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Reintroduction of a captive born white rhinoceros (*Ceratotherium simum simum*) to the Etosha National Park. Part II: Behaviour in the boma, procedures before and locomotion during the first ten weeks after release and observations from June until November 1997

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With 6 figures

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Introduction

In September 1996, a young adult male white rhino, born in the Serengeti Safaripark of Hodenhagen/Germany, was transfered to Etosha National Park as a part of a reintroduction project for this species there. Pretransfer procedures, transfer, behaviour and physiology of the specimen during the first 6 weeks of stay in the boma for adaption have been described earlier in this journal (Böer et al. 1997). This article reports on the most important events until the end of the adaption period and the early stages of the release phase.

Material and methods

Management and behavioural monitoring in the boma

Feeding regimen and water supply for the rhino in the boma up to the point of release are described earlier (Böer et al. 1997). Some of the rhino's basic behavioural patterns of daily activity, solitary behaviour and patterns due to metabolism were monitored and evaluated quantitatively.

Pre-release management

For telemetric implantation and radiotransmitter collaring the rhino had to be immobilized shortly before release. After one day of starving early in the morning and long before the onset of tropical midday heat it was darted with etorphin as de-

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Fig. 1. Cool water is splashed on the immobilized rhino during procedures and recumbancy. Photo: D. HEINRICH

scribed previously (BÖER et al. 1997). To reduce exaggerated locomotion due to etorphin it was tightened with ropes on the hind legs and held by 3–4 persons before falling aside. During immobilization respiration was stabilized with Dopram and cool water was splashed over the body surface in order to increase evaporation by high body temperature (Fig. 1). A telonics-radiocollar, modified for rhino, was installed around the neck. A 9 mm wide and about 7 cm deep hole was drilled into the backside of the front horn 3 cm above the vascularized horn basis. A lotec-GPS (global positioning system) 1 000 telemetric implant was put in the hole and the opening closed with epoxy finally.

With injection of diprenorphin iv the rhino recovered immediately within minutes from immobilization and began to drink and to feed the same day. Next morning, March 9, 1997, the boma was opened for release.

Monitoring of the rhino's locomotion after release

„*Kai's*" wanderings and his localizations were checked daily during the first two weeks after release either from the ground by car and by hiking through the terrain or from the air by plane. After that time he was localized only by, plane regularly twice or three times per week.

Results

Behaviour

Monitoring in the boma was carried out from October 1996 till March 1997 during a total of 712 hrs. Average observation time/day approximated 610 min. Data

obtained indicate two types of behaviour in the boma: Patterns were split into non-active (standing still, lying) and active (horn rubbing, grazing, drinking, feeding, moving) behaviour in the dry and the rainy season (Fig. 2).

A slow and constant divergence of the two behavioural categories was established by increased activities at nights. Particularly then high rates of locomotion were observed. Increasing activity was especially seen at the start of the rainy season, during days of lower temperature, higher humidity and heavy rainfall. Long lying phases for several hours during the day were seen after transfer but lessened considerably over the next six weeks of observation. Deviation of data trends in the 4. week cannot be explained, though its potential cause is described and discussed previously (BÖER et al. 1997) and later in this issue.

