

A VETERINARY RIDDLE

by R. Eric Miller, D.V.M.

The growth of the captive black rhinoceros population has been limited by several diseases, the causes of which have been poorly understood. To paraphrase Winston Churchill, veterinary considerations in this species sometimes seem to be a "a riddle wrapped in a mystery inside an enigma." Fortunately, a multitude of veterinary and medical research teams extending from the University of Missouri to the Mayo Clinic, from New York to Zimbabwe, are solving some of the riddles.

To study these diseases, a veritable "catalog" of research requests has been distributed to all zoos with rhinoceroses. Whenever a black rhinoceros is anesthetized, nearly one pint of blood (from an almost twenty-gallon supply) is collected and rushed to various research facilities. Samples are also solicited from other rhinoceros species to provide comparative data from species in which these diseases have not occurred.

Among the first diseases addressed has been hemolytic anemia, a blood disorder that has caused the deaths of 23 of 31 affected black rhinoceroses. The syndrome, in which the red blood cells are destroyed within the body, is usually acute and rapidly fatal.

While extensive research has evaluated common causes of hemolytic anemia in man and domestic animals, most appear to be unlikely causes for the rhinoceros' anemia. In some cases infection with the bacterium *Leptospirosis interrogans* was suspected; therefore a vaccination program against it was initiated.

Although apparently effective, research for a more definitive cause has continued.

Research led by Dr. Donald Paglia, a hematologist at the University of California, Los Angeles, may shed light on an underlying cause for hemolytic anemia among black rhinoceroses. When compared to other mammalian species, the blood cells of black rhinoceroses are energy deficient. This difference in metabolism may leave their cells less resistant to destruction (hemolysis) triggered by a number of factors. If true, this is a fascinating finding. Similar deficiencies have been detected in several human populations where they may be an adaptive trait for surviving malarial and other blood parasite infections. Interestingly enough, several related parasite species are found in wild black rhinoceroses as well.

Another problem that has affected more than thirty black rhinoceroses in North America is oral and skin ulcers. This statistic is significant for a population that typically numbers approximately eighty animals. These ulcers, which may be small and limited, sometimes progress and cause large areas of skin to slough. Several animals have died during these episodes. Dr. Linda Munson, a veterinary pathologist at the University of Tennessee, is spearheading research into this disease.

The cause of encephalomalacia, a usually fatal degenerative disease of the brain that has affected four black rhinoceroses, has not yet been identified despite extensive investigations. Also unusual in this species is the occurrence of fungal pneumonia (six cases), an infection that is rare in mammals with normal immune systems. Consequently,

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studies are being initiated to evaluate the immune status and function in black rhinoceroses.

It is uncertain if any of these diseases occur in the wild. In Zimbabwe and Namibia, the team of Drs. Michael and Nancy Kock, Drs. David Jessup and Peter Morkel, and Raoul du Toit and Louis Geldenhuys has established a series of "normal" values from wild black rhinoceroses, providing perhaps the best reference and comparisons for captive populations.

Nutrition is another vital area of ongoing health research. Wild black rhinoceroses, unlike their grazing white rhinoceros cousins, are specialized browsers. Dr. Ellen Dierenfeld at the New York Zoological Society has studied Vitamin E levels in captive and wild black rhinoceroses. In addition, a complete review of captive diets by Dr. Craig



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