only in the infected pen, and must be sterilized every time after use. The attendant should wash his hands with an antiseptic soap each time after working in the pen, and should also wear gum boots that are disinfected after use. He should also wear an overall every time he works at the pen, leaving both the overall and gum boots there. The overall should be changed daily.

Colic

Colic is occasionally seen in rhinos in captivity. Clinical signs of colic in the rhino include rolling, 'crying', continual changes in position, repeated standing and lying down, and distress. Probable causes are mouldy feed, change in diet, etc. A single intramuscular injection of a spasmolytic (e.g., Finadyne®) is usually effective. Use 20 ml Telinject® darts. An abscess may develop at the injection site.

Pneumonia

Pneumonia is uncommon in captive rhinos; it usually occurs only in animals that are not in good condition, often following a cold, wet spell. This is where shelter from the elements, especially rain, is very important. A cold animal is bad enough but a cold, wet animal is a dangerous combination. Pneumonia is a very difficult condition to diagnose by just looking at an animal. Listlessness and laboured, often noisy breathing, occur. The animal must be darted with antibiotics (e.g., Potencil®) and vitamin B-complex syrup should be included in the drinking water.

Fly and tick worry

This can pose a problem in summer. Flies tend to sit on wounds and generally irritate the animal. Bayticol®, which is a safe, synthetic pyrethroid, can be sprayed onto the animal weekly. This is effective against both stable flies (*Stomoxys spp.*) and ticks.

Abscesses

Abcesses are seldom seen in rhinos. Abscesses that do develop are usually as a result of a dart wound or injection. Because it is not possible to lance an abscess without immobilizing the animal, the abscess is usually left to rupture on its own. It is then treated as an open wound (i.e., hydrogen peroxide, iodine, acriflavine glycerine, etc.) The wound usually clears up fairly quickly. If the opening continues to ooze it may be necessary to immobilize the animal and flush the abscess. In such cases a long-acting antibiotic should also be used.

Eye infections

Eye infections may be caused by dust or a blow to the eye. An active infection is characterized by a yellow-green, thick discharge, whereas physical trauma is characterized by a watery, clear discharge. Try to wash away the debris with water. Depending on how tame the animal is, it may be possible to treat the eye with an antibiotic ointment: Orbenin OPH® (every 48 hours), Opchlor Vet® (3–4 times daily), or Terracortril® (twice daily). The latter contains cortisone, so one must make sure that there are no corneal lesions before administering it. The animal will not usually be tame enough to allow administration of an ointment. An iodine based spray is very effective in such cases. Examples include Vidine® and Oberdine® wound, eye and footrot spray. These antibacterials can be administered from a distance of 10–20 cm. They should be administered at least twice daily until recovery.

Foot infections

These occur when bacteria invade wounds or cracks on the feet, and are usually only found when the animals are kept under wet, dirty conditions. Hydrogen peroxide, iodine, and acriflavine glycerine should be applied as described earlier. If the animal will not lie down long enough for the full treatment, try to ensure that at least the iodine and acriflavine glycerine are applied. Failing this, alternate treatment with these two drugs. It may be necessary to administer antibiotics (e.g., Compropen® or, in severe cases, Potencil®).

Personal communication: Dr J.R.B. Flamand, Box 456, Mtubatuba, 3935 RSA

5056

Chemical capture of the black rhinoceros *Diceros bicornis*

P. S. Rogers

Also see *Chemical Capture of the White Rhinoceros*, this Section.

The black rhino...

- Is very similar to the white rhinoceros, except that:
  - It favours dense bush;
  - It is not usually gregarious;
  - It is by nature more aggressive and belligerent, and is potentially dangerous when approached on the ground; and
  - It reacts better than the white rhino to the drugs used in the anaesthetic cocktail.
- If disturbed upon approach, and after darting, will either become aggressive and charge the marksman, or alternatively will run off and seek shelter in a dense thicket.

Precautions

The same precautions that apply to white rhino capture apply here. There are some additional precautions to bear in mind.

- Be aware that because azaperone, and not hyoscine, is used in the anaesthetic cocktail, the black rhino's vision is not as severely impaired as that of the white rhino.
- Appropriate precautions should always be taken to ensure that there are no other rhinos nearby when working on an immobilized animal. Because they are not usually gregarious, it is seldom that the helicopter has to chase other family members away. This is not always the case however – for example, a cow/calf combination where only the calf is being captured.
- Because black rhinos usually become recumbent in thick bush, be sure to check that there are no obstacles impeding the immobilized animal's breathing.
- Always cut off the tip of the anterior horn. Black rhinos are often very aggressive towards each other on release from the bomas at their final destination.