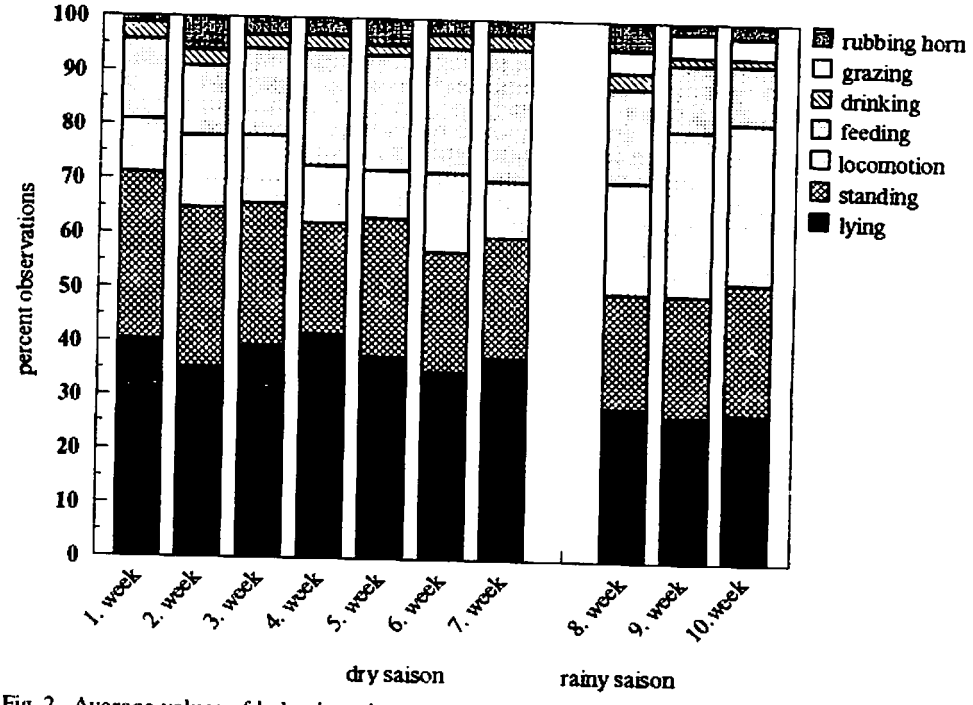

Fig. 2. Average values of behavioural patterns of the rhino during dry and rainy season

Patterns of behaviour

Patterns were evaluated separately on a weekly basis and differed among each other with regard to frequency during the observations, especially between the dry and the rainy season (Fig. 3).

Grazing in the boma in addition to consuming food could only be observed during the rainy season when ground vegetation in the enclosure grew rapidly. Observations for patterns like wallowing or soil/dust bathing were missed after the first ten days in the boma (see also Part 1 of the project). Behavioural differences between both seasons were conspiciously observed for categories lying, feeding, and locomo-

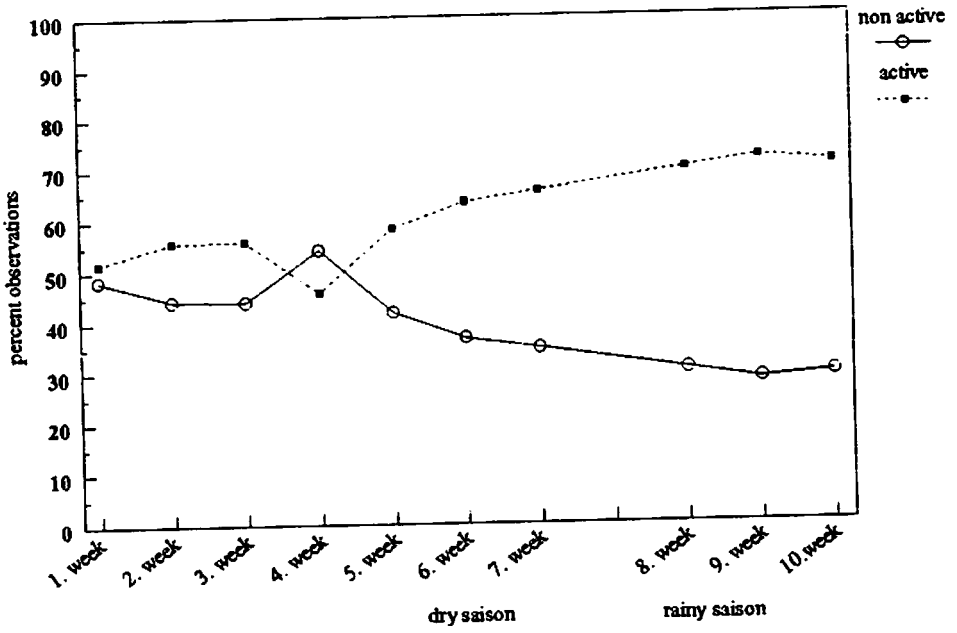

Fig. 3. Weekly average values for active and non active phases of rhino in the boma

tion. Average lying time decreased by approximately 10 % in the rainy season. Contrary to this duration of locomotion increased by 15 % in the rainy season. This trend was synchronized with falling temperatures especially during days with heavy thunderstorms.

