INTRODUCTION

There are two parts to the discussion of each individual species. The first covers a general description of the animal, its distribution, behaviour, preferred habitat and reproduction. This information is given to provide a background that will guide the approach and planning of the capture to be undertaken. The second part deals with the drugs and darting equipment to use, together with brief notes on what to expect from the effects of drugs on each individual species (see Chapters 10, 11 and 12 on dart equipment). All the doses given in the tables in this chapter are for adult males and females, unless indicated otherwise.

It is important for any person moving wildlife in Africa to familiarize themselves with regulations that control the movement of animals, the risks of spreading disease or which species occur naturally in order to conserve the genetic make-up of wildlife populations. The management, handling and anaesthesia of all species will vary, depending on whether the work is done under extensive or intensive conditions. This distinction is important to understand, to ensure that the correct approach to the management of the species is taken.
9.1 GENERAL CAPTURE INFORMATION ON UNGULATES

9.1.1 Pharmacological principles

- The objective for capturing the animal must be clear, as this could influence the drug combination and subsequent handling.
- The established opioids (etorphine and more recently thiafentanil) are the drugs of choice, and tranquillizers (especially azaperone), together with the absorption-enhancer hyaluronidase, are added to the opioid.
- Overdose with opioids rather than underdose.
- Doses supplied are total doses and not given on a weight-equivalent basis, unless indicated as such.
- The recommended drug combination is given first, with other alternatives given as second or third options.
- α-2 agonists can also be added to opioids in the dart but be aware of the significant physiological side effects that they could elicit (decreased thermoregulation, drop in blood pressure, increasing core blood pressure in others, worsening gaseous exchange and regurgitation). The addition of α-2 agonists is not recommended on very young, old and debilitated animals. Medetomidine is the α-agonist of choice, but should be reversed with atipamezole or at least yohimbine. Xylazine is a cheaper alternative but is less specific, and has longer lasting and greater side effects.
- The combination of butorphanol, azaperone and medetomidine (BAM) or midazolam is becoming more frequently used in smaller antelope and predators in southern Africa, as they are safe reversible alternatives to the established combinations.
- Instead of using opioids as a top-up, ketamine on its own can be used in all species, given as a 20–100 mg bolus dose depending on species. Its use is particularly recommended in roan, sable, gemsbok, buffalo, hippo and some predators.
- Midazolam and valium in boluses of 10–20 mg IV also have a good sedative effect, and are both safe and effective drugs to use. A combination of ketamine and midazolam can be given for animals that need additional control.
- Note that animals can recover spontaneously from the effects of reversible anaesthetic combinations without the administration of the reversing drugs, usually within the first hour of immobilization.
- In general, take particular care in the use of reversible combinations in old, sick or debilitated animals, as these often contain sedatives or α-2 agonists, which can induce profound effects in such animals.
- Antidotes are given at 2–2,5 x the opioid dose for diprenorphine and 10–20 x the opioid dose for naltrexone. Although naltrexone is the recommended antidote for thiafenatanil, diprenorphine can be used, especially if the animals are in bomas or need to be transported – they will be slightly subdued compared to those given naltrexone reversal.
- Diprenorphine is the recommended drug for reversal when the animal is loaded for transport or in confined areas. Here it can be easily monitored for renarcotization. However, naltrexone is recommended for free-release situations, where the animals cannot easily be monitored and are potentially exposed to predation or social aggression in the same or other species.
- For animals that react badly to opioids or have potentially been overdosed, administer naltrexone at 20–50 x the opioid dose to revive them fully and to avoid post reversal renarcotization.
- Partial reversal can usually be achieved in animals that need stimulation, partial revival or walking by giving 10–30 mg nalorphine or butorphanol in increments of 5 mg (larger animals) or 2,5 mg (for calves or smaller animals). If only diprenorphine is available, then a dose of 0,5 mg to a maximum of 1,5 mg can be used IV or up to 5 mg IM.
Waterbuck are large antelope that are brownish grey with a grizzled appearance due to the presence of grey and white hairs scattered throughout the coat. The body hairs are long, giving the animal a furry appearance that is not seen in other African antelope species. The common waterbuck has a characteristic white ring encircling the rump. The males are horned. Waterbuck have a strong goat-like smell.

