INFLUENCE OF AMBIENT TEMPERATURES ON WATER CONSUMPTION, FEED INTAKE AND BODY WEIGHT OF RED SOKOTO BUCKS FED GRADED LEVELS OF CORNCOB DIETS

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Abstract

An experiment was conducted during early dry season in 2012 to investigate the response of Red Sokoto buck to ambient temperature on water consumption, feed intake and body weight when fed graded levels of corn cob diets. All the animals responded in a similar manner to changes in ambient temperatures, there was a strong positive (R^2=0.9672) correlation between ambient temperature and water intakes but negative correlations (R^2=0.9723; R^2=0.9723) were observed between the ambient temperature with feed intake and body weight of bucks. The bucks drank more water, eat little feed and loss weight at higher (38.8°C) ambient temperatures. Although at lower temperature (28.5°C), they eat more feed to produce heat in order to regulate their body temperature. The consequence of these was body weight loss. Therefore, livestock owners should provide adequate water, feed and proper housing for their animals at varying ambient temperatures.

Keywords: Ambient temperature, Red Sokoto bucks, Corncob and Diets

Introduction

Climate change caused by depletion of ozone layer leads to high environmental temperatures and humidity which are detrimental to the productivity of livestock in tropical and sub-tropical regions of the world. Exposing these animals to high ambient temperatures will affect their water use and feed intakes, consequently, loss of body weight. Consequently, dry matter intake may decline, but requirements for evaporative and skin cooling increased (NRC, 2007). The possibility of water shortage affects livestock, and therefore all procedures involving water use in animal production must be reviewed (Gherman *et al.*, 2012). Water is therefore required for life (Beede, 2012). Water intake forms about 50-80 percent of an animals live body weight and it is an essential nutrient which many over looked. Whereas an animal may lose almost all its body fat content and 50 percent of its body protein and survive, the loss of only 10 percent of its body water can be fatal. The objective of this study is to investigate the response of Red Sokoto bucks to changes in ambient temperature on their water consumption, feed intakes and body weight gain when fed graded levels of corn cob diets.

Materials and methods

Experimental site and location

The experiment was conducted at Feedlot Unit of the Teaching and Research Farm of Animal Production Department, School of Agriculture and Agricultural Technology, Federal University of Technology, Minna. It has an altitude of 75m above sea level with a land area of 6784km^2 and lies between latitude 9°37'N and longitude 6°33'E. The mean annual rainfall is about 1200-1300mm, while the mean annual temperature of Minna is between 38°C to 42°C and Minna is located in the Guinea Savannah Zone of Nigeria (NSADP, 2005).

Experimental animals, their management and experimental design.

Sixteen (16) Red Sokoto bucks with average body weight of 10.19±0.19kg were used for the experiment. The pens were thoroughly cleaned, disinfected, and wood shaving was spread up to 5cm above the ground level before the arrival of the animals in to the pen. The animals were allowed 7 days acclimatization period to the experimental diets and the environment during which they were observed for any symptoms of disease(s). They were treated with albendazole (orally) 250 milligrams per 10kg body weight against internal parasites, ivomectin (subcutaneously) 0.5ml per 50kg body weight against external parasites, oxytetracycline (long acting antibiotics) 1ml per 10kg body weight (Intra muscular) and multivitamin (intra-muscular) 1ml per 10kg body weight. The animals were randomly allotted to 4 dietary treatments with each treatment having 4 replicates. The animals were fed 500g each in the morning at 7-8am and supplementary feed at 4-5pm daily and water was offered *ad-libitum*. A randomized complete block design (RCBD) was used. The composition of experimental diet is shown in Table 1.

Data collection and statistical analysis

Data were collected on feed intake was determined

Table 1: Composition of the experimental diets fed to Red Sokoto bucks

Treatments Ingredients	D_1	D_2	D_3	D_4
Maize cob	-	10	20	30
Maize offal	67	57	47	37
Maize	24	24	24	24
Groundnut cake	8.0	8.0	8.0	8.0
Vitamin premix	0.5	0.5	0.5	0.5
Salt	0.5	0.5	0.5	0.5
Total	100	100	100	100
Calculated				
% Crude Protein	13.37	12.92	12.47	12.03
ME (kcal/kg)	2710.40	2490.60	2270.90	2051.10

D_1-Control (0% maize cob diet), D_2-10% maize cob diet, D_3-20% maize cob diet, D_4-30% maize cob diet.

