

## Care of the black rhinoceros *Diceros bicornis* in captivity

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### The black rhino...

- Is a big, strong, aggressive, unpredictable, and potentially dangerous animal.
- Is by nature not usually a gregarious animal.
- Usually adapts readily and quickly to captivity. The age of the animal does not seem to influence its adaptation.
- Is a browser.

### Precautions

As for the white rhino (see *Care of the White Rhinoceros in Captivity*, this Section) with the following exceptions:

- Black rhinos start eating almost immediately in a pen.
- Black rhinos are initially even more aggressive than white rhinos so great care must be taken not to aggravate them unnecessarily. However, they calm down within a few days and ultimately become much tamer than captive white rhinos.
- Black rhinos can be put straight into the front pen (see *Accommodation of the White Rhinoceros and Black Rhinoceros*, this Section) because they adapt so readily to captivity.

### How to care for the black rhinoceros

#### Boma management

- All animals are housed individually, except in the case of a cow and her calf.
- The water trough should only be filled once the animal has settled down after its initial introduction to the pen. Vitamin B complex syrup should be mixed into the water (250 ml per 50 l water). The vitamin B complex supplementation can be discontinued as soon as the animal is eating well – usually about 10 days after capture. Water is given *ad lib.* and the water trough is emptied and cleaned twice daily. As in the case of the white rhino, the water trough should be disinfected twice weekly with a suitable disinfectant (e.g., Bacterex ).
- It is best to wait until the animal has settled down (4–5 days) before cleaning the pen. The pen is then cleaned on a daily basis. It is essential, however, to remove as much old browse and lucerne as possible twice a day from day one.
- The sand on the floor of the pen must be removed and replaced on a weekly basis.
- As in the case of the white rhino, deworming of black rhinos is not practised by the Natal Parks Board.

### Off-loading

- The floor of the pen is covered with a thick layer of fine river sand and the water trough is cleaned and emptied before the rhino is off-loaded.
- At off-loading, the black rhino is usually very aggressive. For this reason, fresh browse is cut and hung from the poles all around the pen (thickly stacked) before the animal comes in. This serves to simulate the animal's natural environment.
- Personnel and movement in the vicinity of the boma should be limited to a minimum at off-loading.
- When the animal is off-loaded it is usually very aggressive and runs around the pen a few times before calming down. The animal usually starts chewing on the browse within a few minutes after off-loading.

### Crate training

The animal must be crate-trained, as in the case of the white rhino. To achieve this, the lucerne is used to lure the rhino into the crate. The lucerne is moved closer and closer to the entrance of the crate every day, until eventually the animal is eating inside the crate.

### Feeding

The diet of captive black rhinos must, at least initially, consist of a high proportion of the natural feed. Examples of suitable browse species include *Spirostachys africana* (tambotic), *Ziziphus mucronata* (buffalo thorn), *Acacia* spp., *Grewia* spp., and *Rhus* spp. Do not feed *Dichrostachys* spp.: although palatable, the robust thorns may penetrate the sole of the rhino's foot.

The browse must always be fresh, as wilted browse can cause prussic acid poisoning. Browse is fed twice daily, and the old, wilted browse is taken out on each occasion.

The browse is put onto the ground – there is no concrete slab, as the animal may injure itself on the slab after off-loading.

After 3–4 days, when the animal has settled down and is eating well, lucerne hay of the best available quality should be added to the diet. This is done by spreading a little lucerne over the browse each time it is put in, in the hope that the lucerne will be taken in together with the browse. The lucerne must be thoroughly inspected for mould and other contamination before feeding. Good rodent control is essential.

Some rhinos take to lucerne immediately, while others may take up to 2–3 weeks before they take it well. An adult rhino should eat 15–20 kg of lucerne per day. Once the lucerne is being taken well it can be fed in a heap on the ground next to the browse.

Horse cubes should be provided on top of the lucerne once the animal is eating well. Start gradually and build up to 2.5 kg twice daily in the case of an adult.

The browse is never taken away completely, although it may be reduced gradually as the lucerne intake increases.

In the author's experience, it has never happened that a captive black rhino refuses to eat. Also, we have never had a problem with constipation, probably because the animal starts eating immediately. The age of the animal does not seem to influence its adaptability.

## Long-acting tranquilizers

Perphenazine (Trilafon®) and Zuclopenthixol (Clopixol-acuphase®) have been used by other operators on black rhino with apparently favourable results (see Table 1). Long-acting tranquilizers are not normally necessary as these animals settle down very quickly without the use of drugs.

Table 1. Preliminary dosage rates of long-acting tranquilizers for use in the black rhinoceros (M.D. Kock, pers. comm.).

