AROUND THE HORN

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Regional Captive Propagation Programs

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The Hairy Rhino Within A Hair's Breadth Of Extinction

The Sumatran, a.k.a. hairy, rhino (*Dicerorhinus sumatrensis*) is probably the most endangered of all rhinoceros species. Fewer than 500 survive in the wild. Numbers have declined 50% over the last decade due to poachers and there is no indication that the situation is stabilizing. Although the Javan rhino is fewer in number (K), their main population in Java (~ 50-60) has been rather stable for the last ten years. The African black rhino has declined over 85% during the last decade but numbers of this species are still ~ 2,300 and have been stable at this level for the last two years. Moreover, there is a self-sustaining albeit not vigorously growing captive population. The IRF and the global captive conservation community are involved in both *in situ* and *ex situ* efforts for this species.

In Situ Efforts

For the last two years, the IUCN SSC Asian Rhino Specialist Group (AsRSG) has been facilitating development of a $ 2 million grant from the Global Environment Fund (G.E.F.) to initiate more vigorous programs for *in situ* protection of Sumatran rhino in Indonesian and Malaysia, the last two countries where appreciable populations of this species survive. The IRF has provided the Program Office for the AsRSG and therefore has also been centrally involved in facilitating development of this project. It is expected that this project will be initiated in late March 1995 and continue for three years.

The $ 2 million is no where near enough money to support this program for even three years but it can catalyze more support. The IRF will be centrally involved in attempting to secure other sources of support to supplement the GEF funds and sustain the program beyond the next three years. One effort, modest in amount of money but very significant in terms of impact, is supplemental support to enable a Rhino Conservation Coordinator to be available for the GEF Project in Malaysia. This support is being provided currently by a partnership of IRF and the St Louis Zoo with other partners expected to participate soon.

Ex Situ Efforts

Ex situ captive propagation had been considered an important component in the strategy for Sumatran rhino. However, since the inception of the ex situ programs in 1984, 39 rhino have been captured and 19 of these have died, a mortality of almost 50%. The most recent deaths have been the tragic losses of both of the Sumatran rhino at the San Diego Zoo in February 1995. Exacerbating the high mortality has been the lack of any reproduction in captivity. One female was born at the Malacca Zoo in 1987 but to a female that was captured pregnant although most of the gestation transpired in captivity. Another female had died at Port Lympne in the United Kingdom in November of 1994. Only 20 (7/13) Sumatran rhino survive in captivity at nine facilities in four countries.

The reasons for the high mortality and lack of reproduction are not known. However, there is significant and growing opinion that success of intensive (i.e. captive) management and managed breeding of Sumatran rhinos may require the rhino to be maintained in larger enclosures. Some Sumatran rhino ecologists in particular advocate that females and males be totally separated except when females are in estrus, a social system believed to prevail in the wild.

As a consequence of these misfortunes there have been recommendations for development of managed breeding centers in native habitat. Two major intiatives are under development to create such Sumatran rhino centers.

(1) The Department of Wildlife and National Parks in Malaysia has actually been moving in this direction for some time. They have established a breeding center at the edge of Sungai Dusun Wildlife Sanctuary. The diet of rhino there is largely natural browse collected from the adjacent forest. However, the enclosures are still relatively small (about 2 acres each); females cannot be widely separated from males; and the rhino have no opportunity to select browse from the forest themselves. This situation is being improved by enlarging the existing enclosures to about 25 acres and extending them into the forest.

(2) As recomended by the Indonesian Rhino Conservation Strategy and the 1993 Indonesian Sumatran Rhino Population and Habitat Viability Analysis, efforts are in progress to establish a managed breeding center (being referred to as a Sumatran Rhino Sanctuary or SRS) in native habitat in Way Kambas National Park

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Sumatran Rhino Nutrition

Based on even fewer field studies of native food composition (Dierenfeld et al., 1994; Lee et al., 1993, Van Strien, 1985), and extremely limited laboratory data, the same general feeding principles and recommendations (see Summary, above) appear to hold true for the "other" browsing rhinoceros species, the Sumatran (*Dicerorhinus sumatrensis*).

