

# Capture, handling and transport of springbok and the application of haloperidol as a long-acting neuroleptic

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## ABSTRACT

In view of the alarmingly high mortalities which accompany springbok *Antidorcas marsupialis* capture operations, this paper describes the techniques for the successful capture, handling, holding and transport of these animals and the selection of a suitable long-acting neuroleptic.

One hundred and ninety-seven springbok were successfully captured with the use of either the boma method or drop nets. Although the overall mortality rate was only 3.5 %, the animals had been over-exerted during the capture operation and displayed a marked alarm reaction. At a dosage rate of ca. 0.25 mg/kg, considerable success was achieved with haloperidol (R1625 - Serenace) (G. D. Searle) in effectively reducing the effects of stress and abating the alarm reaction. It maintains a therapeutic effect for 10 - 12 hours in the springbok. We therefore consider it to be a valuable drug in eliminating fear, injuries, additional exertion and stress during handling, transport and the initial acclimatisation of springbok.

## 1 INTRODUCTION

Springbok are known to be one of the most difficult African ungulates to capture successfully in large numbers and losses of 10 % and more are not unknown. In fact, during a previous capture operation by this Division a mortality rate of 17 % was sustained. Also, Wessels (1975) reports losses as high as 33 % and 42 % during capture operations in the Willem Pretorius Game Reserve. The poor success achieved may be ascribed particularly to the nervous temperament of the animal and the often difficult terrain which they generally inhabit, making the standard capture techniques difficult to apply.

The objectives of this investigation were, therefore, to devise new techniques for the successful capture, handling, holding and transport of springbok to minimise injuries and stress, and reduce losses. Major considerations were the selection and application of a suitable long-acting neuroleptic required to eliminate fear, exertion and injuries during the handling, transport and the initial acclimatisation of springbok when introduced to new and strange surroundings.

## 2 LOCALITY AND TERRAIN

The springbok were caught in the winter months of July and August 1973, on the farm Lochkolk which is located at approximately 19°26'E and 26°22'S some 100 km east of Keetmanshoop. The terrain is generally flat and open. The vegetation is typical Dwarf Shrub Savanna (Giess, 1971) and certain areas are well covered with shrubs and small trees such as *Boscia albitrunca* (Burch) Gilg & Benedict, *B. foetida* Schinz, *Catophractes alexandri* D. Don, *Lycium* spp. and *Parkinsonia africana* Sonder.

## 3 PROCEDURE

Both the boma technique (Oelofse, 1970) and drop nets (Hofmeyr & de Bruine, 1973; Pienaar, 1973) were employed. Although maximum environmental temperatures rarely exceeded 23°C, the capture operation was undertaken during the cool hours of the day.