**Size:** Waterbuck bulls stand 1.2 m at the shoulder and have a body mass of 250–270 kg. Cows are smaller and more lightly built.

**Habitat:** Waterbuck are usually found in close association with water, rivers, swamps and waterholes supplied by a borehole. They will move when access to the water is denied or when waterholes dry up. They utilize flood plains, vleis, reed beds and woodland cover close to water.

**Habits and behaviour:** Waterbuck are found in herds 6–12 in size. Their social structure includes territorial bulls, nursery and bachelor herds. Adult bulls of 5–6 years are capable of establishing and maintaining a territory that they defend against trespassing bulls using displays of aggression and, if necessary, by fighting them off. Deaths are not uncommon in these cases. Waterbuck are grazers with a preference for short grass and may utilize fruits such as marulas.

It has been found that nyala out-compete waterbuck for food during dry periods. Deaths have been described in waterbuck calves suffering from malnutrition and severe tick infestations in the Hluhluwe-Imfolozi Game Reserve when nyala take the bulk of the available grazing.

**Reproduction:** Waterbuck have a gestation period of approximately 280 days. Calves are born throughout the year with peaks in October and February to March. Calves hide in long grass or bush thickets for their first 3–4 weeks of life before joining the herd. They are weaned at approximately 9 months of age.

**Equipment:** Telinject, Dan-Inject, and Pneu-Dart.
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INDIVIDUAL SPECIES REQUIREMENTS

- IM reversal takes a long time (up to 30 minutes) and may be due to slow absorption due to shunting of blood away from the periphery during immobilization.

- NB: There is a risk of spontaneous wake-up with the BAM combination, especially if the dart went off subcutaneously or if the dose was too low. This is also more possible if the procedure takes 45–60 minutes or longer. Pain stimulation such as a needle injection, or excessive handling, can result in partial reversal.

- It is recommended that 400–500 mg ketamine is given intra-lingually or IM before any procedures such as moving, handling or cutting teeth are conducted. Wait for at least 5 minutes after ketamine is given before starting the procedure.

- If the dart went off subcutaneously, a top-up dose of one-third of the original dose must be given by deep IM before handling starts. Use ketamine as described above to reduce risks of spontaneous wake-up due to under dosing.

Technique: Capture techniques must take cognizance of the tendency that these animals want to get back into the water if they are darted on land, and in so doing can drown, but this risk is reduced when using the BAM combination as it does not suppress the breathing reflex (see Figure 9.27b). Some animals that are darted in the water may move to land as they start to feel the effects of drugs and ‘beach’ themselves (rarely) but others may not. Steps must therefore be taken to deal with these possibilities. Hippo can be herded to shallow water with boats, graders or helicopters and then darted. Young animals may be roped and pulled from the shallows to be darted on land. A harpoon-type darting system was developed in the Kruger National Park to enable darted adult hippo to be pulled to the land. This approach is no longer used but may be useful with the BAM combination to retrieve animals from the water, especially if there are crocodiles and other hippo around. When working from a helicopter and if it is possible to get them out of the water, they respond much better to the helicopter if it is some distance from the hippo rather than maintaining pressure on the animal, which usually results in them running back to the water.

Figure 9.26: Adult female hippo sedated with the BAM combination
Recovery of an immobilized hippo from the water still needs to be refined. After checking that the animal is properly immobilized, a rope can be attached around its neck and the hippo pulled to the shore – they float well. A mat made of conveyor belting can be placed under the animal in shallow water, and the animal can be pulled out of the water by a vehicle.

Noosing the immobilized animals from a helicopter may also be possible if they are amongst a pod.

