Nig. J. Anim. Prod. 2002, 29(2): 195-198
Nigerian Journal of Animal Production

Effect of level of concentrate feeding on the performance of Bunaji bulls grazing natural range

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Abstract

Twenty Bunaji bulls averaging 178.5kg live weight were blocked by weight and randomly allotted to four treatments (5 bulls per treatment) to determine the level of concentrate feeding on the performance of bulls grazing natural range and the practicability of fattening on range. The treatments consisted of four levels of concentrate feeding, i.e 0,2,3 and 4 kg/head/day. The concentrate was compounded as 60% maize offal and 40% cotton seed cake with a crude protein level of 17.6%. The trial lasted 105 days. Criteria investigated were live weight gain and body condition score of the animals, dry matter yield and nitrogen content of the forage from range grazed by the animals. Bulls receiving 4 kg/head/day (treatment 4) had the highest average daily gain (0.70kg/head/day). This was different (P<0.05) from treatments 1(0.36kg/head/day) and 2 (0.46kg/head/day) but similar to treatment 3(0.50kg/head/day). Though there was no significant difference (P>0.05) in body condition score (BCS) between the treatments, bulls not given concentrate feeding (0 level) had the least BCS. There was no marked difference between DM yield of the forage grazed during the sampling period. However, there was a decline in DM yield in the later part of the trial. It is concluded from this study that bulls can be fattened on range with minimum supplementation. It is therefore recommended that bulls being fattened on range be given a minimum of 2kg/head/day of concentrate supplementation.

Keywords: *Bunaji, live weight, condition score*

Introduction

Presently, different categories of people are involved in smallholder cattle fattening operations. These include crop farmers, government workers, businessmen, women and unemployed people (Adamu *et al.*, 1996). The time and financial commitment by the various smallholder cattle fatteners to fattening operations differ, resulting in varying durations for fattening. Gryseels (1981) states that the major identifying characteristics of small scale farmers are their limited access to resources, generally land and capital and their low income level. The feed resources available to the smallholder cattle fattner are natural pasture, crop residues and to a limited extent agro-industrial by-products. The availability of these feed resources varies with the season of the year. These crop residues and grasses which form the bulk of feeds in Sub- Saharan Africa are low in protein and minerals (Ash 1990, Garg and Gupta, 1992). Smallholder cattle fattening operation is therefore constrained primarily by inadequate nutrition.

The concept of fattening in large ruminants requires confinement for intensive feeding on rich diets so that animals attain slaughter

weight within a relatively short time of about 70-120 days (Olayiwole and Fulani, 1980). Olayiwole and Olorunju (1986) developed a technology for fattening based on range grass, crop residues and agro-industrial by-products. Fattening operation based on combination of concentrate feeding and range grazing is an uncommon practice. However, during the wet season fatteners cut and carry fresh forage from range as the sole source of forage for growing and fattening cattle (Adamu *et al.*, 1996).

The purpose of this study was determine the effects of the level of concentrate supplementation on the performance of bulls grazing natural range and the practicability of fattening on range.

Materials and methods

Location

The experiment was conducted at the National Animal Production Research Institute (NAPRI), Ahmadu Bello University, Shika-Zaria. Shika is located in the Northern Guinea Savanna Zone with an altitude of 610mm.

Animals and management

Twenty Bunaji bulls averaging 178.5kg live weight were used. The animals were dewormed (by administering Thiabendazole^{R}) one week prior to commencement of the experiment and dipped weekly in acaricide (Rhodiacide^{R}) solution for ectoparasite control for the duration of the experiment. The animals were kept in holding pens at night and allowed to graze during the day within the Institute.

Concentrate feed

The concentrate feed used was compounded as 60% maize offal and 40% cottonseed cake. The chemical composition of the feed ingredients and compounded feeds are shown in Table 1.

Treatments

The animals were blocked by weight and randomly allocated to four treatments of 5 bulls per treatment. The treatments were four levels of concentrate supplementation as follows:

Treatment 1 = 0kg (no concentrate supplementation

Treatment 2 = 2kg/head/day concentrate supplementation

Treatment 3 = 3kg/head/day concentrate supplementation

Treatment 4 = 4kg/head/day concentrate supplementation.