- Black rhinos usually wake up completely shortly after administration of the antidote. Be well prepared, as the animal usually hops onto its feet when the prodder is applied. There is no room for error here.
- Be prepared: black rhinos occasionally get up quite unexpectedly, even when they appear to be fast asleep. For this reason it is even more important not to walk in front of the animal, and to make sure that the foot rope is well secured.
- Because azaperone, and not hyoscine, is used, if a black rhino has to be walked to the crate it is essential that the towel over the eyes be well secured so that the animal cannot see out.
- Ensure that the rhino does not stand with its head in the corner of the crate once it is loaded – the shape of the black rhino's head predisposes it to smothering itself. This is not often a problem as the black rhino is usually wide awake while being loaded!
- Be careful when removing the head rope and cloth from the eyes.

How to capture the black rhinoceros

Equipment and preparation are the same as for the white rhino (see *Chemical Capture of the White Rhinoceros*, this Section).

Drugs

There is one major difference in the cocktail used to immobilize black rhinos – azaperone is included in the black rhino's anaesthetic cocktail instead of hyoscine. The cocktail used by the Natal Parks Board is given in Table 1. Black rhinos react extremely well to this cocktail, and a very relaxed state of restraint is usually achieved.

Table 1. Drug combinations for the capture of free-living black rhinoceros.

	Immobilizing cocktail			Opioid antagonist
	Etorphine (M99) (mg)	Fentanyl (mg)	Azaperone (mg)	Diprenorphine (M5050) (mg)
Adult	1	30	150-200	6
Sub-adult	0.5	20	100	4
Juvenile	0.25	12	50	3

An alternative to this cocktail is given in Table 2. This cocktail has also been used with great success, although the etorphine/fentanyl combination produces a slightly quicker and more relaxed restraint.

As in the case of the white rhino, these combinations serve only as a guide, and the doses should be tailored to suit the individual animal. The knock-down time ranges from seven to nine minutes. It seldom happens that the animal is roped while still standing – it is usually down by the time the follow-up team gets to it. As in the case of the white rhino, if a black rhino goes down in less than six minutes it should be attended to as quickly as possible.

Table 2. Alternative drug combinations for the capture of free-living black rhinoceros.

	Immobilizing cocktail		Opioid antagonist
	Etorphine (M99) (mg)	Azaperone (mg)	Diprenorphine (M5050) (mg)
Adult	3	150-200	6
Sub-adult	1.75	100	4
Juvenile	1	50	3

Technique

The technique is exactly as for the white rhino with a few exceptions.

Because black rhinos often tend to stick to thick bush after being darted, this is usually also where they become recumbent. To avoid losing sight of the recumbent animal from the air, it is useful to have at least one roll of toilet paper in the helicopter. This roll can be thrown out of the helicopter like a paper streamer to mark the spot where the animal has gone down or was last seen. The helicopter can then move off to guide in the follow-up team.

It very seldom happens that a black rhino is roped while still standing. The foot rope must, however, still be put on, even if the animal is down.

Because the black rhino is almost fully awake after being given the antidote, it is advisable to give it additional tranquillizer 5–10 minutes before waking it up. This helps to prevent the animal from fighting in the crate. Azaperone is recommended for this purpose at the following intramuscular doses:

Adult	100–150 mg
Sub-adult	50–100 mg
Juvenile	25–50 mg

It is usually not necessary to administer nalorphine once the animal is in the crate, as is sometimes the case with a white rhino.

Do not

- **Never dart two black rhinos at once – the chances of losing one of the animals in thick bush are just too great.**

Bibliography

Denney, R.N. 1969. Black rhinoceros immobilisation utilising a new tranquillising agent. *E. Afr. Wildl. J.* 7:159–165.

Haigh, J.C. 1977. The capture of wild black rhinoceros using Fentanyl and Azaperone. *S. Afr. J. Wildl. Res.* 7:11–14.

Hartheorn, A.M. 1973. The drug immobilization of large wild herbivores other than the antelopes. In: E. Young (ed.). *The Capture and Care of Wild Animals*, pp 51–61. Human & Rousseau, Cape Town.

Henwood, R.R. 1989. Black rhinoceros *Diceros bicornis* capture, transportation and boma management by the Natal Parks Board. *Koedoe* 32:43–47.

Hitchins, P.M., Keep, M.E. & Rochat, K. 1972. The capture of black rhinoceros in Hluhluwe Game Reserve and their translocation to the Kruger National Park. *Lammergeyer* 17:18–30.