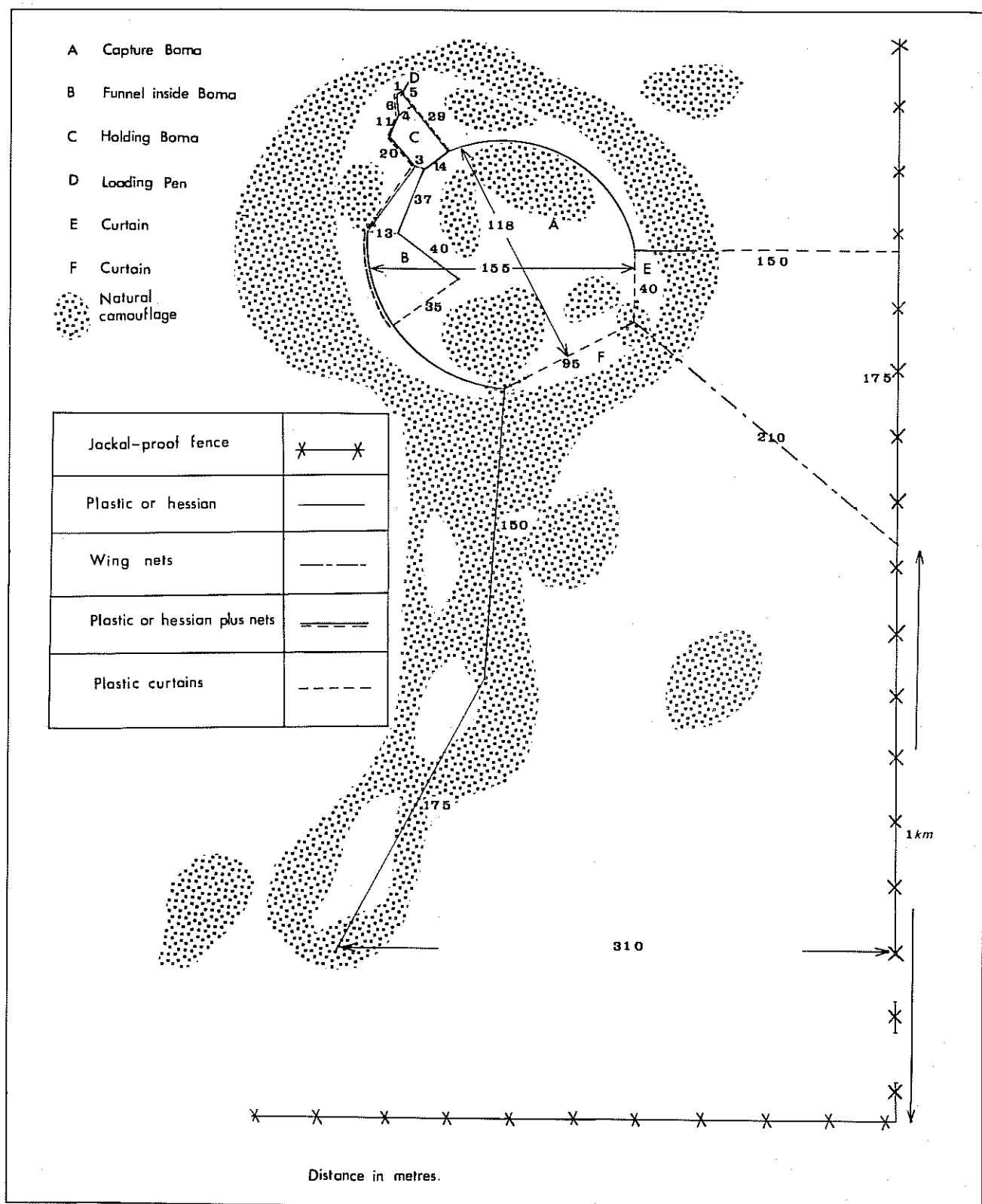


Figure 1 — A diagrammatic illustration of the capture boma and holding pen.

### 3.1 Boma method

A plastic/hessian-lined boma (Fig. 1) was erected in a 1 580 ha paddock which contained approximately 350 springbok. The boma was located close to a 137 cm high jackal-proof fence on the paddock boundary. This site had suitable natural cover in the form of shrubs and trees to camouflage the material of the enclosure. The boma wall was 220 cm high and it was designed with two entrances (E & F). Either of these could be used depending on the prevailing wind. From the one entrance (E), two wings diverged, one of plastic and the other of netting.

The springbok were located from a light fixed-wing aircraft which, with the aid of radio transceivers, positioned and coordinated the movement of the capture vehicles and assisted with the drive. As many as six vehicles were employed. The animals were herded cautiously and only after they approached the wings were they pursued at close quarters and at high speed. The curtains were drawn on command as soon as they had entered boma A and those captured in the wing-net were immediately freed and released into the enclosure.

The springbok were herded for 2–6 km to the boma and the duration of the chase was 10–20 minutes. The captive animals were left to settle down and were then herded into the attached holding pen (C) which was reinforced with netting on the outside (Fig. 1). To achieve this, attendants entered the boma with caution and positioned themselves in such a way as to allow the springbok to enter the funnel (B), whereupon curtains were drawn across the funnel entrance and the holding pen.

### 3.2 Drop nets, handling, tranquillisation, holding and transportation

Drop nets (Fig. 2) were employed in paddocks where the terrain was more open and the boma technique could not be used. Localities were selected where the nets were suitably camouflaged and they were usually erected close to fences. Rocky terrain was avoided. A similar herding technique was employed as in the boma method, although two vehicles without the assistance of the aircraft were adequate in the more open terrain. Nets were erected and removed as quickly as possible to utilise and derive maximum benefit from potential capture sites and to take advantage of favourable capture periods. By alternating between various paddocks, allowance was made for the recovery of chased animals.