Release phase

The rhino was released during the morning hours of March 9, 1997. The unusual large amount of people round the boma and the new situation with a few meters of open fence obviously made the rhino nervous. When alfalfa was spread across the fence opening into the outside area as a trail the rhino slowly left the boma after about one hour (Fig. 4).

Obviously a short period of time of finding his bearing followed when he finally headed straight toward the open plains of the grasland west of the boma. Rangers tried to follow the rhino on terrain and by plane. The GPS system proved to be suitable for localizing the animal in a few minutes. After a few hours "*Kai's*" speed of locomotion became too fast to be persuited by hiking through the rugged and thorny terrain. For the next three days he was followed by car but thereafter he moved into the flooded south of the National Park area where he only could be localized by plane then.

Movements in Etosha National Park from March 9 to March 25, 1997

During the first week the rhino moved southwards into the wet part of Etosha covering distances of 3–12 km per day. Then the rhino changed its main direction

Fig. 4. "*Kai*" slowly leaves the boma about one hour after it had been opened.
Photo: S. SCHUBERT

and moved northwards. On March 19, it was located near Twee Palms, about 12 km west of Fort Namutoni, after having travelled over a distance of 100 km (Fig. 5).

The second week after release "*Kai*" headed towards the northeastern part of the fenced reserve and was seen there several times. In the southern part of Etosha vegetation consists mainly of Mopane (*Colospermum mopane*) and Competrum forest (*Competrum* spec.) in addition with a mixed "bushveld" (*Acacia* spec., *Croton* spec., *Dichrostachys cinerea*) and is a prefered habitat for *Diceros bicornis*, whereas the northern part consists of wide open grasland plains and "sandvelds" with wide and flat dune formations and lots of different gras species. This area was presumed to be the favourable location for the white rhinos already translocated, adapted and released one year before this project started.

Movements in Etosha National Park from March 30 to May 25, 1997

A trend for territorial settlement in the northeastem part of Etosha is shown in Fig. 6. The rhino's movements were confirmed to this region. Many tracks were found there and the amount of dung left by him in this area suggests that he has already been staying there for quite a longer period of time. Given enough waterholes and gras in an optimum height for white rhinos, "*Kai*" roamed in this part of the park throughout the entire period. Furthermore his movements indicated his ability to find and remember localizations of permanent waterholes.

On April 17, 1997 the rhino was spotted, his condition was excellent. He had lost the collar, which was found two days later at the edge of the Etosha pan. The GPS 1 000 implant broke at the end of May. Afterwards data collection of the rhino's movements could only roughly be accomplished by ground patrol and the APU (anti poaching unit).

