White Oak Conservation Center Newsletter

KARATASI

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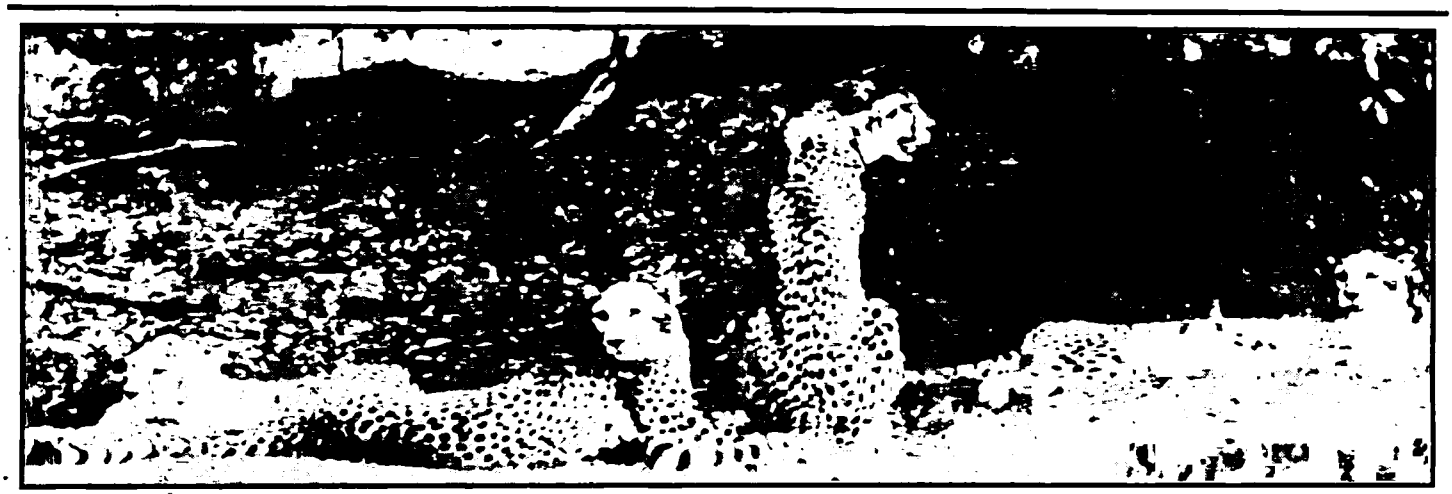
White Oak Conservation Center Welcomes New Cheetahs



These orphaned cheetahs from Namibia represent a very important contribution to the cheetah population in the United States.

A group of six orphaned cheetahs from Namibia cleared customs this past April and started the final leg of their journey to their new home at White Oak Conservation Center. Identified from their entry papers as Zaris, Osamba, Otavi, Torra, Peggy and Gremlin; the three males and three females were, as are all new arrivals to White Oak, eagerly awaited. Their arrival in the United States was accomplished following a long, multi-faceted, international endeavor of cooperation requisite to modern day conservation breeding efforts for the world's growing numbers of threatened species.

Cheetahs were once found over a vast range stretching as far east as India (their name is believed to be derived from the Hindi word "chita" meaning spotted one). The species occurred in good numbers throughout Persia, Arabia and over most of the continent of Africa. Today, the cheetah is extinct in India. There continue to be reports of small, widely scattered individuals in Iran, Afghanistan, Pakistan and Turkmenistan; the African populations have seriously declined in West and East Africa. In Namibia, nearly 20% of the world's remaining cheetahs are found.

Namibia is home to the Cheetah Conservation Fund (CCF), founded in 1990 by an American, Laurie Marker. White Oak Conservation Center has long been an avid supporter of Laurie and CCF with both John and Vanessa Lukas serving on the CCF Board of Directors. CCF is a prime example of the tremendous strides that can be accomplished by a single-minded purpose and long-term commitment to a conservation goal. For the last ten years, Laurie and her staff have worked closely with Namibian farmers to develop techniques that will help protect the farmers' livestock from cheetah predation without negatively impacting the cheetahs themselves. During this time, Laurie has recruited a number of farmers that help in this dual-purpose goal. As a by-product of this cooperative effort, CCF inherently finds itself serving as custodians for a number of orphaned cheetahs whose mothers have met an untimely end. Lacking training from their mothers, and oft times convalescing from serious wounds for

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White Oak Browsing Rhino Diet

The black rhino, a browsing species of rhino from Africa, has developed a number of health problems at various captive facilities in North America and elsewhere, and it is suspected that they may be associated with a lack of suitable quantities of browse in the diet. Among these problems are hemolytic anemia, ulcerative dermatitis, peripheral vasculitis, mineral imbalances, and possible overall impaired immune function.

Black rhinos browse on green leaves and woody branches and twigs, all very high in roughage and fiber, not easily replicated in a commercially prepared diet.

In an effort to help correct these problems and thereby improve the health of black rhinos in captivity, White Oak Conservation Center, in conjunction with the International Rhino Foundation, has sponsored a project to develop a pellet diet for black rhinos that more closely matches the chemical composition of the forage they would eat in the wild. A high percentage of a black rhino's diet in the wild would consist of leaves, stems, and twigs, which are very coarse, woody, and fibrous. Most of this material is not highly digestible, but the digestive tract of the black rhino has evolved to handle this roughage and extract the nutrition the animal needs. Most commercial diets available for captive animals are generally designed to be very nutritious and easily digestible and thus may be too "rich" for black rhinos. In very simple terms, this may be one of the underlying causes of the health problems mentioned above.