As soon as the animals became entangled in the nets, they were immediately restrained in a comfortable position to avoid struggling and given an intra-muscular injection of haloperidol (G. D. Searle) used at a concentration of 10 mg/ml. Each animal was ear-tagged and once the drug had taken effect after 10 minutes, the captives were carried and placed in a sternal position on a layer of sand in the back of an enclosed, semi-darkened, well ventilated vehicle and conveyed to the holding boma.

The springbok were fed dry lucerne (alfalfa hay) and antelope cubes (Epol (Pty) Ltd.) and received water *ad lib*. The animals (Plate 1) were kept under close observation for 3–10 days before they were sold to farmers. They were caught by hand in a 12.5 m<sup>2</sup> pen (D) attached to the holding-boma (C) (Fig. 1). To prevent injuries to the animals caused by jumping against solid structures, the poles supporting the pen (D) were positioned on the outside ca. 30 cm from the hessian lining.

The purchased animals were transported to their destination under the influence of haloperidol in the back of enclosed trucks.

Clinical data on cardiac rate, respiration rate and rectal temperature were recorded as soon as possible in eight springbok captured in drop nets. Immediately afterwards an injection of haloperidol was administered and the observations were again recorded one hour later. During this period and once the tranquilliser had taken effect, the animals remained quiet in the back of a truck. Similarly, the above parameters were also determined in nine springbok after they were captured from a holding pen. Statistical analysis of the data consisted of testing for significance between the recordings by using Student's *t* test. Apart from the above observations, a detailed investigation on clinical observations and blood chemistry was carried out by Gericke, Hofmeyr and Louw (1977) on eight springbok captured in drop nets and retained in a separate pen.

## 4 RESULTS AND DISCUSSION

### 4.1 Response to capture and captivity

A total of 197 springbok was caught; 64 with the boma method and 133 with nets. The first 116 springbok comprised 74 ewes (36 adults, 38 young) and 42 rams (16 adult, 26 young). Of the total, 52 were adults and sub-adults and 64 were less than 6 months old.

When using the boma, the first drives were most successful, but the springbok soon discovered the presence and position of the boma and this made subsequent drives more difficult to conduct.

The olfactory and optic senses are particularly well developed in springbok. It was therefore, necessary to pursue them with increased speed and at close quarters during the final stages of the drive as they tended to veer off when they detected anything strange upon entering the catching site. These springbok, like eland (Hofmeyr & Lenssen, 1976), preferred to be herded up-wind and they usually scattered when chased down-wind for a long distance. Moreover, they could only be chased into the boma when no wind was blowing or when a cross or down-wind prevailed. Consequently, in order to herd them into the boma, it was often necessary to alter their course as they approached the capture site.

The captives settled down remarkably quickly. They almost immediately commenced feeding off the natural available bush inside the boma and within 48 hours readily took to lucerne and, to a lesser extent, antelope cubes. Surprisingly large quantities of water were consumed. Although all the animals fed well they generally lost condition within the first week of captivity. This may be ascribed to a change in diet.

When drop nets were used, injuries and losses could not be entirely eliminated, but with sound handling procedures these were considerably reduced. For example, sufficiently few animals were captured during a single drive so that all the animals could be effectively restrained and medicated. During the capture operation two springbok escaped from the boma and a total of six animals died. These mortalities were the direct result of mechanical trauma; two of which were sustained in fixed nets, two in drop nets, one of an unknown injury and one adult ram died as a result of fighting which occurred amongst untranquillised springbok in the holding pen.