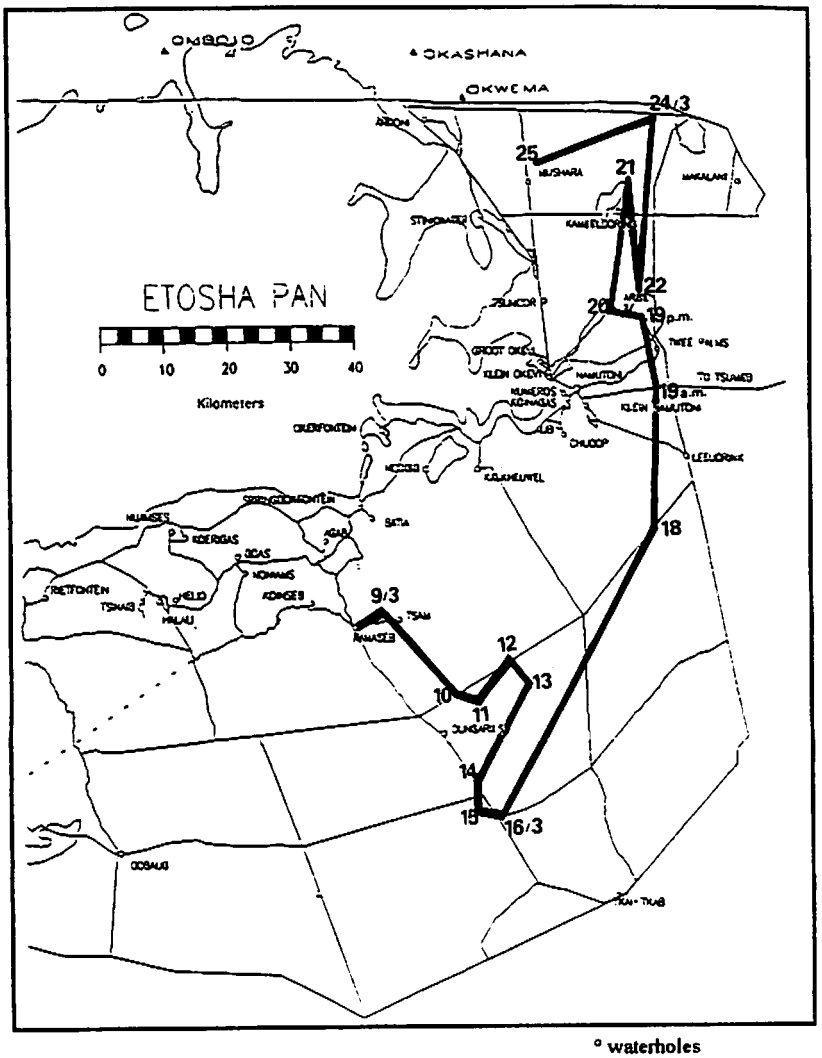

Fig. 5. Movement of the reintroduced rhino in Etosha National Park from March 9 till March 25, 1997

Behaviour towards humans

Approach by humans up till the end of the dry season was only possible for the rangers during feeding the rhino. Approaching attempts failed completely in the rainy season when "*Kai's*" increasing aggression led to attacks. The food then was thrown over the fence.

Until the end of March 1997 calling the rhino by its name provoke its standing motionless and turning ears and head towards the voice, sometimes the rhino approached the caller and sniffed intensively. By the end of May, more than two months

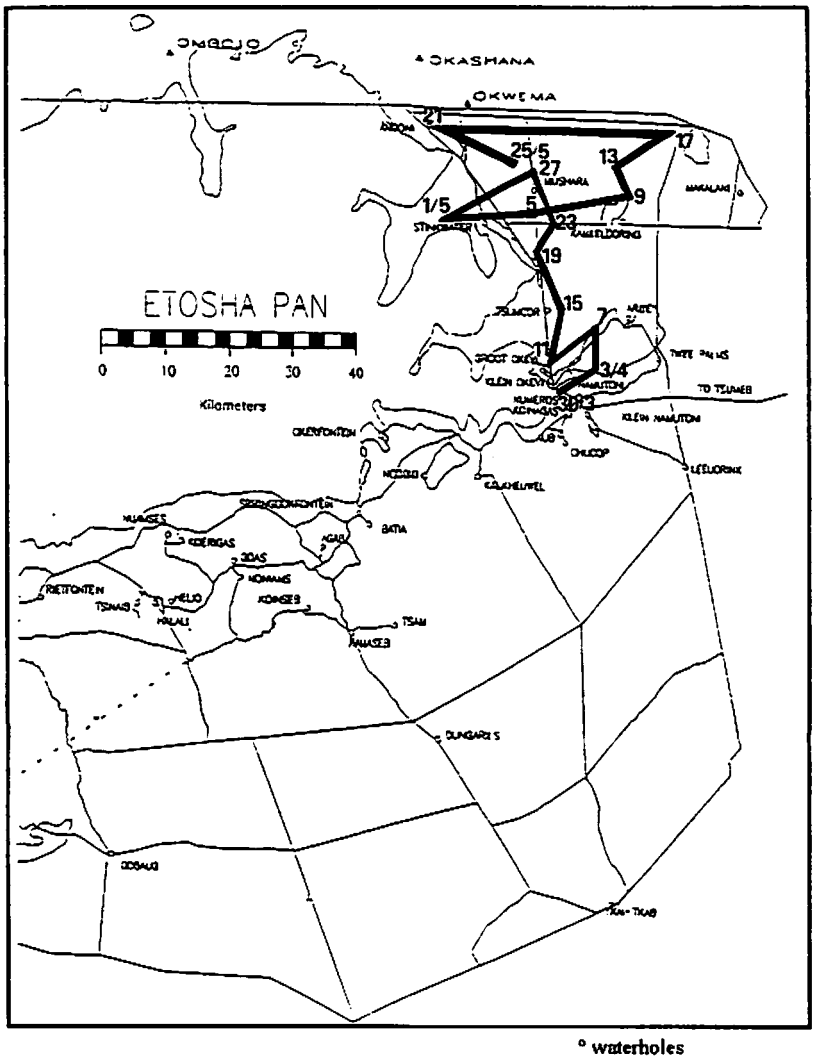

Fig. 6. Movements of the reintroduced rhino in Etosha National Park from March 30 till May 25, 1997