The bulls were group fed the concentrate in the evening on their returns from grazing. The animals were watered twice daily. The experiment lasted 105 days (September-December, 1997).

Measurements

The production criteria evaluated were monthly live weight gains and body condition score (Pullan, 1978). The Dry matter yield (kg/ha) and nitrogen content of clipped forage from the range grazed by the animals were taken in September and November.

Laboratory analysis

Proximate analysis of the concentrate supplement, feed ingredients and clipped forage were determined by oven drying according to the method of A.O.A.C. (1984).

Table 1 *Chemical composition of concentrate feed*

	Maize offal	Cotton Seed Cake	Compounded Supplement
DM	92.22	91.28	92.49
CP	9.79	21.20	17.61
NDF	54.61	50.20	56.44
ADF	29.50	25.45	28.21

Table 2 *Total DM yield (kg/ha) and nitrogen (%) of natural range at two different sampling dates during trial*

	September	November
DM yield	3.49	3.73
CP	5.64	4.10

Statistical analysis

Data collected were analysed using the standard analysis of variance (SAS, 1986). Differences between treatment means were separated by Duncan multiple range test (Duncan, 1955).

Results and discussion

Table 1 gives the chemical composition of the compounded maize offal and cotton seed cake fed to the bulls. Table 2 shows the DM yield and crude protein (CP) contents of forage samples from the range on two different dates during the experimental period. The pasture grazed in this experiment was dominated by perennial grasses, mainly *Andropogon* species, *Bracharia* and *Sporobolus* species, *Cenchrus ciliaris, Urelytrum muricatum, Panicum phrimitoides* and *Elionurus pubigunii.* The native legumes occuring in the area were *Tephrosia praeteolata, Cassia rotindofolia, Desmodium velitinum* and *Alyscarpus* species. There was no marked difference between the DM yield and CP content of the range forage during the different dates. The DM yield and CP are typical of the Northern guinea Savanna zone and agree with earlier reports by Onifade and Agishi (1990).

Table 3 shows the body condition score (BCS) and liveweight gains of bulls during the experimental period. Though there was no significant difference ($P>0.05$) in BCS of the bulls in the different treatments, bulls not given supplementation (0 level) had the least BCS. Bulls receiving 4kg/head/day of supplement (Treatment 4) had the highest average daily gain and this was significantly different ($P<0.05$) from those on treatments 1 and 2 but similar to those on treatment 3.

The level of live weight gains obtained in this study though lower than those obtained in conventional feedlotting (Olayiwole and Olorunju, 1986), are higher than those reported for animals grazing rangeland alone (de Leeuw, 1992). This shows that range grazing and concentrate supplementation can provide the necessary forage required for fattening of bulls in the wet season. Though cattle fattening is more pronounced during the dry season, it is a year round enterprise. Bulls receiving 4kg/head/day concentrate had the highest cost per live weight gain as compared to bulls receiving 2 kg/head/day with the least concentrate feed cost per live weight gain. The least concentrate feed cost per live weight gain (treatment 2) was obtained at the expense of lower liveweight gains which will utlimately result in longer time for animals to achieve market weights.

Table 3 *Effect of level of concentrate feeding on body condition score and liveweight gains of bulls grazing natural range*

	Treatments			
Measurements	1	2	3	4
Av. Initial BCS	3.2	3.2	3.1	3.2
Av. Final BCS	3.8	4.3	4.3	4.4
Av. Initial Wt (kg)	178.00	178.00	179.00	179.00
Av. Final wt (kg)	208.00	216.00	221.00	238.00
Av. Daily gain (kg)	0.360^{c}	0.456^{b}	0.504^{ba}	0.702^{a}
Conc. Cost N/kg wt gained	0	38.2	46.4	54.5

^{ab}Figures within the same row bearing different superscripts differ significantly ($P < 0.05$).

It is concluded from this study that bulls can be fattened on range with minimum supplementation. The duration of fattening will, however, be longer than obtained in conventional feedlot operations. This is because range pasture and minimum supplementation cannot provide the concentrated form of nutrients necessary for optimum performance or attainment of maximum liveweight gains within a relatively short period as obtainable in conventional feedlotting

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(Received 14 September 1999; Accepted 18 July 2001)