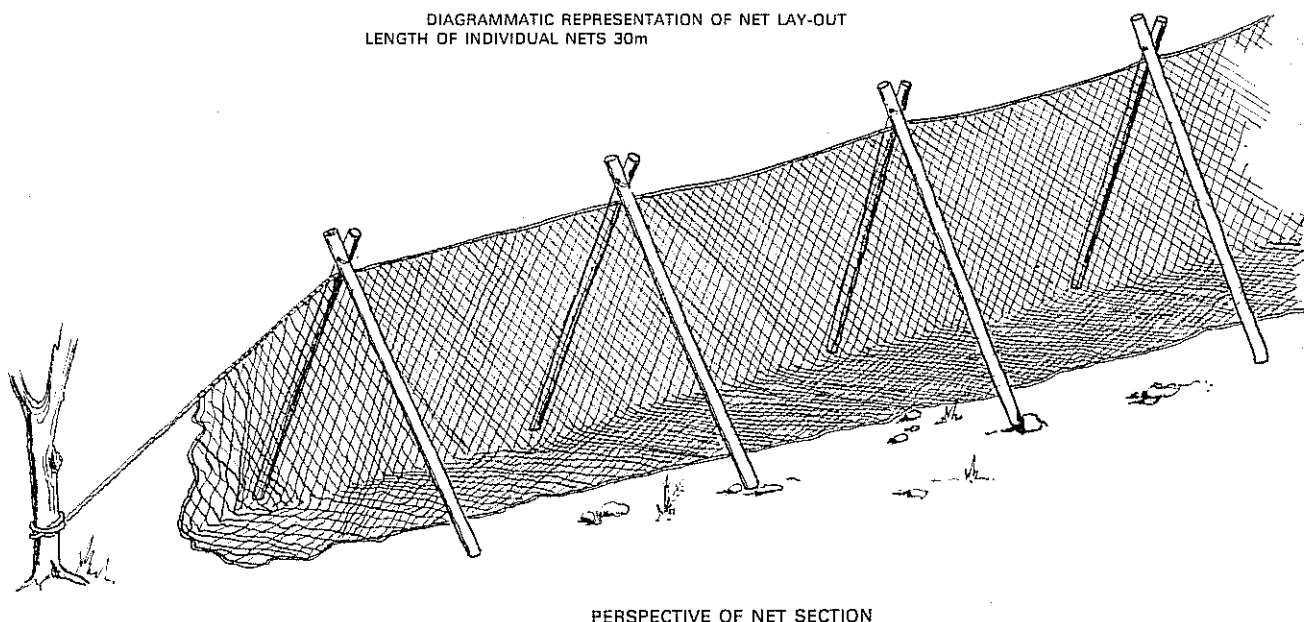
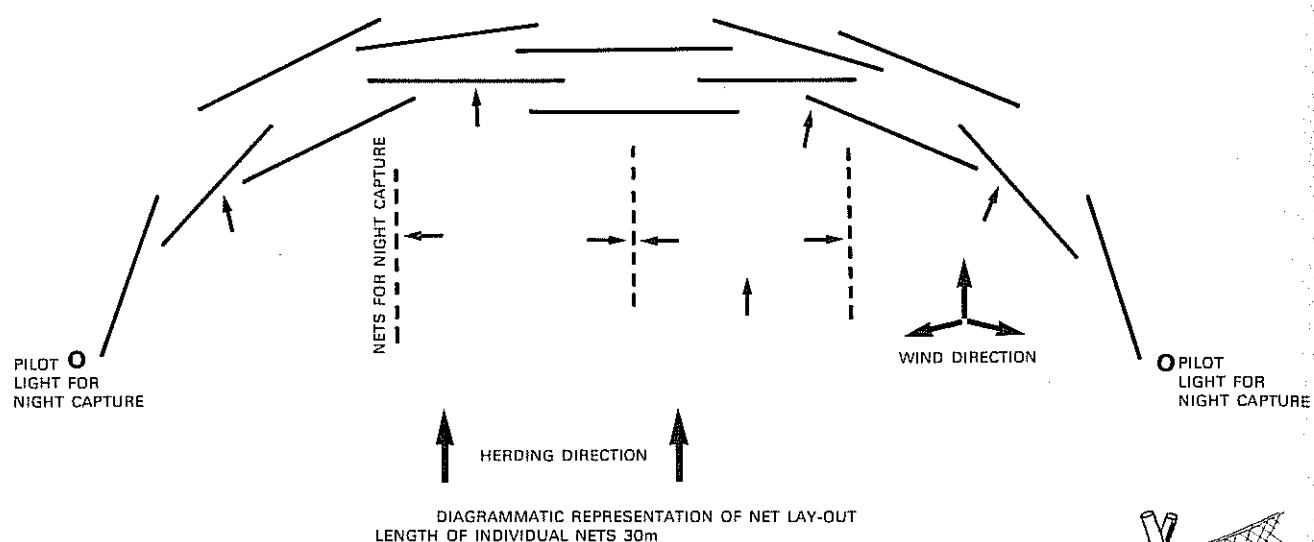


Figure 2 — A diagrammatic illustration of the drop-net method.

