Grazing Behaviours of four Nigerian Breeds of Cattle in Awka, South East Nigeria

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KEYWORDS

Bite rate,
Breeds' difference,
Grazing,
Grazing pattern,
Grazing time,
Resting position

ABSTRACT

This study was carried out to evaluate the grazing behavior (GB) of four different breeds of cattle (Sokoto Gudali, Red Bororo, Adamawa Gudali, and White Fulani) in Awka, South East Nigeria. The study lasted for 90 days from September-December. Twenty four long weaners (average weight of 83kgs) were randomly allotted to four treatments (breeds) with six animals per treatment. The animals were subjected to rotational grazing system, co-grazed more than 6 ha of range containing grass, legumes and browse plants, the vegetative survey showed an average vegetation height of 2.6cm to 10cm. There was periodic recording of time spent Grazing, resting, bite rate and idle position from all the animals . The result show no significant difference (P>0.05) in the bite rate among the four breeds of cattle, but the highest bite rate was recorded in Red Bororo 3.42 (bite/min). The highest resting time was recorded in Sokoto Gudali 48.08(mins) which is not significantly different (P>0.05) from White Fulani 45.00(mins) and the least resting time was recorded in Adamawa Gudali 35.50(min) which was not significantly different from Red Bororo 39.42(mins). There was no significant different (P>0.05) in grazing time among the breeds. The study further revealed average grazing time of 8:26(hrs) and resting time which ranges from 48:00 - 35:00 minutes among the four breeds. There was no significant difference in the rest position among the breeds which show laying as predominant resting position against standing. the study show that the breeds do not differ on their grazing behavior which disagree with previous works showing breed factor as sources of variation on Grazing behavior among different breeds of indigenous cattle.

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INTRODUCTION

Grazing behavior is a feeding pattern within the ecology of herbivores which is related to how live-stocks respond in-other to meet their nutritional requirement (Launchbaugh, 2020). Grazing involves the activities of searching, selecting, harvesting and ingesting of forage. This behavioral patterns have been shown to be affected by both abiotic and biotic factors, physiological state of the grazing animal, geographical conditions, sward surface-height, stocking density, and botanical composition of pastures, and breed factor known as trait (Launchbaugh, 2020). Herbivorous or grazing animals differ in the way they grasp and ingest forages (Schulze et al., 2019). Abubakar et al., (2020) stated that cattle prefer low grassland due to the presence of up dental pad which causes a lack of selectivity and results in cattle eating more dead material than other ruminants, such as sheep, goats. Generally, feed consumption has a reverse relation with temperature and during normal circumstances, an increase in temperature causes lower feed consumption (Rhoads et al., 2009). Basic feeding/grazing activities of cattle involves ruminating, resting phase and grazing. Russell, (2001) in his work on the grazing pattern of cattle stated that cattle normally spent about 45 minutes in each period of resting and ruminating. According to Van Laer et al., (2015), both individual (phenotypes or genotypes) and group (breeds) diversity can impose different grazing patterns. Also vegetative composition and availability is directly proportional to time spent grazing as scarcity of forage will increase the time spent grazing and the availability will reduce the time spent grazing. Further more, studies on grazing behavior are baseline information for designing improved grazing management schemes that will ameliorate animal productivity, welfare and increase grassland diversity (Utsumi et al., 2009; Lin et al., 2011; Meier et al., 2012). Various grazing management systems and restoration strategies have been employed for ecosystem maintenance and sustainable utilization of range-lands for livestock production (Havstad et al., 2007) they include; Rotational grazing, use of enclosure, season grazing, and this strategy has no doubt shown a positive attribute towards gain and welfare of cattle. Some indigenous cattle breed have shown high level of adaptability and

performance under aforementioned management system; The White Fulani cattle, Muturu, and Gudali breeds are, however, important for their genetic predisposition of hardiness, heat tolerance and adaptation to local conditions (Alphonsus et al., 2012)

In Nigeria over the past decade; drought, poor knowledge on grazing behavior and Government policy (open grazing law 2017) have resulted to farmer-pastoralist conflict which has escalated in recent years and are spreading throughout the nation, threatening the country security and stability. International crisis Group reported an estimated death toll of approximately 2,500 people in 2016. There is need to establish core information on patterns of grazing in other to mitigate the effect of inadequate availability of forages from the natural pasture for sustainable livestock production in Nigeria (Jacobo et al., 2006). However, in other to provide solution towards the ongoing conflict among cattle headers and farmers in southern Nigeria, and to mitigate the negative effect of extensive grazing in eco system, there is need to understand the grazing patterns of common breeds of cattle which in return will provide core knowledge in developing management strategies which will not have adverse effect on the welfare and decrease their negative effect of overgrazing in the eco system particularly in our nation Nigeria.