Hofmeyr, J.M., Ebedes, J., Fryer, R.E.M. & de Bruine, J.R. 1975. The capture and translocation of the black rhinoceros *Diceros bicornis* Linn in South West Africa. *Madoqua* 9:35–44.

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., Tinley, J.L., Rochat, K. & Clark, J.V. 1969. The immobilisation and translocation of black rhinoceros *Diceros bicornis* using Etorphine Hydrochloride (M99). *Lammergeyer* 10:4–11.

King, J.M. 1969. The capture and translocation of the black rhinoceros. *E. Afr. Wildl. J.* 7:115–130.

King, J.M. & Carter, B.H. 1965. The use of M99 for the immobilisation of the black rhinoceros (*Diceros bicornis*) and its antagonism with the related compound M285 or Nalorphine. *E. Afr. Wildl. J.* 3:19–26.

Kock, M. 1992. Use of hyaluronidase and increased etorphine (M99) doses to improve induction times and reduce capture-related stress in the chemical immobilization of the free-ranging black rhinoceros (*Diceros bicornis*) in Zimbabwe. *J. Zoo. Wildl. Med.* 23:181–188.

King, J.M. & Carter, B.H. 1965. The use of the oripavine derivative M-99 for the immobilization of the black rhinoceros (*Diceros bicornis*) and its antagonism with the related compound M-285. *E. Afr. Wildl. J.* 3:19–27.

Morkel, P. 1989. Drugs and dosages for capture and treatment of black rhinoceros *Diceros bicornis* in Namibia. *Koedoe* 32:65–67.

Transportation of the black rhinoceros *Diceros bicornis*

P. S. Rogers

Also see *Transportation of the White Rhinoceros*, this Section.

How to transport the black rhinoceros

As in the case of white rhinos, black rhinos are all crated and transported individually. The Natal Parks Board recommends transporting boma-trained animals only, for two main reasons. First, the initial aggressiveness of the black rhino immediately after capture is such that the journey immediately after capture should be as short as possible. Second, unlike white rhinos, black rhinos are completely awake after administration of the antidote, and are thus stressed by the sudden exposure to the strange sights, sounds and smells of the crate.

Because black rhinos adapt so much more readily to captivity than white rhinos, it is possible to transport them after a boma-training period of only four weeks. A boma-training period of at least six weeks is, however, recommended. The advantages of boma training white rhinos also apply to black rhinos.

Loading

The loading procedure for black rhinos is exactly the same as for white rhinos with a few exceptions.

The black rhino is smaller and is more susceptible to etorphine than the white rhino The recommended doses are:

Adult	0.25 mg
Sub-adult	0.125 mg
Juvenile	0.0625 mg

Black rhinos often refuse to enter a crate. They stand at the entrance to the crate with their legs splayed, head down, and salivating. If this occurs, a cloth is used to cover the animal's eyes and a rope is slipped over its head. The animal is then pulled into the crate while being guided and supported by an attendant on either side.

If it appears that the animal may go down, nalorphine may be administered at the same dosage rate as in white rhinos (see *Transportation of the White Rhinoceros*, this Section). This becomes necessary much more frequently with black rhinos than with white rhinos.

Transportation

In the author's experience it has never been necessary to tranquillize boma trained black rhinos *en route* to their new destination. They travel extremely well and usually eat large amounts of lucerne during the journey. This seems to keep them quiet: for this reason it is advisable to take along a good supply of lucerne for the journey. Remember to supply adequate bedding.

If tranquillization does become necessary, the recommended doses of azaperone are as follows:

Adult	100 mg
Sub-adult	50 mg
Juvenile	25 mg

These doses may be increased if necessary. Rather start off with low doses: one does not want an animal going down in the crate.

Off-loading

Black rhinos are usually off-loaded more easily than white rhinos. It has been found that if they are allowed to disembark in their own time, which is usually not very long, they are less aggressive in the receiving pens. After disembarkation they often run around and perform for a while. As in the case of white rhinos, a cloth or the handle of a prodder may have to be used to get the animal out of the crate. One seldom has to use the prodder itself. Unnecessary or excessive use of a cattle prodder to get a reluctant animal to disembark will merely aggravate the situation.

Spectators, movement, and noise at the off-loading site should be restricted to an absolute minimum as these factors further aggravate the animal. As with white rhinos, it is essential to separate a cow and her calf on disembarkation. The cow's behaviour should be closely monitored before reuniting the two – this may only take 10 minutes if the cow is calm, but longer if the cow is very agitated.

Release

See *Transportation of the White Rhinoceros*, this Section. In the case of black rhinos it is essential that they are taking in sufficient local browse before being released. It is not necessary to reduce their daily lucerne quota before release.