gone. For the next five hours during the journey down the lake he lay on his side and apart from blinking

Case 4. This adult female was shot in the right side of the rump at 10.35 a.m. As the projectile syringe hit her, some fluid was seen to run down the leg. The syringe was not recovered but it was presumed that either the needle had fractured or the threads screwing the needle to the body of the syringe had stripped. Thirty minutes later she was found floundering in three feet of water. For a further 30 minutes she was closely observed and although she frequently swayed and fell off her hind legs, was otherwise alert. At 11.35 a.m. as a boat approached her she ran out of the water and a second syringe with a half dose of the immobilising mixture was shot into the rump. Twenty minutes after receiving the second dose she was found struggling to extricate herself from an antbear hole submerged in a foot of water. She was approached and tied up with no difficulty. It was necessary to put logs under her chin to prevent her nostrils being submerged during the tying up operation.

After being removed to a pen on an island nearby she received 16 c.c. Lethidrone intramuscularly and at 3.30 p.m. was on her feet with her head pressed against the side of the pen.

At 8 p.m. was seen to be eating browse bush.

BUFFALO

Case 5. An aged bull was darted just to the left of the penis half way between anus and testicles. Seven minutes later was seen to stagger and went down finally 11 minutes after darting. Given 5 c.c. Lethidrone. The animal was tied up, rolled onto a sleigh which was dragged onto a raft, and thus transported to the mainland.

Within 30 minutes of going down, it bloated and during the course of the next three and a half hours, the bloating was relieved several times by means of a large hypodermic needle.

From the time the animal went down the tongue was paralysed and hanging out, but at no time was the tail paralysed or eye reflexes absent.

From three hours after darting, the animal, which by this time had been untied and left on the mainland, struggled to rise. When it finally did rise, it was noticed to be suffering from a right radial paralysis which must have been caused when it repeatedly fell among some small tree stumps after darting. Had it not been for this radial paralysis, it almost certainly would have been on its feet sooner, as it appeared to be fully conscious and very aggressive.

The next day it was seen in the neighbourhood and appeared to be completely normal.

Case 6. This adult buffalo bull was darted in the rump and went down 45 minutes later. The Lethidrone was administered intramuscularly at this time. Again it was noticed that the tongue was paralysed but at no time was the tail paralysed or eye reflexes absent.

On examination was found to have one atrophied testicle.

He was up on his feet two and a half hours after darting and appeared to have hallucinations, attacking some small bushes.

Case 7. This young buffalo bull was darted through the side of his tail, pinning the latter to his rump. Was found 30 minutes later lying down with tongue paralysed, but tail apparently completely normal. After transporting to the mainland and releasing, he was on his feet three and a half hours after going down. Repeated bloating during the time he was down was relieved by means of a large hypodermic needle.

DISCUSSION

Previous to the above work, the action of a single dose of Phencyclidine had been tested on a bovine, to find out what use it would have as a tranquiliser or anaesthetic. A fractious cow was given a carefully computed dose of 2.584 mgms. per kilo by deep intramuscular injection. Detailed results will be published elsewhere but briefly the animal went down in 20 minutes and although it was struggling to rise from an hour after the dose was administered, was not on its feet till four and a half hours later. During this time its tongue was completely paralysed and hanging out, but at no time was the tail paralysed. This peculiar action was later noticed in both black rhinoceros and buffalo (see Plates I and II). It is concluded that Phencyclidine has a selective action on centres in the brain.

The aged rhinoceros concerned in case 3 received a dose of only 2 mgms. per kilo of

phencyclidine, and as the post mortem examination later revealed a thrombus in its heart, it is not possible to comment adequately on the use of pure phencyclidine to maintain deep narcosis in black rhinoceros, if it is required.

The variation in immobilisation times, is undoubtedly due to the vascularity of the spot where the drug was administered. From the unusually short time that effects were noticed on the buffalo case 5 it was concluded that some of the drug had gained entrance to the venous plexus of the penis.

The interest that black rhinoceros show in food so soon after recovering from the effects of immobilising drugs is most noticeable compared to experiences with white rhinoceros (*Ceratotherum simum*). The latter need considerable persuasion to eat in pens following capture, while the black rhinoceros will often be found to take food on the same day as it was captured

In case 2 this rhinoceros, if persuaded, would have risen to her feet sooner. She was kept quiet in a pen, in her own time rose five hours after being immobilised, and took food two hours after getting on her feet.

Buffalo will readily take to water and have been noted to be strong swimmers. In the rescue operations on Lake Kariba to date, it has not been found necessary to immobilise any for translocation. The capturing of three individuals recorded above was carried out in order to determine the optimum mixture to use in case it became necessary. The mixture used in cases 6 and 7 is considered to be an optimum, giving adequate time for handling and translocation over a short distance, and at the same time having a wide margin of safety.

It will be noted that Lethidrone was administered in case 6 and not in case 7. This was purposely omitted in order to determine how long the animal would take to recover.

The relatively low doses of Lethidrone used in all cases, were sufficient for this method of translocation where it was desirable to have the animal immobile for two to three hours.

The bloating of immobilised buffalo is to be expected when a large ruminant is recumbent for so long a period. The use of a large hypodermic needle in relieving the condition appeared to be quite satisfactory.

No excess salivation was noticed in immobilised rhinoceros, while it did occur in buffalo. The addition of atropine when dealing with buffalo would therefore be an advantage.

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