

# FORAGING BEHAVIOR OF ZEBU CATTLE GRAZING DECIDUOUS FOREST

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## ABSTRACT

The objective of this study was to determine whether the foraging behavior of Zebu cattle in deciduous forest was affected by time of the year. Data were recorded during the wet, *nortes* and dry seasons. Ten Zebu cows were used to record biting rate. Intake and bite size was estimated using three esophageally fistulated animals. Cattle browsed shrubs and trees in the wet season and ingested litter leaves in the dry season which resulted in differences of ingestive behavior. In general, bite size and intake were higher in the wet season and decreased during the *nortes* and dry seasons.

## KEYWORDS

Zebu cattle, biting rate, bite size, intake, intake rate, deciduous forest

## INTRODUCTION

In the Yucatan Peninsula, weather patterns lead to large seasonal differences in quantity and distribution of forage available for cattle. The response of grazing animals to their environment strongly influences forage intake. Ingestive behavior can provide a basis to study how variations in forage influences the consumption. As it is presently stated, bite size is influenced primarily by plant structure and has the greatest influence over intake (Forbes, 1988). This study was conducted to determine the differences in ingestive behavior of cattle during the seasons of higher vegetation changes in deciduous forest.

## METHODS

The study was conducted at the Unidad de Produccion San Jose Kuche, near the C. E. Mococho INIFAP-SAGAR, Mococho, Yucatan. The study site is located at an elevation of 8 m and shallow soils (<1-25 cm). The climate of the area is characterized by a distinct wet (June-September), *nortes* (October-January) and dry (February-May) seasons. The 15-year average precipitation for the area is 990 mm. The average daily temperature is 26.5° C.

The vegetation of the area is composed by species typical of the low deciduous forest of the north-central part of Yucatan Peninsula. A 10-ha area was selected for this study. The principal tree species on the area included huaxin (*Leucaena leucocephala*), Sac-kaatsin (*Mimosa hemiendyta*), Box-Kaatsin (*Acacia gaumeri*), Chakaj (*Bursera simaruba*), Ja'abin (*Piscida piscipula*), Ts'iits'ilchee' (*Gymnopodium antigonoides*). Some annual forbs present in the area included *Chamaechrista spp*, *Porophyllum spp*, *Croton spp*.

Ten Zebu cows were selected and trained for close observation. Data were collected for three periods of the year: dry, wet and *nortes* seasons. Focal animal sampling (Altmann, 1974) was used to determine the number of bites that each cow took per unit of time while actively foraging on forest vegetation. A bite was defined as the tearing sound that occurred when forage was severed from the vegetation. Observations were made from a distance <1.5m. Thus, it was possible to observe animals foraging close to the ground as in the case of the dry season. Biting rate was recorded daily for each animal for one minute four times in a day for five consecutive days during each period. Measurements were obtained using a hand-counter and a stop watch. The order in which cows were observed was determined at random.

Intake and bite size were estimated with esophageally fistulated animals (Forbes, 1988). Three animals collected forage samples for one hour for five consecutive days each period. Intake (g/h) was estimated by weighing total collection of extrusa. In addition, all bites taken during extrusa collection were recorded. Bite size was calculated by dividing extrusa weight by number of bites. Intake rate was the product of weight of extrusa divided by 60 minutes.

Data analysis was done using the statistical package SAS. The statistical design for the analysis of variance had three treatments (seasons). Data were collected over several days which required a repeated measures analysis (Winer 1971).

## RESULTS AND DISCUSSION

Period of the year affected foraging behavior of cattle foraging on deciduous forest. Animals browse trees and shrubs during the wet and *nortes* seasons. They also forage on herbaceous annual plants during the wet season. More forage is available during the wet season than in the other two. Thus, cattle had more bites and a higher biting rate ( $P<0.05$ ) this time of the year (Table 1). Leaf litter and seed husks are the main components of the available forage in the dry season, but the production is low and biting rates of cows declines drastically (Table 1).

Biting rate values obtained in this study were considerably lower than reported in the literature. However, most of the results from those studies are from cattle grazing pastures rather than browsing species (Forbes, 1988). Nevertheless, studies with grazing animals have shown that biting rate is variable depending on plant species and/or vegetation stand (Trudell and White, 1981).

Cattle took significantly larger bites (2.9 g/bite) during the wet season than the average of the other seasons (Table 1). In some cases bite size is more closely related to plant surface density (Minson, 1990) and a greater density of food species may result in a higher intake (Stuth, 1991). Numerically, a greater bite size was observed during the dry season compared to the *nortes* season. In the *nortes* season the vegetation available for cattle is mainly regrowth, but the amount and density of this, in a given feeding station, is much lower than the one animals have during the wet season. On the other hand, in the dry season cattle have many leaves available at one time per feeding station allowing animals to ingest more g/bite than during *nortes* (Table 1).

The higher bite size and biting rate in the wet season allowed cows to have higher intake and intake rates this time of the year (Table 1). As season changed from wet to *nortes*, availability of forage declined affecting bite size and intake. Hendricksen and Minson (1980) reported a reduction in intake as a result of a reduction of bite size of cows grazing a tropical legume. No differences ( $P>0.05$ ) were found between intake and intake rate values of *nortes* and dry seasons. Even though cattle had higher bite size in the dry season than in the *nortes*, the number of bites was the lowest this season affecting the resulting intake (Table 1).

Results from this study indicate that foraging behavior of cattle on forest vegetation changes from one season to the next. These

differences can be attributed primarily to the availability and distribution of forage.

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**Table 1**

Means ( $\pm$  se) for the effect of period of the year on foraging behavior of cattle grazing deciduous forest

Period	Bite Rate (#/min)	Bite size (g/bite)	Intake (g/h)	Intake Rate (g/min)
Wet	20 $\pm$ 0.43 <sup>a</sup>	2.93 $\pm$ 0.27 <sup>a</sup>	3510 $\pm$ 311 <sup>a</sup>	58.5 $\pm$ 5.1 <sup>a</sup>
Nortes	18 $\pm$ 0.35 <sup>b</sup>	1.15 $\pm$ 0.33 <sup>b</sup>	1220 $\pm$ 377 <sup>b</sup>	20.3 $\pm$ 6.2 <sup>b</sup>
Dry	7 $\pm$ 0.44 <sup>c</sup>	1.77 $\pm$ 0.26 <sup>b</sup>	728 $\pm$ 298 <sup>b</sup>	12.1 $\pm$ 4.9 <sup>b</sup>

<sup>a,b,c</sup>Values on the same column with different superscripts are different,  $P < 0.05$ .