

owing to the mean retention time of ingesta. Additionally, fecal samples of five males were collected over a period of one year. The samples were analyzed for dry matter, crude protein, crude fibre, nitrogen free extraction (Weender) and the cell wall constituents by Van Soest (ADF, ADL, NDF).

The mature grass in South Africa was higher in fibre and lower in protein content than the hay and grass feed in the zoo. The digestibility of nitrogen free extraction, crude fibre, organic matter and dry matter of the samples from South Africa was higher than expected, as in general a high fibre content is known to reduce digestibility. No differences were found in the quality of food and feces between territorial males during the rainy season. The fecal samples collected over the year showed a peak in the concentration of crude protein and cell constituents after seasonal rains.

Population Growth, Sex Ratio and Reproduction of a Natural Living Population of White Rhinoceros

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White rhinos are being intensively managed both in captivity and in their natural habitat, but only a few data are available about the demography of this species. Informations about how the populations are regulated or patterns of their dynamics are however necessary in order to base management practices on ecosystem principles. In this study the demography of a natural living population of white rhinos was studied and the influence of management practices on the growth of the population has been analyzed. The study was carried out on a game farm in South Africa which housed a well growing population of white rhinoceros since 1991. All animals were individually known and their age was established by comparative horn and body analysis. The date of birth was determined by observations with a ± 1 month accuracy. Occasionally hunting of adult males and translocation of subadult males took place for management reasons.

The annual growth rate over the last 10 years was 15%. The high rate of increase is believed to be a consequence of the low population density (0.23 animals/qkm). The white rhinos reproduced seasonally with an increase in birth rates between December and June and a peak in March. The median interval between successive birth was 2 years and 3 months, however the length of the interval varied in dependence on the sex of the previous calf. Hunting of males has disarranged the adult sex ratio (15% males: 85% females), which is believed to have caused a skewed proportion of juveniles. More than twice as many males than females were borne during the last years. The high proportion of receptive females per male could possibly explain the shortened courtship period which was observed during the study. Whether the change in mating behavior has had an influence on the reproduction rate has still to be analyzed.

An Overview of Diseases of Black Rhinoceroses in North America 1980 - 2000

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This report summarizes a number of diseases of unusual nature and uncertain etiology that have affected captive black rhinoceroses (*Diceros bicornis michaeli* and *D. b. minor*) in North America. Included are hemolytic anemia, fungal pneumonia, leukoencephalomalacia, several skin disorders including superficial necrolytic dermatopathy, idiopathic hemorrhagic vasculopathy, and hemosiderosis. The diseases have played a significant role in limiting the growth of that population. Hemolytic anemia is one example, in the past, it accounted for 40% of all adult deaths of captive black rhinoceroses (although its current incidence appears to be reduced). In contrast, a syndrome of mucocutaneous ulcers has had an even higher morbidity, but fortunately, a lower mortality.

Other conditions of note in captive black rhinoceroses also include an apparently high level of severe dental disease due to the presence of significant accumulations of dental tartar. In several black rhinoceroses ill from other causes, significant hypophosphatemia have developed. Liver failure from suspected creosote toxicosis has also been reported in both captive and recently imported black rhinoceroses. Several diseases, that are more commonly seen in domestic animals, such as tuberculosis, have also been reported.

In contrast to the black rhinoceros, the diseases of white rhinoceroses (*Ceratotherium simum simum*) in North America are of a more routine nature and apparently lower incidence. Efforts have been made to identify „common denominators“ that may cause increased susceptibility of black rhinoceroses to some or all of these syndromes. A holistic approach is necessary as unusual patterns of cellular metabolism, hemosiderosis associated with time in captivity, various aspects of nutrition, and other factors are being evaluated to determine their relationship with these diseases. Additionally, a PhD candidate in veterinary epidemiology is surveying the health, nutrition and management of the North American population in attempt to identify further correlates with these syndromes.

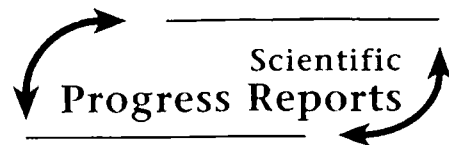
Microsatellite Analysis of African Black Rhinoceros (*Diceros bicornis*) to Determine Genetic Diversity and Population Structure

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The application of DNA markers coupled with the advent of the polymerase chain reaction has revolutionised the fields of evolutionary biology, population genetics and conservation biology. Molecular markers allow questions in biology to be addressed that could not be



Harald M. Schwammer
Thomas J. Foose
Michael Fouraker
Deborah Olson



Recent Research on Elephants and Rhinos

Abstracts of the
International Elephant
and Rhino Research Symposium,
Vienna, June 7-11, 2001