Figure 1: cummulative response of Red Sokoto bucks to ambient temperature on water intake

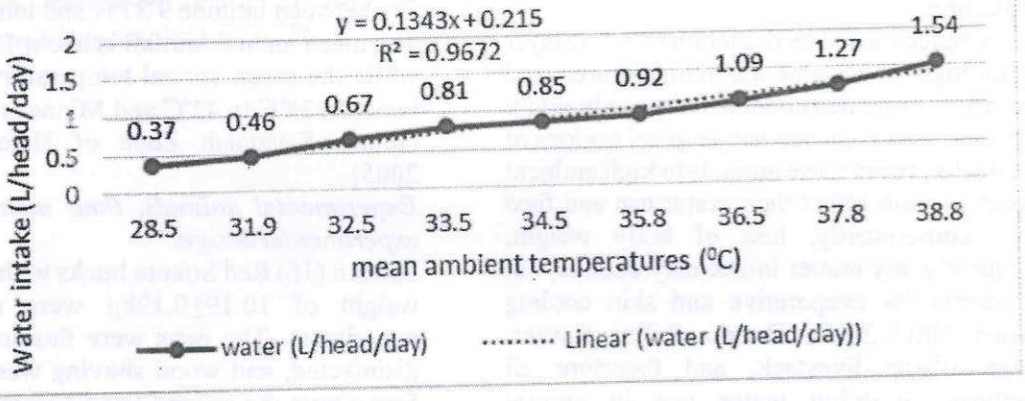
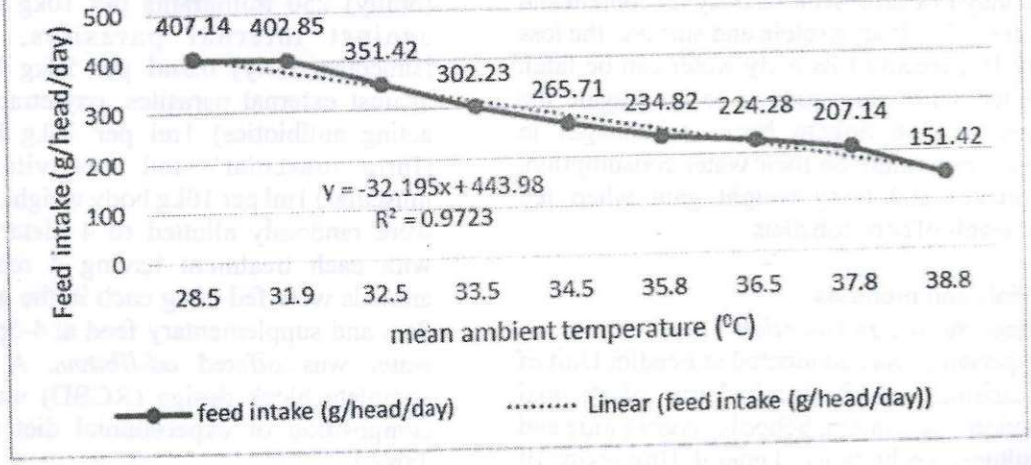
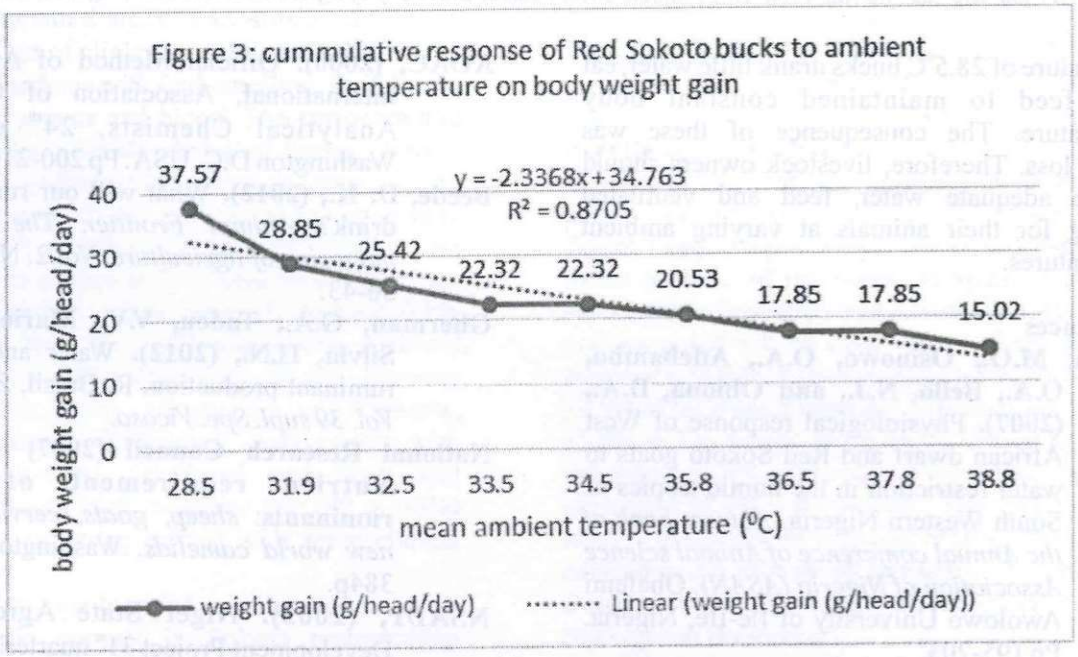