MATERIALS AND METHODS

The study was carried out at Nnamdi Azikiwe University Awka Anambra state Nigeria. Awka is the capital of Anambra state with mean annual temperature, rainfall and humidity of 27.0˚C, 1828mm and 80% respectively. The peak of rain fall is September having an average rainfall of 306mm and least is December with a rainfall of 7mm, annual rainy interval last for about six months. It is located within the latitude of 60˚12 25" N and longitude of 7˚04 o4" E.

Vegetation

The vegetative components of the field was evenly distributed. The botanical composition of the grazing field was classified 95 percent of grass, legume, herb, (mostly: *Panicum maximum, Centrosoma pubescence* etc.) and 5 percent browse plants. The animals were placed on rotational grazing system, also the demarcated section of the farm was used for the experiment, botanical survey was carried out on the vegetation using qua-drat frame the result showed an average vegetative height which ranges from 2.6-10cm.

Management

Total number of twenty-four intact male long weaners comprising of 6 animals each from different breeds (Sokoto Gudali, Red Bororo, Adamawa Gudali, and White Fulani) of cattle were procured from cattle markets in Adamawa. The study lasted for 90 days, using 6 growing animals per breed. Animals was subjected to rotational grazing system, co-grazed more than 6 ha of range containing grass, legumes and browse species, grazing record was taken on all the experimental subject periodically from 0800-1700. Before the onset of the study, all the experimental animals were dewormed and administered Oxytetracycline L.A. They also were ear tagged for proper identification. The research was undertaken during (September- December). During the observation period, supplement of concentrated palm kernel cake and poultry dropping was provided once a day mostly in the morning. The animals have an average weight of 85kgs.

Data collection

The primary (grazing, resting time) and secondary (bite per minute, idle phase) behavioral patterns were assessed without block and replicate. The animal were observed at a distance of about 10 meters in other to avoid altering the record. All animals were followed on pasture for the whole days and records taken per animal at a given period of time.

Grazing time: The experimental cattle were carefully monitored and followed during grazing to estimate the grazing time. The animals were grazed from 0800 – 1700 hrs. The length of grazing was recorded by the use of stop watch.

Bite rate: Measurements were taken periodically throughout the experiment. Bite rate (bite/ min) was calculated by recording the number of bites in five minutes period among the four different breeds of cattle.

Resting time and position: Idling phase was frequently observed during the period of the project (standing and lying) by recording the time spent on each position during resting.

Experimental Design. The experimental design was a one way classification in completely randomized design (CRD).

Data collected was analyzed using one-way analysis of variance (ANOVA) using (SPSS) model 2011, When the analysis of variance revealed significant differences, treatment means were compared using Least Significant Difference (LSD) test ($P<0.05$).

RESULTS AND DISCUSSION

The study revealed that there was no significant difference among the four breeds in their grazing time with average grazing time of 8:14 to 8.29h a day representing 92% of their day light activities (Table 1). The current result agrees with the reports of (Lyons and Machen;2000, Viator et al., 2013) who stated that cattle to spent 7 to 12 h a day grazing; which occupy about 70-90% of daylight

activities. Time spent for grazing by herbivores primarily depends on supply of feed from the grazing area (Viator et al., 2013). Less time is spent grazing when forage is plentiful and quality is good, and vice versa. The findings support the previous report of (Mohammed et al., 2020) who reported no significant difference in grazing time among breeds of cattle which spent 83% of the day light activities grazing . Ferreira et al. (2013) also noted that due to the nature of the teeth, cattle are reluctant to modify diet preferences towards browse vegetation species if sward height is not below 4 cm. In this study, sward height was between the range of 2.6-10cm, forage patch condition, could presumably be a reason for cattle spending almost the 89% of day light activities grazing. Breinhort et al., (2000) studied the influence of animal factor on day and night grazing activity of imported Holstein-Friesian cow his mean grazing activity accounted for 7.6 hours at night and day light activity of 7.4 hours per 24 hours, contradiction from this findings may be as a result of less level of adaptability from the exotic breed used and also difference in weather condition of the research area.