Drug	Zuclopenthixol (Clopixol-acuphase)	Perphenazine (Trilafon)
Adult	0.24-0.41 mg/kg 300-600 mg total dose	0.2-0.6 mg/kg 300-500 mg total dose
Sub-adult	0.67-1 mg/kg 250-300 mg total dose	0.6-0.8 mg/kg 200-300 mg total dose
Juvenile	0.67-1 mg/kg 200-250 mg total dose	0.5-0.8 mg/kg 100-200 mg total dose

## Clinical problems

### Wounds

In addition to traumatic wounds as seen in white rhinos (see *Care of the White Rhinoceros in Captivity*, this Section), black rhinos have unusual lesions normally just behind the front limbs on either side of the thorax. These may also occur on the chest, neck, and the top of the forelegs. The lesions are caused by the filarial nematode, *Stephanofilaria dinnicki*, and are typically open, superficial sores that exude copious amounts of blood and serum. The nematode is transmitted from one animal to another by an unknown biting fly.

The distribution of these lesions is age related, and their severity seems to be aggravated when the animal is under stress, probably due to secondary bacterial infection. The lesions are also aggravated by oxpeckers and biting flies. The irritation induced by the lesions causes the animal to rub against objects, thus aggravating the situation even further.

In captive animals these lesions can be kept under control by:

- Maintaining a high plane of nutrition;
- Weekly spraying with a fly repellent, e.g., Bayticol®; and
- Twice-daily spraying with a 1:500 acriflavine solution. Deeper, ulcerated lesions may also initially be treated with hydrogen peroxide, iodine, and acriflavine glycerine 1:1,000, followed eventually by acriflavine solution 1:500 (see *Care of the White Rhinoceros in Captivity*, this Section).

The lesions sometimes become infested with maggots, but this can easily be remedied using a suitable insecticidal spray (e.g., Dazzel®). Theoretically an ivermectin preparation (e.g., Ivomec®) could be used to kill the filarial nematodes. However, because of the deaths experienced with horses and black rhinos in Kenya, we do not think it is worth taking the risk. Note: when black rhinos are moved away from the eastern areas of southern Africa (Zululand and the Kruger National Park) to other areas, the lesions disappear completely. This is probably because the vector is not present in these areas.

## Constipation and diarrhoea

Constipation is not a problem commonly encountered in captive black rhinos, probably because they eat so readily from the start. Diarrhoea is seen on very rare occasions, and then it usually only lasts for a day or two. It is usually seen within two days of capture. Kaolin can be put in the water but, because of its poor solubility, its efficacy is questionable. An electrolyte/glucose supplement can be added to the water (as in white rhinos – see *Care of the White Rhinoceros in Captivity*, this Section). *Salmonella typhimurium* fortunately has not been a problem in black rhinos in our pens.

## Pneumonia

Pneumonia is very seldom seen in captive black rhinos, and then only in debilitated (e.g., snared) animals. The symptoms and treatment are as for white rhinos.

## Fly and tick worry

The treatment is the same as for white rhinos (see *Care of the White Rhinoceros in Captivity*, this Section).

## Pigmented urine

Five black rhinos were transported to a farm approximately 80 km west of Pretoria in June 1991. There they were fed *Spirostachys*, *Grewia*, lucerne, and horse cubes: exactly the same diet to which they were accustomed in the bomas at Umfolozi Game Reserve. However, two days after arrival it was observed that the urine of these rhinos was turning a dark red colour shortly after urination. The urine was initially the normal white/cream colour, but it gradually turned red, eventually looking like pure blood.

Blood, urine, and browse samples were taken for analysis. Haematology was normal and no pathogenic parasites were found in blood smears. Liver and kidney function were found to be normal. However, spectrophotometry showed that the *Grewia* bark and the rhino urine contained at least one spectrophotometrically identical component. Liquid chromatography suggested that there were some elements present in the rhino urine that also occurred in the *Grewia* and *Spirostachys*. These elements bore a strong resemblance to rutosid, a chemical that also apparently occurs in the bark of *Japonica sp.* and the leaves of *Eucalyptus sp.*

The rhinos never showed any sign of malaise. They were released into their new environment, and were reported to be doing well. An interesting fact to note here is that five black rhinos from the Umfolozi bomas had been sent to the same farm in February 1991. These animals were fed exactly the same diet as those that arrived four months later. These animals did not develop this syndrome at all. In May 1992, a black rhino cow and her six month old calf were transported to the same farm. Again, the animals were from the Umfolozi bomas, and were fed the same diet as the June 1991 animals. Two days after arrival the cow developed the dark red urine, but also showed no signs of malaise. It therefore seems that there is a seasonality to the occurrence of this phenomenon. It appears that the pigment is present in both *Grewia* and *Spirostachys spp.*, but only at certain times of the year. It is also apparent that the pigment does not adversely affect the animals in any way. Although not a common problem as yet, this syndrome may become more prevalent as the frequency of translocation of black rhinos increases.