Through the combined efforts of White Oak Conservation Center, Dr. Ellen Dierenfeld (Nutritionist for the Wildlife Conservation Society and Nutritional Advisor for the Rhino Taxon Advisory Group), and Nutrena Feeds, Inc., a browsing rhino diet was developed and produced. The first batch of the new wood-based pellet was formulated and manufactured in 1997. The formula for the new diet was developed using data from the literature on black rhinos, estimated nutritional requirements, blood nutrient parameters, and known composition of browse in the rhino's natural diet. One of the first steps in producing this product was to locate a source of wood fiber readily available in the U.S. that closely resembled (both chemically and physically) the native browses found in Zimbabwe. White Oak (*Quercus alba*) was selected and guidelines for testing the wood shavings for toxins, molds, and other impurities were established.

The new diet was tested at three facilities using a total of five black rhinos. The facilities that participated were: White Oak Conservation Center (two animals), Fossil Rim Wildlife Center (one animal), and Denver Zoological Gardens (two animals). The amount of the diet needed at these other facilities for the feeding trials was donated by White Oak.

Both Fossil Rim and Denver measured intake and digestibility and the results indicated that the wood-based pellet was less digestible than a lower-fiber, grain-based diet, which was the goal. Diet digestibility averaged 50%, approximately the same as that measured in free-ranging black rhinos.

Staff at all three facilities were able to draw blood from the rhinos to measure levels of fat-soluble vitamins, minerals, and fatty acids. In a second phase of the diet testing, canola oil was added to correct the ratio of linoleic acid to linolenic acid in the blood and to increased the Vitamin E levels. It was also determined that the amount of iron in the diet needed to be reduced.

The browsing rhino diet is available to all North American institutions housing black rhinos. Although this diet is a considerable improvement over what was previously available, research will continue and changes in the diet will be made if warranted by future findings. The official name of the diet is "White Oak Browsing Rhino Diet", which carries a double meaning since White Oak wood is the primary source of the fiber in the diet and White Oak Conservation Center supported its development.

Nutrition By Nature

By: Ellen S. Dierenfeld, PhD
Wildlife Conservation Society

Captive management programs, either *in situ* or *ex situ*, rely heavily on food and nutritional resources as a very foundation of optimal health, reproduction, and conservation efforts. The field of comparative animal nutrition is one of many disciplines that must be applied to successfully meet the future challenges of wildlife preservation, education, and science. Yet we often fail to recognize the many ecological layers that must be considered in conservation nutrition.

WOCC staff prepare special diets twice daily to provide for the proper nutritional needs for all our animal residents. Everything from bales of hay, fresh fruit and vegetables, and commercially prepared diets for carnivores, birds, and ungulates, plus specialty products like worms, crickets and mixed nuts fill the back of each pickup truck during a feed run.

Detailed nutritional requirements of most species are unknown, and indeed can be quite flexible. We attempt to meet dietary needs by combining natural history information with captive management records, and appropriate domestic animal comparisons, at the same time recognizing gaps and distinct limitations. An underlying, but mostly undocumented, assumption of diet optimality in free-ranging animals is common. Yet few data on either food composition or physiological assessment criteria exist for most species with which to evaluate nutritional status. Diet descriptions, to be useful, must be truly representative and not simply an artifact of habitat, sampling or season. Chemical composition, as well as feeding behavior and environmental data, are essential for evaluating diet suitability, and should be integrated into managed feeding programs whenever possible. We can rarely duplicate ingredients of an animal's native diet in an artificial setting – we haven't the environment, nor the spatial, temporal, or chemical variety. What we can duplicate, and must strive to understand, are nutrients contained within those diets, and how they interact with and within other biological systems.

Native Nutrients

Browsing rhinoceros species are an excellent example: despite hundreds of observations of feeding ecology, and numerous lists of plants eaten, less than a dozen scientific publications document the chemical composition of native forages consumed by black rhinos. Even fewer exist for Sumatran rhinoceros. Yet solid clues for improving diets fed to captive browsing rhinos, and health issues linked to nutrition, could be obtained by summarizing limited data from the literature. Browsing rhinos consume high fiber, highly-lignified forages in nature which are lower in digestibility than typical forages fed in zoos. Gastrointestinal upsets, and obesity, in captive rhinos have been associated with overly digestible forage substitutes. Native browses are also lower in available protein, contain mineral-binding secondary compounds, and display a very different fatty acid profile compared with zoo diets. Mineral and vitamin concentrations in native browses also differ considerably from those in captive forage substitutes fed to these species. Every major nutrient category appears to differ in zoo-derived compared to native diets for browsing rhinos, which may have underlain a suite of disease and reproductive issues attributed to these species. Using available data as the starting point for directed efforts provided a head start in addressing these problems (many currently under active investigation and resolution).

In the case of browsing rhinoceros species, alfalfa (*Medicago sativa*) appears to be poor substitute forage from a chemical perspective. On the other hand, locally-grown alfalfa hay fed to okapi in North American facilities (*Okapia johnstoni*) rather closely duplicates the chemical content of browse selected by that species in the Democratic Republic of Congo. Behaviorally, rhinos eat more of the woody fiber fraction of browses compared with more selective species – not all browsers, nor browse substitutes, then, should be considered interchangeably, but each evaluated on their own components. Further information on browse composition and utilization by herbivores, and influences of environment (light, temperature, water, soils) on its chemical content, remains a high priority of continuing research.

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