Ten browses consumed by Sumatran rhinos in Malaysia contained less cellulose (14 to 23% of DM), but even higher lignin levels (8 to 24%) than black rhino browses, suggesting that south-east Asian forages may be less digestible than African browses. Total cell wall (NDF) averaged 50%; ADF, 27%). Crude protein levels in Malaysian (n=10) and Indonesian (n=12) browses identical to ranges recorded in African forages (6-24%), with average available protein content about 9% of dry matter. No work has been conducted on soluble sugars, or lipid content of Sumatran rhino diets.

Sodium appears limiting in native browses, but can and is readily obtained through natural salt licks utilized by Sumatran rhinos. Phosphorus, particularly in relation to calcium content, also appears limiting in native rhino browses; overconsumption of high-Ca forages (including alfalfa) may precipitate metabolic imbalances of these nutrients. More work regarding mineral status of browsing rhinos is required.

Although much emphasis has been placed on vitamin E nutrition of black rhinos over the past decade, almost no data exist on this nutrient in Sumatran rhinos. Tissue (liver, heart, skeletal muscle, and adipose) concentrations have been measured in 3 animals; results suggest metabolic similaries with black rhinos in hepatic or adipose storage of this nutrient, but uniqueness in muscle tissue metabolism. In general, domestic horses do not appear to provide useful comparative indicators for tissue vitamin E status in any of the rhinoceros species.

After prolonged diet refinement to improve diet palatability and fecal consistency, feeding trials at Bronx and Cincinnati Zoos resulted in a daily diet comprising mixed hay (intake approximately 10 kg), 3.2 kg of a high-lignin browser pellet, and 3 to 4 temperate browses, to most closely duplicate natural forage composition for maintenance of adult Sumatrans. Nonetheless, diets appear not entirely adequate, and health problems which may be linked to nutrition continue to affect browsing rhino populations in zoos. Clearly immediate attention to identified research priorities for understanding nutritional biochemistry and physiology of these species is critical, before they are lost to us forever.

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Veterinary Medicine In North American Rhinoceros Programs

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Veterinary medicine has been an integral part of the management of captive rhinoceros populations. In North America, veterinary contributions have been formalized by the inclusion of Veterinary Advisors to each rhinoceros Species Survival Plan (see addendum below). For white rhinoceroses (*Ceratotherium simum*), reported diseases have not been remarkable or unusual, but for black (*Diceros bicornis*) and Sumatran (*Didermocerus sumatrensis*) rhinoceroses, veterinary medical problems have been a limiting factor in the maintenance of captive populations.

Descriptions of the general diseases of rhinoceroses are available from several sources.[1,3,5,11,12,13] Recently, two bibliographies for rhinoceroses have been published.[6,14] Several diseases of large animals, such as tuberculosis, can presumably affect all rhinoceros species (in rhinoceroses, infection with *Mycobacterium bovis* has been most frequently reported). Although the data are inadequate to make definitive testing recommendations, it is of interest to note that several infected animals have had positive reactions with intradermal PPD bovis in the eyelid. Any reactors should have mycobacterial cultures performed on tracheal and/or gastric lavage samples for confirmation.

Leptospiral infection has been indicated in some of the black rhinoceroses undergoing hemolysis,[2] and has also been identified in an aborted fetus from a greater Asian one-horned rhinoceros (*Rhinoceros unicornis*). In the black rhinoceros, vaccination with a leptospiral bacterin containing five serovars has been recommended (Leptoferm-5, Norden Lab. Inc., Lincoln, Nebraska, USA).[2] Excessive build-up of oral plaque has been noted in several captive black rhinoceros, and a thorough oral examination of all anesthetized rhinoceroses is warranted.

Black Rhinoceroses

Diseases of black rhinoceroses are characterized by several syndromes of unusual nature and uncertain etiology or pathogenesis. These include hemolytic anemia, mucocutaneous ulcerative disease, encephalomalacia, hemosiderosis and fungal pneumonia. Hemolytic anemia has been identified as the leading cause of death

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