

Conclusions

The volatile fraction from sugarcane silage (75W) was considered high but not enough of a challenge to the ruminal buffering capacity. The clearance of volatile compounds in the rumen might be an explanation for the mild impact on the measured parameters. As expected, the energy supply from a higher inclusion of concentrate in the diets including sugarcane silage led to a more intensive change on the physico-chemical balance in the rumen.

References

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Effects of protein supplementation during the dry season on the feed intake and performances of Borgou cows in the sudanian zone of Benin

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Introduction

Dairy production in Benin relies on native cattle breeds such as Borgou cattle. The production system is a traditional low input system involving extensive grazing on natural pasture without supplementation. Natural forage is not sufficient to satisfy animal requirements in the dry season when the quantity decreases by 25 to 50% of peak biomass with nitrogen content falling well below 1% (Ayantunde, 1998). The aim of the present study was to assess the effects of dry season protein supplementation on feed intake, milk production, and body weight of Borgou cows. An economic evaluation of the results was also done.

Materials and methods

The experiment was conducted at Fana Fulani camp, located in Gogounou district (long. E 2°85' and lat. N 9°43'), on 24 cows in early lactation. Animals were divided into three groups each of 8 animals which were homogeneous with respect to body weight, age and the number of calving. Animals were all given a basal diet of straw bush *ad libitum*. Groups of animals were supplemented with a concentrate C1 (50% dried brewers grains, 30% cassava chips, 15% dried cassava leaves, 2.5% dicalcium phosphate, 1.5% sodium chloride and 1% premix), or with concentrates C2 (20% of the cassava chips replaced with cottonseed cake) and C3 (20% of the cassava replaced with soybean cake). The experimental period lasted for 90 days. The first 20 days of the experiment were for adaptation of the cows to the new diets, and the recording period of each treatment was 70 days. The cows had free access to clean water all the time. The feed intake was determined by weighing daily feed offered and refused. Samples of bush straw, concentrates (C1, C2, C3) and refusals were analyzed for dry matter (DM), crude protein (CP), crude fibre (CF), ether extract (EE) and ash using procedures described by AOAC (1990). Net energy content in Mega-Joules (MJ) of bush straw was determined using the Netherlands tables (Rivière, 1991). Determination of net energy (MJ) content of concentrates (C1, C2 and C3) was based on the equation fitted by Rivière (1991) for concentrate mixture. The age of cows was determined by dental timing and body weight was estimated using a weight-band at the beginning and the end of the experimental trial. Milk production records began 20 days after calving and hand milking was done twice a day (8.00 a.m. and 6.00 p.m.). Calves were allowed to suck for about one minute in order to stimulate milk let down. Partial milking was done in order to reserve milk for sucking calves which were prevented from sucking the dams. The evaluation of milk production was carried out each 10 days and chemical analysis of milk was conducted on samples from 3 cows per group. Estimated milk yield was calculated from the sum of the milk offtake and calf's growth $\times 9$. Calf weight was determined at the beginning and the end of the recording period and at the age of 1, 2 and 3 months by means of spring balances of 10 to 100 kg load capacity. Data collected on dry matter intake, milk yield, milk compositions, cow weight and calf growth rate were subjected to statistical analysis using the ANOVA procedure. Means were separated using the Least Significant Difference (LSD) method.

Results

Bush straw had a low net energy and CP contents (1.89 MJ/ kg DM and 1.8% of DM respectively), offset by high CF content (44.3% of DM). The three concentrates had similar net energy content: 5.36, 4.96 and 5.12 MJ/ kg DM, for C1, C2 and C3 respectively. However, their CP

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content was different ($P < 0.05$) and was valued at 16.6, 25.7 and 26% of DM for concentrates C1, C2 and C3 respectively. The voluntary intake of the three concentrates was similar ($P > 0.05$) and was valued at 2.20, 2.15 and 2.16 kg DM/d for concentrates C1, C2 and C3 respectively. Protein supplementation had a significant effect ($P < 0.05$) on the voluntary ingestion of straw which was 5.95, 8.64 and 8.74 kg DM/d for groups 1, 2 and 3, respectively. Protein supplementation also had a significant effect ($P < 0.05$) on milk production of cows in groups 2 and 3 (4.0 and 4.2 kg/d vs. 2.8 kg/d for group 1). The average daily milk offtake was higher ($P < 0.05$) in groups 2 and 3 (2.4 and 2.5 kg/d vs. 1.5 kg/d for group 1). In addition, the quantity of milk consumed by calves was higher ($P < 0.05$) in groups 2 and 3 (1.6 and 1.7 kg/d vs. 1.3 kg/d for group 1). There were no significant differences ($P > 0.05$) in the chemical composition of cow's milk. The average daily weight gain of the cow was higher ($P < 0.05$) in groups 2 and 3 fed the protein supplement (49 and 51 g/d vs. 13 g/d for group 1). Protein supplementation improved ($P < 0.05$) growth of calves from 30 to 90 days of age from 141 g/d for group 1 to 181 and 190 g/d, for groups 2 and 3 respectively. Cost of feeding was significantly different ($P < 0.05$) in the three groups (19912 vs. 24129 vs. 29030 FCFA respectively for groups 1, 2 and 3). Cost of feed per kg of milk produced was also significantly different ($P < 0.05$) in the three groups (100.5 vs. 86.1 vs. 98.6 FCFA respectively for groups 1, 2 and 3). Net benefit was significantly higher ($P < 0.05$) in groups 2 and 3 (45980 and 44563 vs. 29591 FCFA for group 1).

Conclusions

This experimental trial showed that protein supplementation during the dry season increased dry matter intake and improved milk production of Borgou cows while maintaining their body weight and increasing the growth of their calves.

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Seasonal variation of the nutritive value of natural forage and effect on cattle performances in Cameroon

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Introduction

The Adamawa plateau (Cameroon) is the major cattle farming region in Cameroon. The plateau is characterised by a mild highland subtropical climate with a precipitation of 1600–1700 mm per annum falling between April and October. Grass species such as *Hyparrhenia*, *Panicum* and *Seteria* dominate natural pastures found on granitic and basaltic parent rock-based ferralols. The woody vegetation is mainly composed of *Lophira* and *Daniella* sp. In this region, natural forage remains the major feed for ruminant livestock. However, the nutritive value of this resource, affected by many factors, is variable (Enoh *et al.*, 2005). Thus rationing in the sense of complete feed formulation and decision making in terms of livestock sector improvement are difficult. Therefore, studies aiming to generate more information on the variation of the nutritive value of forage and its impact could be of great importance for the sector. From 2006 to 2009, a study was carried out in the region to assess the effect of seasonal variation of climate on the nutritive value of forage and the consequences on cattle performances.

Material and method

Data were collected monthly on a representative rangeland (comprising the four main effective pasture types found in the region and identified by their level of degradation) using forage sampling methods (Levang and Gouzis, 1980). Every two months, samples of forage

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