

## **Maintenance of Captive Black Rhinoceros (*Diceros bicornis*) on Indigenous Browse in Zimbabwe: nutrition and energetics.**

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Poor nutrition has been implicated as a key factor contributing to the high levels of morbidity and mortality seen in captive populations of black rhinoceros, *Diceros bicornis* (Kock *et al*, 1992; Miller, 1993). The translocation of four adult black rhinos (2 males, 2 females) to the Intensive Management Center at Sinamatella, Hwange National Park, Zimbabwe, in January 1995 led to the question of how best to maintain these endangered animals whilst held captive *in situ*. Given that diets of cut browse are desirable, the study aimed to determine whether these animals could be maintained on diets of indigenous cut browse. In doing so, it would also provide a protocol for maintaining captive black rhinos on indigenous browse.

Food intake was quantified for each rhino during two separate one-day collections carried out in February 1995. Animals received two feeds per day and were presented with a selection of at least 12 browse species per feed. Immediately following this set of trials, "cafeteria" trials were carried, were as predicted from concurrent studies on the free-ranging population.

Five-day digestibility trials were conducted on each of the four animals between late March and May 1995. Using two different test diets, a medium (five species) and high preference (six species) browse diet, the aim was to carry out replicate trials on each animal for each diet to determine whether there were any significant differences between digestibilities. In practice, the leaf phenology of some of the trial species changed so much in the period between the initial and replicate trials, as did the acceptability shown by the rhinos towards certain browse species, that each trial had to be regarded as a different diet. Throughout these trials, animals received 200 kg of freshly cut browse per feed and total daily intake and total fecal output were determined. Chemical analysis was carried out on plant samples collected during the feeding trials as well as on the pooled plant and fecal samples collected during the digestibility trials.

When a wide range of browse species was provided (12 species), mean daily food intake was 58 kg wet weight (25 kg dry mass). Intake dropped, however, when a limited number of species was on offer (i.e. during the "cafeteria" trials). Results from the "cafeteria" trials indicated that the patterns of browse selection exhibited by the captive animals were as predicted from studies on the free-ranging population. No correlation, however, could be found between the tissue fractions assayed and browse preferences.

Mean dry matter digestibilities varied between 28-50% during the trials, with digestibilities following a pattern of decline as the dry season progressed. During the wet season, when there was an abundance of good quality vegetation, the rhinos digested approximately 50% (DM) of the browse consumed and each diet appeared able to provide sufficient crude protein and energy to meet daily requirements. During the transition between the wet and dry season, dry matter

digestibilities fell below 30% and although each rhinos protein requirements could be met on a solely browse diet, energy appeared to become limiting, dropping below field metabolic requirements.

*Key words:* digestibility, feeding preference, energetics, black rhinoceros, *Diceros bicomis*, browse.

*References:*

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