Figure 2: cummulative response of Red Sokoto bucks to ambient temperature on feed intake





by subtracting the left over from the fed offered. Three (3) litres of clean fresh water was given to each buck at the same time as feed, water intake was obtained by deducting the water left over and the evaporatory water loss from the water offered daily as recommended by NRC, (2007) growing sheep and goats will consume 2-4 litres of water per day at higher ambient temperatures. Body weights gain was determined by the difference between the weights of previous week and the weights of present week. A standard wet and dry bulb thermometer was hanged centrally inside the buck's pen for measurement of ambient temperatures between 12.00am-2.00pm daily. Data collected were subjected to analysis of variance (ANOVA) with general linear model of SAS (2008) and significant means were compared by Duncan Multiple Range Test.

Result and Discussion

The cumulative response of Red Sokoto bucks to ambient temperature on water consumption was shown in (figure 1). There was positive (R^2=0.9672) correlation between ambient temperature and water intake. At 28.5°C the bucks drunk 0.37liters/head/day in the first week of experiment less than the recommendation of 2-4liters/head/day at 27.0°C (NRC, 2007) but when the temperature increased to 38.8°C the animals consume much water 1.54liter/head/day to maintain their body temperature. The result obtained in this study was in line with Adogla-Bessa, (2000) who reported animals drank less water in winter than in summer and they consume more feed and convert feed more efficiently and gain more weight in winter than in summer, the animal losses more water to cool it body temperature by increased water intakes.

Figure 2: shows the cumulative response of Red Sokoto bucks to ambient temperature on feed intakes. As the ambient temperature decreased from week 1 to 9 the animal increased their feed intake from 1.06 to 2.85kg/head to be able to regulate their body temperature through homeostasis. There was a negative (R^2=0.9665) relationship between ambient temperature and feed intakes of bucks. This agreed with the report of Abioja *et al* (2010) as the ambient temperature declines, the animal losses more heat to the environment and more energy are required to maintain a constant body temperature through increased feeding.

Figure 3: shows the cummulative response of Red Sokoto bucks to ambient temperature on body weight gain. There was a strong negative (R^2=0.8705) correlation between ambient temperature and weight gain. Highest weight gain (37.57g/h/day) was observed at first week of experiment when the temperature 28.5°C. At this point the body weight continued to decrease up to week 9 of experiment as the ambient temperature rises to 38.8°C. This could be attributed to inability of bucks to properly utilize feed to gain weight instead busy regulating body temperature..

Conclusion and Recommendation

Ambient temperature has significance influence on the performance of Red Sokoto bucks in terms of water consumption, feed intakes and body weight. At higher ambient temperatures of 38.8°C the animals drank more water and decreased feed intake, on the other hand at low ambient

temperature of 28.5°C bucks drank little water, eat more feed to maintained constant body temperature. The consequence of these was weight loss. Therefore, livestock owners should provide adequate water, feed and ventilated housing for their animals at varying ambient temperatures.

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