#### 4.2 The effect of haloperidol therapy on behaviour

From previous capture operations springbok were found to be highly excitable when handled and transported and often led to fatal consequences. Blindfolds and ear plugs were not effective in calming springbok. Although placing them in hessian bags prevented injuries to the animals during translocation, hyperthermia was not controlled and in some instances resulted in the death of the animals. The animals also tended to be alarmed and they remained stressed. Furthermore, most tranquillisers are of short duration, while the phenothiazine derivatives have been shown to disrupt the heat-regulatory mechanism in the brain (Pienaar, 1968). As high losses were sustained when the above aids were tried, their use is generally not recommended. Consequently, if injuries and mortalities were to be avoided the application of a suitable long-acting tranquilliser was essential.

Haloperidol administered at a dosage rate of 0,2 — 0,3 mg/kg (x 0,25 mg/kg) to springbok, except in noticeably pregnant

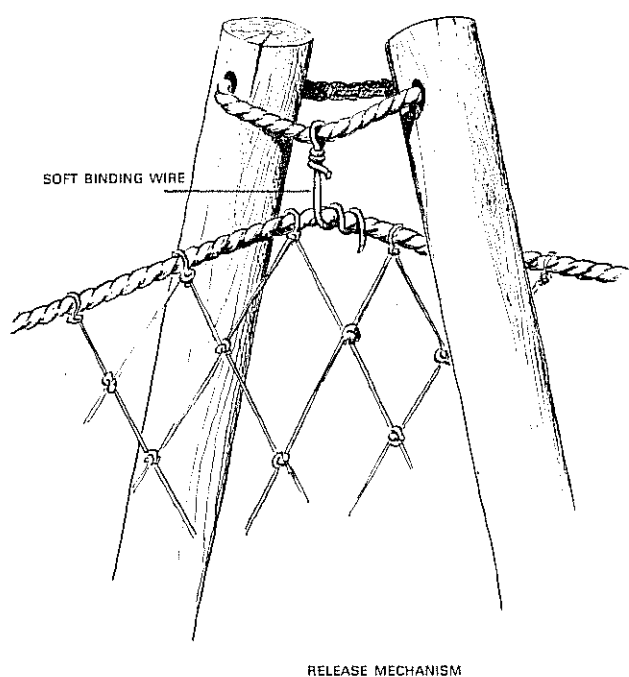




Plate 1 — Captive springbok in the holding pen. Ear-tagged individuals were captured in nets.



Plate 2 — Springbok under the influence of haloperidol in the back of a truck.

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ewes which received ca. 0,175 – 0,2 mg/kg, was shown to be most suitable for the handling and transportation of springbok. The springbok were effectively tranquillised and displayed considerable catalepsy when placed in the back of an enclosed vehicle. In fact, it was possible to quietly move amongst the animals and they were not alarmed when clinical observations were done, blood samples taken, or when they were removed from the truck. They either remained in a sternal position or stood occasionally. Consequently bewilderment, fear and resultant injuries to animals by blindly dashing against obstacles were effectively controlled for a 10 – 12 hour period following medication (Plate 2). Only occasionally were rams involved in mild scrimmages or solitary animals found to show transient restlessness. Moreover, tranquillised animals were not alarmed when released in the holding pen. Unless disturbed, they remained calm once the effect of the drug had worn off, although sporadic fighting did occur amongst untranquillised rams.

At the dosage rates used, no extrapyramidal effects were observed, although according to Pienaar (1968), extrapyramidal effects are more frequently encountered with the long-acting butyrophenone compounds such as haloperidol.

TABLE 1 – Effect of capture and haloperidol therapy on cardiac rate.