**Colic, abscesses, eye infections, foot infections**

See *Care of the White Rhinoceros in Captivity* (this Section).

**Do not**

- Do not put animals, other than cow and calf, together in the same enclosure. Even in the case of a cow and a calf, the individuals must be separated initially until they have calmed down.

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## Hand-raising of orphaned rhinoceros calves

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### 1 Introduction

Both the black and the white rhinoceros are extremely valuable animals, and it is essential that there should be some information available on how to raise calves that have been separated from their mothers. In the case of the black rhino, being an animal that is threatened with extinction, this information becomes even more critical. There is very little published data on the raising of rhino calves, and that which is available is sketchy and difficult to obtain. While there is still insufficient information available to make firm recommendations and predict results, it is essential that there be some review of current knowledge on this subject. Given the limitations already mentioned, I have summarized the important points into a set of general guidelines based on what information I could obtain and on personal experience in assisting with the raising five white rhino orphans. This is followed by two recent case studies that highlight some of the problems that may be associated with the difficult but rewarding task of raising rhino calves.

#### Rhino calves...

- Do not drink water, even if it is freely available. (It should, nevertheless, be available.) This seems to be the case while the calf is being fed milk at 10–15% of its body mass. As soon as it starts taking significant amounts of solids and the milk to body mass ratio declines, it will start taking water.

- Become stressed if they are continually exposed to strange faces.
- Do not require manual stimulation in order to urinate and defaecate.
- Become attached to their foster mothers, and adapt with great difficulty to changes in the person caring for them.
- Are unable to control their body temperature for the first six weeks of life. Rectal temperature may vary from 29.4°C (!) to 39.7°C. Body temperature appears to become more constant between six and fourteen weeks, and thereafter stabilizes at approximately 37.5°C (Trendler, pers. comm.).
- Obtain colostrum from their dams. However, there may also be transfer of antibodies before birth: there has been at least one case of a calf being raised successfully without having received colostrum or colostrum substitutes<sup>1</sup>.
- Must be exercised regularly from an early age.
- Tend to 'flop down' and sleep after each feed.
- May occasionally develop a serous nasal discharge (runny nose), but this usually passes uneventfully.
- Have a respiratory rate of 16 to 30 breaths/minute. This increases with fever or pain, and decreases as the calf gets older.
- Become dehydrated and hypoglycaemic very quickly when they are young. Calves in this state must be warmed and given an intravenous infusion containing 5% dextrose (or Lectade<sup>®</sup> *per os* if they can still suckle).
- Are born without any teeth. Reports on tooth eruption are varied: 3 weeks (black rhino), 56 days (black rhino), 70 days (white rhino). The eruption of the teeth is usually accompanied by a rise in temperature, sore or itchy gums, and possibly even a loss of appetite and diarrhoea.
- Should be weaned at 18 months of age. They can be weaned as early as 12 months, but it is preferable to wean them later.
- Thrive on the company of other animals and humans.
- Take a variable time to start eating solids: two months (black rhino), four months (white rhino), seven months (white rhino).
- That are orphaned at five months are already eating solids well, although they still need milk. Calves that are orphaned at a young age may only take solids after 6–7 months.

### 2 Milk substitutes

- Rhino milk is unusual in that it contains very little fat and a high proportion of lactose (see Table 1).
- Many preparations have been used as a base for a milk substitute for rhino calves: Denkavit<sup>®</sup> calf milk replacer (Flamand, pers. comm.), Elite<sup>®</sup> skimmed milk powder followed by Surromel<sup>®</sup> (Bengis, Espie, Keet, pers. comm.), Lactogen<sup>®</sup>, Melk-Vita<sup>®</sup> calf milk replacer (author), fresh skimmed milk, Nestle Rhino Milk<sup>®</sup> (Trendler, pers. comm.).
- These standard milk formulas should be modified to resemble rhino milk as closely as possible, especially with respect to fat and lactose. Melk-Vita<sup>®</sup>, Surromel<sup>®</sup>, Denkavit<sup>®</sup>, and Elite<sup>®</sup> formulas should be prepared according to the instructions and then substituted with 40 g of glucose per litre. Even though the fat content of the calf milk replacers is reasonably high, they appear to be well tolerated. A substitute based on Lactogen<sup>®</sup> has been described by Sheldrick<sup>2</sup>.