after release, calling the rhino did not lead to reaction and approaching had become impossible now. The rhino's flight distance had become noticably greater.

Sporadic observations of the rhino between June and November 1997

Although regular monitoring had become impossible due to loss of both telemetric transmitters, "*Kai*" was seen once or twice a month by the Namutoni rangers or the APU during the next half year. He was always localized in the area between the

three waterholes Mushara, Kameldoring and Aroe, which he used for drinking according to his tracks found regularly at these places. He was always in optimal condition. The tracks investigated gave no hints on critical meetings with elephants or large predators. His tracks were also found on the "spoors" of an adult female and a 2–3 years old juvenile, which had settled in this area earlier after their transfer from Kruger National Park to Etosha.

Discussion

Behavioural changes as well as other physiological processes during the adaption period in the boma can be a result of a species' specific ability to react in a broad positive way toward climatic change shortly before the onset of the rainy season in northern Namibia. The sudden decrease of activity in the fourth week of stay in the boma may have been caused by suffering from deep skin scratches due to acacia thorns. Either inborn or acquired, the broad trend to increased locomotive activity in the boma and in the beginning of release may have inabled the rhino to find an area most suitable for a grazing megaherbivore in the northeastern part of Etosha within 12 days after travelling over more than 100 km. This area was predicted to be the prefered area for released white rhino. Olfactoric orientation for a potential breeding partner may also have attracked „*Kai*" to this area. The region between the three waterholes mentioned above covers an area of about 40 square kilometers and since the rhino's wanderings focus on this area during the last six months, „*Kai*" may have adopted these grounds as territory, which provides permanent water supply and large diversity of gras species during the rainy season, biomass sufficient for a grazing hind gut fermenter all year round and the vicinity of potential breeding partner conspecifics. Changes in behaviour toward humans indicated a trend toward increasing feralization after release. The data collected from this case study so far are promising with regard to future reintroduction of ex situ captive bred white rhinos as well as other rhino species to communal or private in situ nature reserves.

Summary

After an intercontinental long distance transfer and an adaption period of about six months, an ex situ captive born white rhino which had been grown up in middle European climate for five years, was released into an area of the natural former range of this species abundaned a century ago in tropical northern Namibia. The rhino was able to find optimal habitat with regard to digestable biomass, water resources, landscape and further reproduction within 12 days after travelling over a distance of more than 100 km. The rhino settled down in the northeastern part of Etosha National Park. The results describe one possible way of performing such transactions and enhance future chances of successful reintroduction of ex situ born rhinos.

Zusammenfassung

Nach einem interkontinentalen Langstreckenflug und einer Anpassungsphase von ca. 6 Monaten wurde ein ex situ geborenes und über fünf Jahre in mitteleuropäischem Klima herangewachsenes Breitmaulnashorn in einem Gebiet des ehemaligen natürlichen Verbreitungs-

raumes seiner Art im tropischen Norden Namibias freigelassen. Das Nashorn fand nach einer mehr als 100 km langen Wanderung innerhalb von 12 Tagen einen hinsichtlich Nahrung, Wasserressourcen, Landschaft und Reproduktionsmöglichkeiten optimalen Biotop und verhält sich seit Mai 1997 dort im nordöstlichen Teil des Etosha Nationalparks ortstreu. Die Ergebnisse zeigen einen möglichen praktikablen Weg der Wiederansiedlung zoogeborener Nashörner und erhöhen die Erfolgsaussichten möglicher zukünftiger Transaktionen von Individuen dieser immer noch sehr seltenen und aus vielen Gebieten Afrikas verschwundenen Großwildart.

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