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Investigating the spatial and temporal behavior of a translocated black rhino (*Diceros bicornis*) starter group on a private game farm in Namibia using camera traps and VHF radio telemetry

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The black rhino (*Diceros bicornis*) is the more endangered African rhino species and acts as a distinguished example of a flagship species. As a result of extensive poaching, the numbers of black rhinos declined drastically. In order to protect and stabilize the remaining populations, animals from areas with redundant numbers of black rhinos (e. g. Etosha National Park in Namibia) are transferred into other fenced-in and protected areas with small or no rhino populations. Due to the fact that translocations are very important and cost-intensive procedures, careful post-release monitoring and management is of the utmost importance. Monitoring programs are, for example, essential tools for evaluating the suitability and sustainability of the chosen habitat concerning the area's size and the availability of resources and shelter. Furthermore, ongoing monitoring and systematic post-release studies are needed to generate information about social structures, including possible intra-specific aggression, and the reproductive performance of starter populations. A promising and appealing possibility to observe and monitor rhinos after their translocation is the use of camera traps and VHF telemetry. Each of these non-invasive approaches has proven to be a reliable method of observation in the field.

Aim of this study is to combine and compare VHF radio telemetry and camera traps in order to document the behavior and physiology of a re-introduced black rhino founder group in a fenced-in area in Namibia. One important aspect was the question, whether the camera traps are continuously and sufficiently providing data, once the radio transmitters fail due to the limited battery lifespan.

During the study period of four months we collected approximately 5,500 pictures of black rhinos at the seven waterholes distributed across the farm. Camera trap pictures enable us to successfully identify all of the four translocated rhinos and to evaluate social structures, aspects of temporal and spatial behavior, health status and ultimately the time-being success of this specific translocation procedure. The combination of the two methods allows data collection throughout the day and night hours and is providing reciprocally supporting data. By means of this investigation, we can help to make predictions about management strategies and prospective translocations of other black rhino populations and hope to give suggestions for physical planning in the future.

Figure 1: Signs of malnutrition: This rhino seems to be in a poor health condition. After this picture was taken, we used radio telemetry to achieve direct observations for a further evaluating of this animal's condition.

Figure 2: A rare social interaction: All four rhinos re-introduced to the area were gathering at the same waterhole during one night.