

## Genetic Kinship and Social Structure in White Rhinos at the Zoological Center Tel Aviv -Ramat Gan Israel

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Since 1974 the Zoological Center Tel Aviv- Ramat Gan has kept a large herd of 11-15 white rhinos in a free ranging multi-male situation. The total number of adult males ranged between 4-6. Over the years 14 rhinos were born, the most recent in 1996. A drop in fertility, including first generation animals led us to investigate whether genetic and behavioral components contribute to the problem. Since multiple male matings occur, paternity can only be determined genetically. During 1998-1999 hair samples were taken from all 11 living rhinos at the Safari. The method of DNA analysis was random amplified polymorphic DNA (RAPD).

Paternity was identified in 5/7 offspring present. Three young were fathered by one male, and one each was fathered by two other males. The identities of fathers of two other calves is unknown, and could have been males that have died or are no longer in the Safari. Behavioral observations on social preferences and copulatory behavior were made over the 2.5 year time period. Stable social preferences were found among the females, not necessarily related to matriline. The same male who fathered the most young is solitary while the other males form loose groups. Further observations showed that both males and females could interfere during copulations.

The results have led us to continue behavioral studies, and following fertility evaluation, planned for May 2001, we will reconsider our management system.

## Demographics of Sumatran Rhinoceros (*Dicerorhinus sumatrensis harrissoni*) in Sabah, Malaysia : Correlation to food distribution in Tabin Wildlife Reserve

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The Sumatran rhinoceros (*Dicerorhinus sumatrensis*) is the most primitive and smallest species in *Rhinocerotidae* family (Groves, 1967). This animal is included in one of the 12 most endangered species in the world according to the 'International Union for Conservation of Nature and Natural Resources' (IUCN) data. Sumatran rhinoceros in Sabah are fully protected under the Wildlife Conservation Enactment 1997. The Borneon subspecies of Sumatran rhino can be found in several locations principally in the east of Sabah, Malaysia (Payne, J *et al.* 1985). Their distribution was focused around two

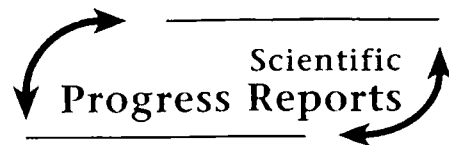
residencies which are the Residency of Sandakan and Residency of Tawau especially in the Kinabatangan district in Sandakan and Lahad Datu district in Tawau. Recent reports from the 'Asian Rhinoceros Specialist Group of SSC (Special Survival Committee)' from IUCN in 1989 believe that the population in Sabah may be as low as 30 individuals (Yasuma & Andau, 1999). This species is becoming extinct because of poaching activities for their valuable horn, believed to have medicinal value. Their future survival is also in jeopardy due to habitat loss and disturbance. This species may only be found currently in protected areas such as Tabin Wildlife Reserve. The 1998 Tabin scientific expedition reported that at least three individuals were found in their study area consisting of 8000 ha. of primary rainforest. Jomitin (1999) reported that one of their survey groups were face to face with Sumatran rhino, which very rare occurrence. Unfortunately, the animal fled prior to being photographed. According to the size, age of and foot print location, 3 individuals could be confirmed in their study area. Due to the elusive nature of this animal, the dense vegetation and relief of their habitat, most estimates of population size are based on the presence of footprint or dung samples and very rarely on actual animal sightings. Information on the demographics of these animals in the wild and home ranges of individuals is therefore very limited. Using new tools such as camera traps, GPS systems, vegetation evaluation, genetic analysis and GIS mapping, we hope to acquire additional information to help determine the composition of the remaining wild population of rhino in Sabah. Hence, in the future we hope to predict the carrying capacity of the various habitats for Sumatran rhino based on food supply. The results from this survey will produce objective data used to assess the status of these animals and make well-planned future wildlife management decisions to assure their survival into the next millennium.

## An Overview of Pathological Alterations of Hooves and Soles of Captive Indian Rhinos (*Rhinoceros unicornis*) and a Comparison of Anatomical Foot Structures of Captive and Wild Indian Rhinoceroses

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Captive Indian rhinos (*Rhinoceros unicornis*) suffer from numerous pathological alterations of their feet structures. Cracks between the pad and the central sole are a common finding. All breeding bulls (n=11) and more than half of the breeding females (n=8) of the investigated European population (13.19) suffered from these cracks with various degrees of severity. 69% (n=22) of all rhinos had abraded side horn walls and 41% (n=13) showed vertical and/or horizontal cracks in the horn wall with inflammatory processes along the coronary band. 16% (n=5) showed fistules and ulcers in the pad. All feet structures were examined histologically, using the feet (n=6) of deceased animals and horn samples collected from pads, soles, and horn walls during foot care procedures. The histological results as well as the macroscopical findings were compared with the feet of wild animals (n=10). The comparison of captive and wild feet revealed that wild Indian rhinos have long hooves, with the sole protruding the pad for several centimetres. The rim of the central sole adjacent

to the pad is elevated and all soles have a concave shape. The horn of the pad appears rough, hard, and free of pathological alterations. The feet of captive Indian rhinos have a very smooth pad surface with the horn layer being 1cm thick at the most. The soles of the three hooves have a flat and even surface; the hooves are short. The pad and the central sole adjoin at even level. The comparison of wild and captive animals show that wild rhinos are by nature 'sole-walkers', captive animals show abraded horn structures and turned to 'pad-walkers'. These abraded hoof structures are prone to acute or chronic impacts. It is suggested to reconsider some husbandry aspects to prevent the occurrence of foot problems in future generations of Indian rhinos.



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## **Recent Research on Elephants and Rhinos**

Abstracts of the  
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