Most hippo are mass captured in bomas next to their water habitat and then lured into a capture boma with a trapdoor, whereafter they are chased into compartments or crates on transport vehicles. During the latter part of the dry season, when grazing is scarce, hippos can be lured with Lucerne to feed in capture bomas near the water. Once the animals are habituated to feeding in this way, the bomas are closed to prevent them from getting back to the water and they are then tranquillized and chased into crates or transport vehicles. This technique takes up to six weeks and is therefore labour- and time-consuming. The hippo can also lose condition during this period, resulting in post-release mortality of older and younger animals if the release conditions are not ideal. However, it remains the safest way to capture larger numbers of hippo.

Ezemvelo KZN Wildlife have developed a trapdoor system that can be placed near open...
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water and can be remotely triggered to close the two open sides. The hippo is then loaded out of the capture pen into trucks. This allows for capture of hippo in good condition, as they are not forced to be confined in a small area where they are getting suboptimal nutrition, and therefore post-release mortality can be reduced.

Beware of hippo that appear asleep but suddenly wake up with stimulation. They bite quickly – never approach a hippo from the front!

Hippo can be captured using a net-gun (P. Morkel, pers. comm.).

Tranquillization using 200–300 mg azaperone given IM during transportation is effective in hippo.

9.4.3 WHITE or SQUARE-LIPPED RHINOCEROS (Ceratotherium simum)

The white rhino is a grazer and has a square lip, which enables it to graze efficiently. The black rhino has a pointed prehensile lip to be able to browse on leaves, fruits and twigs. The white rhino is considerably larger than its black relative, has a hump on its neck and on its back in front of the hindquarters, both of which are not seen in black rhino. Apart from the anatomical differences, these animals differ in their responses to capture and handling. The white rhino is approachable when free-ranging. In contrast, the black rhino is well known for its aggressive nature, which results in it being more likely to seek and destroy the source of its pain when darted. Once these two species are captured, however, their temperament changes. White rhino become aggressive and more dangerous in captivity, until they calm down a number of weeks after being placed in captivity. It is rare that an adult white rhino taken out of the wild will allow touching or feeding by hand. However, black rhino placed into captivity generally calm down quickly and start feeding within 2–3 days. Wild, free-ranging black rhino can be very aggressive initially in a boma – this varies from individual to individual. Black rhino need much more individual and specific management compared to white rhino, which are much more predictable once settled.

White rhino often take up to 12 days to eat properly and some have to be released because they do not settle or eat at all. Black rhino quickly settle into a routine and can be easily managed within a week after
9.12 PRIMATES

VERVET MONKEY *(Cercopithecus aethiops)*, SAMANGO MONKEY *(Cercopithecus mitis)*, CHACMA BABOON *(Papio ursinus)*, MANDRILL *(Mandrillus sphinx)*

9.12.1 General

Working with primates differs markedly from working with herbivores or carnivores in terms of immobilization. These animals are more aware of what might occur and take steps to avoid being darted. Captive animals particularly will hide behind barriers and even make use of movable things in their enclosure to block darts. For example, it is not unusual for them to use their bedding, blankets or straw, which they hold up so that there is no part of their body exposed. Be creative in planning the darting procedure to prevent them from being able to avoid being darted. Free-ranging primates are not immobilized by darting as a rule. Baboons can become habituated to feeding from vehicles in nature reserves, and can then be lured with food to approach a vehicle. They will, however, be able to identify an official vehicle and a uniformed person or someone with a dart gun in the vehicle. Dress and behave like a tourist in these situations and cover the dart gun with cloth or cardboard.

**Precautions:** Lateral recumbency is the best body position in which to keep immobilized primates. They are single-stomached animals and respiratory volumes will not be affected severely by the position of the body, but position does affect the way in which an open and free airway is maintained.

Position the animal on its side, with the mouth open and the tongue out to the side. If possible, angle the head downwards, so that saliva does not collect in the animal’s mouth – this may be aspirated into the lungs if it finds its way into the pharynx.