Generally, the time spent during day light for resting was not affected by the co-grazing animal breeds in this study. It appeared that animals were busy harvesting forages to meet nutritional requirements during the 9 h day light that they were allowed to stay in the grazing area. Accordingly, time spent for resting might have happened during night time (Fierro and Bryant, 1990: Moges and Uden, 2005), with possible differences among the co-grazing animal these different breeds. From this study the resting time occupy 9% of their daylight activities. The result from these study on resting behavior contradict to the time estimated by Braun et al. (2013), who calculated resting time in cattle at a mean of 16.2 min/ 5h with a range from 11.6 to 18.6 min/h, which is a result of less grazing time given by his trial. Similar results to those reported in the current study for rumination and resting time are those of Gregorini et al. (2012), reported that the resting and rumination in cattle mostly occurring during the night with an average rumination and resting time estimated from 18 to 25 min/h. however; since resting time is subjected to be voluntary control by the animals the grazing cattle might regulate resting time in an attempt to increase or reduce digesta flow from the rumen (Chilibroste et al., 1997). In the study of Hassoun (2002) the patterns of feeding, resting and grazing time were also similar to the findings of the present experiment.

Furthermore Udeh et al., (2013) stated a significant difference among Muturu and Sokoto gudali on the total grazing record which contradict the findings of this study. Muturu is highly adapted breed in southern part of Nigerian while Sokoto gudali in northern part of Nigeria, his experiment was undertaken in south east of the country recalling that grazing behavior can be acquired (Baily et al., 2015) and has been repeatedly reported to be affected by geographical condition . Also Jennifer et al., (2014) sated that low level of adaptability by exotic breeds resulted to different on grazing behaviour among local and exotic breeds.

The mobile tongue and large and flat muzzle of cattle makes them less efficient in short swards and browses (Mohammed et al., 2020). The result from this work show that Red Bororo have the highest bite rate which do not differ significantly from the other breeds. Sprinkle et al., (2020) on his study on grazing behavior and production characteristics among cows support this research work by his statement of 18.5 mins on each phase of ruminating which no significant difference among different breeds of cattle. Jacobo et al., (2006) classified cattle as slow eaters which is mostly affected by vegetative characteristics.

Table .1: Grazing behavior of different breeds of cattle

Parameters	Bite Rate (Bite/min)	Resting Time (mins)	Grazing Time (hrs)	Position (laying/standing)
Sokoto Gudali	3.32	48.67	8.14	standing
White Fulani	3.17	45.00	39.17	laying
Red Bororo	3.42	39.17	8.23	laying
Adamawa Gudali	3.20	35.50	8.21	Lying
SEM	0.11	1.69	0.02	
P-Value	0.87	0.02	0.52	

Note; (P<0.05); SEM: Standard Error of Mean.

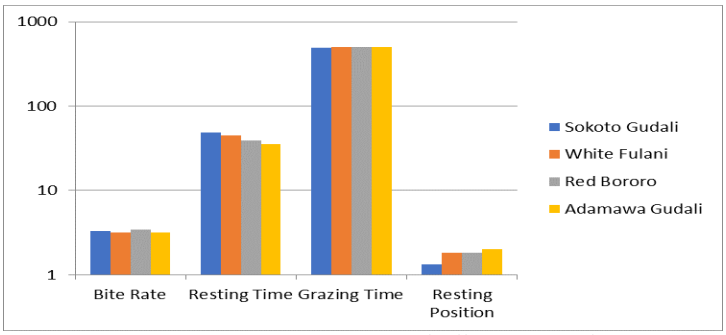


Figure 1: Bar chart: Grazing behavior of different breeds of cattle

CONCLUSION

The study on grazing behavior of four different breeds of cattle (Adamawa gudali, Sokoto gudali, white Fulani, Red Bororo) show that those breeds do not differ on their grazing behavior. The study further revealed the average grazing time to be 8:26h. This disagrees with other findings that grazing behavior vary among different breeds of cattle when subjected to same management practices.

RECOMMENDATION

This research brings new insights into the grazing cattle daily time budgeted in Awka south east Nigeria in respect to grazing time, bite rate (intake rate), idle position and resting time for developing management strategies. Cattle should be allowed to graze at minimum of 8h/day. From this study Sokoto Gudali breed of cattle was least adapted on this geographical region compare to other breeds.

Further study of both daylight and night grazing behaviors using digital monitoring devices might be needed to have a better insight on the impact of co-grazing of different livestock breed on range and productivity.

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