GROUP	CARDIAC RATE rate/min				N
	MEAN	RANGE	S.D.		
1 Springbok captured in nets	152,25	126–218	± 31,107		8
2 One hour later	75,00	58–100	± 13,049		8
3 Springbok captured in holding pen	114,67	91–140	± 17,671		9
Group 1 verses Group 2 = H.S. ( $P \leq 0,001$ )					
Group 1 verses Group 3 = H.S. ( $P \leq 0,001$ )					
Group 2 verses Group 3 = H.S. ( $P \leq 0,001$ )					

TABLE 2 – Effect of capture and haloperidol therapy on respiration rate.

GROUP	RESPIRATION RATE rate/min				N
	MEAN	RANGE	S.D.		
1 Springbok captured in nets	157,50	120–200	± 29,602		8
2 One hour later	55,25	26–81	± 17,572		8
3 Springbok captured in holding pen	53,22	22–88	± 22,11		9
Group 1 verses Group 2 = H.S. ( $P \leq 0,001$ )					
Group 1 verses Group 3 = H.S. ( $P \leq 0,001$ )					
Group 2 verses Group 3 = N.S. ( $P \geq 0,05$ )					

TABLE 3 – Effect of capture and haloperidol therapy on rectal temperature.

GROUP	RECTAL TEMPERATURE °C				N
	MEAN	RANGE	S.D.		
* 1 Springbok captured in nets	42+	41,7–42	—		8
2 One hour later	40,28	39,2–42,0	± 0,911		8
3 Springbok captured in holding pen	40,78	39,9–41,9	± 0,573		9

Group 2 verses group 3 = S. ( $P \leq 0,05$ )

\* Temperatures higher than 42°C exceeded the scale on the clinical thermometer and are indicated 42+.

#### 4.3 The effect of haloperidol therapy on the alarm reaction

The captured springbok were considerably over-exerted especially when captured in nets and even to some degree when caught out of the holding pen (Tables 1, 2 and 3). For example, significant rises in cardiac and respiration rates were evident and although favourable ambient temperatures prevailed, hyperthermia was encountered as rectal temperatures recorded after capture (Table 3), exceeded the scale on the clinical thermometer ( $>42^{\circ}\text{C}$ ) in seven of the eight animals. Additional exertion was effectively eliminated with the use of haloperidol and a highly significant reduction in cardiac rate, approximating a normal value, and respiration rate, with an appreciable reduction in rectal temperature, were evident one hour later.

It should also be mentioned that the observations on the effect of capture and haloperidol therapy upon cardiac rate, respiration rate and rectal temperature were confirmed in a separate study on the blood chemistry of the captured animals (Gericke *et al.* 1977). The latter study clearly showed that the animals had been over-exerted during the capture operation and that they had displayed a marked alarm reaction. Similarly, as judged by changes in their blood chemistry, haloperidol was effective in reducing the effects of stress and abating the alarm reaction. It was therefore concluded that haloperidol, as well as the capture methods used, can be very successfully employed with springbok. In fact, it proved so effective that 50 tranquillised springbok which were captive for 10 days, were successfully transported 1 365 km to the Orange Free State – a journey of 22 hours. No maintenance dose was administered in this instance.

The condition of all the springbok was investigated three weeks later, and from the total number supplied to farmers, only one had died. Overall loss resulting from capture, handling, holding and transportation was therefore, only 3,5 %. The success achieved in this capture operation with haloperidol confirms earlier findings of Pienaar (1968) when tranquillising captured impala lambs.

#### 4.4 General precautions and improvements for capture techniques

It should be emphasised that despite the precautions taken and the success achieved with haloperidol, traumatic injuries were sustained in the nets and mortalities did occur while the animals showed marked hyperthermia, stress and alarm as a result of the capture operation. These problems should be partially overcome by considering the following:

