Semen Collection, Sperm Assessment and Cryo-Preservation in African Rhinoceroses

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The captive white rhinoceros population currently faces a demographic crisis. As a consequence substantial knowledge on reproductive biology of the female white rhinoceros has been gathered over the past years. However, little emphasis has been put on the evaluation of male fertility as a possible contributing factor to the low rate of reproduction. In the present study the reproductive fitness of ten male white and one black rhinoceros was evaluated by ultrasonography and semen assessment. Semen collection was obtained by manual stimulation (n=2) and electro-stimulation (n=9). Based on 39 semen assessment results seven males were identified as reliable semen donors. Preserved semen samples remained viable for up to four days. Cryopreserved samples showed post thaw motility suitable for assisted reproduction. Reproductive assessment provided accurate information on the breeding potential of male white rhinoceros with an implication on management decisions.

AFLP as an Economical Method to Correct Field Observations for Genetic Wildlife Management in Rhinoceros

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Introduction

Due to habitat loss and poaching the numbers of rhinoceros declined severely over the last decades. Intensive protection measures and the translocation of animals to reserves and private game farms managed to stop this decline in the African rhinoceros and led especially in the white rhinoceros even to increasing numbers (Emslie & Brooks 1999). But saving them from habitat loss and poaching is not enough. On a long term basis a specific breeding program has to be applied as well. This would also include shifting of animals between different locations (Mace & Lande 1991), as small and isolated populations can rapidly lose genetic variability and with it their capacity for genetic adaptation (Schreiber et al. 1995; Parker & White 1997). They become more vulnerable to changes in their environment (Foose 1991) and the fertility and viability of these animals can be reduced (Baur et al. 1995). To set up such a breeding management, prior information about the genetic population structure is required for translocations to prevent inbreeding (Moehlmann 1996).

Lacking DNA sequence information in the rhinoceros for a molecular genetic approach, a suitable PCR method had to be found to generate genetic markers from the uncharacterised genome. Therefore the sequence independent DNA fingerprinting method termed "Amplified Fragment Length Polymorphism (AFLP)" was established for the rhinoceros to determine paternity and genetic variability for four different species of rhinoceros: the great Indian one-horned rhinoceros (*Rhinoceros unicornis*), the black rhinoceros (*Diceros bicornis michaeli*), the northern white rhinoceros (*Ceratoterium simum cottoni*) and the southern white rhinoceros (*Ceratotherium simum simum*).

The degree of inbreeding is mainly determined by the number of reproducing males in one area (Parker & Waite 1997). Within a separate study on the breeding patterns of white rhinoceros on a game farm in South Africa, genetic analyses was used to determine the proportion of reproducing males within this population and to increase the database on secured parentage.

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