

STUDIES ON THE DIGESTIVE PHYSIOLOGY OF CAPTIVE INDIAN RHINOCEROSSES (*Rhinoceros unicornis*)

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Extended abstract

With an estimated total free-living population of 2500 animals in a fragmented and decreasing habitat, zoological gardens play a major role in the conservation of the Indian rhinoceros. Traditionally, the horse has been used as a model animal for designing rhinoceros diets. Recently, obesity has received increasing attention in the zoo community. We intended to measure parameters of digestive physiology in Indian rhinos to facilitate a comparison with horses and to evaluate the adequacy of traditionally fed zoo rations.

11 Indian rhinos from 4 institutions were submitted to 2 feeding trials each, one on the regular zoo diet (A) and one on a concentrate-free/concentrate-reduced diet (B). Feeds consumed and faeces voided were weighed *in toto*, and representative subsamples analysed according to standard laboratory procedures. Water intake was measured, and urine was sampled sporadically. Passage rates were determined using Cr-mordanted fibre (< 2 mm) as a particle marker.

In spite of very long passage rates (particles 60 ± 4 h) the measured digestibilities generally did not differ from those reported for horses on similar diets. Ration B generally resulted in lower digestibilities except in one facility where grass silage was used as the predominant roughage source. Endogenous faecal losses of protein, fat, NFE and several minerals calculated by regression analysis generally resembled those reported for horses. A horse-like calcium metabolism, with increased urinary Ca excretion on diets of higher Ca content, was evident in Indian rhinos. On 2 of the 4 regular zoo rations, animals ingested more digestible energy (DE) than they were likely to need. Even on ration B individual animals ingested amounts of DE in excess of 0.6 MJ/kg metabolic body weight which is regarded as the maintenance requirement for horses. With the exception of one animal, all regular zoo rations (A) had to be considered deficient in zinc compared to horse requirements, in spite of the use of mineral supplements at all facilities.

In general, the suitability of the horse as a model animal for rhinoceros nutrition could be confirmed. *Ad libitum* provision of a high-quality roughage can lead to energy intakes which are likely to exceed requirements. Mineral supplements should be allocated according to ration calculations. With regard to the reports of skin and hoof problems in captive Indian rhinos, prevention of obesity and an adequate zinc supply are important goals in dietary management.

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