- i. In the present investigation the springbok were herded for 2 – 6 km to the nets. Provided the animals are not too wild, nets can be erected in close proximity to the springbok once they have been located. This was successfully accomplished during a capture operation on the same farm, in 1975, when 185 springbok were caught. These animals were not chased for more than one kilometre and overall loss during capture, holding and translocation was 2,2 %.
- ii. The night capture of springbok, during a dark moon and using nets, has been successfully employed especially in very open terrain where the nets cannot be suitably camouflaged. During night capture, hyperthermia is also more effectively controlled and the capture period may be extended to the warmer months of the year. General observations have also shown that the springbok are not as alarmed when herded at night with vehicles and powerful spot lights, but they do tend to veer off as they approach the nets. To overcome this problem additional nets were erected in front of and at right angles to the main nets (Dr T. van Wyk, Veterinarian – Game capture, South West Africa, Division of Nature Conservation and Tourism, *pers. comm.*). The position of the nets is indicated by a pilot light placed at either end (Fig. 2).
- iii. Springbok are prolific breeders, especially during good years when ewes may lamb twice yearly. Consequently, the selection of a favourable capture period may be difficult as the capture of ewes during full term pregnancy, especially when nets are used, should wherever possible, be avoided. Operations should be carried out either, when ewes are not in the last stages of pregnancy, or once the lambs are weaned.
- iv. Less serious traumatic injuries sustained in nets, are manifested from several hours to a few days after capture. It was therefore proposed that a captivity period and close observation of captured springbok may be necessary before translocating the animals, but fighting, change of diet and additional handling and stress may lead to loss in condition and unnecessary deaths. In fact, subsequent observations have shown that mortalities may be further reduced if a captivity period is avoided. In view of the possible problems, attempts should be made to transport the springbok to their final destinations following capture and handling in the nets and while they are still under the influence of haloperidol. Although the effect of haloperidol wears off after 10 – 12 hours, a group of eight springbok was successfully sedated with haloperidol for a period of 24 hours following a maintenance dose after *ca.* 12 hours. Even though the favourable effects are clearly demonstrated in the clinical findings and blood chemistry studies conducted by Gericke *et al.* (1977), maintenance dosage rates and their effects on springbok during transport and holding, require further investigation. Nevertheless, maintenance

doses are recommended where journeys exceed 12 hours, especially in instances where springbok are transported after capture.

- v. The intravenous injection of haloperidol, was investigated during subsequent springbok capture operations. The effects were much swifter than with the intramuscular route, which resulted in less struggling within the nets and the animals could be safely removed and placed in the back of trucks, five minutes after the injection. The vein of the ear pinna, using a 23 gauge needle, is the most convenient as a route of injection. In view of the above advantages, the intravenous administration of haloperidol is recommended.

#### 5 SUMMARY AND CONCLUSIONS

Where suitable terrain and cover exist and provided there is a large concentration of springbok, the boma method is recommended. In more open terrain or where smaller numbers of springbok occur or when fewer animals are required, the use of drop nets is advocated. Where visibility is hampered by vegetation, an aircraft can be usefully employed in locating the springbok and directing the vehicles. Consequently, herding must be carefully planned and controlled to avoid scattering. In difficult terrain where vehicles cannot be used for the herding operation, a helicopter is the only alternative method.

Although the overall mortality rate was only 3,5 %, the present investigation and the blood chemistry studies by Gericke *et al.* (1977) clearly show that the springbok had been over-exerted and displayed a marked alarm reaction during the capture operation. We feel, therefore, that every precaution should be taken as has been suggested, to control hyperthermia, mechanical trauma and over-exertion during the capture operation. Irrespective of whether the boma method or drop nets are used, injuries and exertion cannot be entirely avoided, but the incidence may be considerably reduced by following sound capture procedures. For instance, the night capture of springbok using nets, holds considerable promise. Hyperthermia should be more effectively controlled and animals appear not to be as alarmed and hence are less exerted when captured at night. Moreover, in view of the favourable long-acting properties of haloperidol, mortalities may be further reduced by avoiding a holding period and transporting the springbok to their final destinations directly after capture if this is practical.

Considerable success was achieved with haloperidol in reducing the effects of stress and abating the alarm reaction. In springbok, haloperidol showed an effect within 10 minutes of an intramuscular injection and within 5 minutes following an intravenous injection. At a dosage rate of *ca.* 0,25 mg/kg it maintains a therapeutic level for 10 – 12 hours. It was shown to be a valuable drug in eliminating fear, injuries, additional exertion and stress during the handling, transport and initial acclimatisation of springbok.

In conclusion then, haloperidol holds considerable promise in game capture operations under a variety of practical conditions. In the present investigation it greatly facilitated the management of springbok and together with the capture procedure followed, it was largely responsible for the success achieved and the high percentage of survivals.

## 6 ACKNOWLEDGEMENTS

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