

Preference and Daily Intake of Five East African Grasses by Zebras

JOHN C. NGETHE

Highlight: Three captive zebras were fed five common East African grasses—*Themeda triandra*, *Eragrostis caespitosa*, *Cynodon dactylon*, *Digitaria milanjiana*, and *Cymbopogon pospischilii*—to determine rates of voluntary forage intake and species preference. Forage intake averaged 43 g dry matter per kg body weight (41 lb/1,000 lb body weight). *Digitaria milanjiana* was the most preferred species.

The common zebra [*Equus burchelli* (Gray)] is a grazing animal of considerable ecological consequence in East African rangelands. The important ecological features associated with zebra include high biomass (Simmons, 1975) and rapid passage of forage through the digestive tract. These lead to high rates of food intake, nutrient turnover, and cycling through the ecosystem (Bell, 1971; Robinson and Slade, 1974). Furthermore, zebras appear to have wide distribution and an apparent ability to thrive on low quality forage. Their gregarious habit results in heavy trampling of the vegetation and soil (personal observation).

Outside Kenya's National Parks, livestock and wildlife occupy the same ranges, competing for various resources. The success of common-use programs involving livestock and wildlife depends on thorough knowledge of food preferences and forage selectivity of all animals involved, as well as the rates of daily forage consumption for these animals. Such data and information are vital to understanding the physical and ecological constraints in these rangelands but are lacking for most herbivores in East Africa.

The preliminary cafeteria study reported here was designed to evaluate (1) the quantity of forage consumed by zebras per unit body weight and (2) species preference among five grass species abundant at Kiboko Range Research Station, Kenya.

Procedure

Three mature zebras, one male and two females, captured in July and August 1972, were tamed and trained through January. They were used in a cafeteria study from mid-February through March 1973. Feeding racks, each with five compartments, were constructed and positioned, one in each pen. Each compartment was large enough to contain 8 kg of loosely packed mowed herbage. Every morning at 9:00 am during the study period, each compartment was filled with 5 kg of freshly cut herbage, providing an equal opportunity for each zebra to select from the five different species. The species studied were *Themeda triandra*, *Eragrostis caespitosa*, *Cynodon dactylon*, *Digitaria milanjiana*, and *Cymbopogon pospischilii*. The position of each grass species in each rack was rotated on a daily basis so that no compartment contained the same species on two consecutive days. Animals were allowed to feed *ad lib* for 24 hours. Water was also provided *ad lib*. The residual grass was removed and weighed every morning before the racks were filled with fresh material. Dry matter content of forage samples offered was determined and intake calculated on a dry matter basis.

Results and Discussion

Zebras consumed on average 43 g dry matter per kg body weight (Table 1). *Digitaria milanjiana* was the most preferred species by all animals. *Themeda* and *Eragrostis* were intermediate in preference and were consumed in about equal amounts while *Cynodon* and *Cymbopogon* were the least preferred by all the animals. Animals were statistically similar (Table 1). Based on qualitative assessment, *Eragrostis* appeared the least fibrous, followed by *Digitaria* and *Cynodon*, while *Themeda* and *Cymbopogon* were the most fibrous during the experimental period. Animals showed no apparent aversion to fiber content.

The author is with the Kiboko Range Research Station, P.O. Box 12, Makindu, Kenya. Manuscript received September 18, 1975.

Table 1. Dry weight of forage (g) consumed by three mature zebras per unit body weight (kg) during mid-February–mid-March period.

Species	Zebra 1	Zebra 2	Zebra 3	Mean
<i>Digitaria milanjiana</i>	15.3	13.0	14.3	14.2 a ¹
<i>Eragrostis caespitosa</i>	6.5	10.1	10.7	9.1 b
<i>Themeda triandra</i>	9.3	11.1	5.2	8.5 b
<i>Cynodon dactylon</i>	6.0	4.8	6.7	5.8 c
<i>Cymbopogon pospischilii</i>	5.4	4.8	4.8	5.0 c
Total	42.5	43.8	41.7	42.7
Mean	8.5 d ¹	8.8 d	8.3 d	8.5

¹Means having same superscript are not significantly ($P < 0.05$) different using Duncan's new multiple range test.

Casebeer and Koss (1970) analyzed zebra stomach contents and feces and found *Themeda* to be the most abundant diet component. Bell (1970), working on stomach contents collected over 1 month (September 1967) during the dry season, concluded that zebra diets were composed of half grass stems and half grass sheaths with no leaves. Our observations indicated that zebras consumed a considerable amount of grass leaves. It is difficult to visualize how pioneering animal species in a grazing succession (Bell, 1970) would select a diet composed of grass stems and grass sheaths without leaves.

In extrapolating the results of this study, several considerations should be borne in mind. In the wild, zebras are gregarious animals and feed as a group. Consequently animal separation and penning may have induced important psychological problems which may have affected measured food intake. However, all animals appeared to behave "normally." Captive animals expend considerably less energy compared to free animals, due to physical limitations imposed by pen size. Further, cut herbage in trays does not have the same physical characteristics as rooted plants. This is apparent in plant part selection. Animals bite off parts from rooted plants quite easily; however, when animals are feeding on cut material, pulling results in lifting the whole bunch of herbage. In other words, cut herbage has "a low biological feeding advantage."

Despite the above considerations, the three animals gained weight (Table 2) and one female foaled a normal, healthy foal weighing 27 kg shortly after the study. This implied that adjustment in captivity was adequate.

Table 2. Average daily intake (kg), and weights and weight gains (kg) of three mature zebras under Kiboko conditions during the study period.

	Zebra 1	Zebra 2	Zebra 3
Average daily intake	7.8	9.1	10.5
Animal initial weight	180.0	202.5	247.0
Weight gains over the period	2.5	4.5	5.0

Although this study was preliminary in nature, it provided base-line data on the quantity of dry material consumed by zebras. Further results suggest the order of species preference among the five grass species evaluated. Future research work under a more natural setting should add valuable information.

Literature Cited

- Bell, R. H. V. 1970. The use of the herb layer by grazing ungulates in the Serengeti, p. 111-124. In: Animal populations in relation to their food resources. Ed. by A. Watson. Blackwell Scientific Publications.
- Bell, R. H. V. 1971. A grazing ecosystem in the Serengeti. *Sci. Amer.* 225:1-9.
- Casebeer, R. L., and G. G. Koss. 1970. Food habits of wildebeest, zebra, hartebeest and cattle in Kenya Masailand. *E. Africa Wildl. J.* 8:25-36.
- Robinson, D. W., and L. M. Slade. 1974. The current status of knowledge on the nutrition of equines. *J. Anim. Sci.* 39(6):1045-1066.
- Simmons, I. G. 1975. The ecology of natural resources. Halsted Press Book. John Wiley and Sons, New York, N.Y.