

EFFECT OF CONCENTRATE LEVELS ON WATER INTAKE OF THREE BREEDS OF SHEEP IN NIGERIA

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ABSTRACT

This study tested the effects of feeding *Digitaria. Smutsii* (Stent) hay supplemented with two levels of concentrate (1 or 2 % of body weight) on the water intake of Balami, Uda and Yankasa rams. It was hypothesised that feeding of rams with these levels of concentrate would: positively impact their water intake. Thirty yearling weighing averagely 34.20, 35.35 and 31.80 kg for Balami, Uda and Yankasa, respectively were used. They were fed *D. Smutsii* hay supplemented with concentrate at 1 or 2 % body weight for ninety days. Daily water intake of rams was recorded after subtracting the quantity of the left over from the quantity supplied. Result showed that Yankasa breed had significantly ($P < 0.05$) higher water intake than Balami and Uda and animals fed concentrate at 2 % body weight had significantly higher water intake than those fed 1 %. Hence it was concluded that levels of concentrate in the diet of sheep affect their water intake.

Keywords: water intake, breed, concentrate level, sheep, supplementation

INTRODUCTION

The significance of water in ruminant livestock production was reviewed by Aganga *et al.* (1986), who pointed out that the body water of ruminant animals is not fresh water since it contains salts in solution, and the salts inside and outside the cells are different in character. In Nigeria, especially in the Guinean and Sahelian savannah zones where there is a long dry season each year, water is not available all year-round. Consequently, the animals have adapted to little water at certain times of the year Aganga *et al.* (1986). The water intake of ruminant is affected by several factors such as age, size, pregnancy, lactation, shearing, walking distance, competitive behavior; breed, etc. (Macfarlane *et al.*, 1961 and Vosooghi-Postindoz *et al.*, 2018). The aim of the study was therefore to investigate effect of concentrate levels on water intake of three breeds of sheep in Nigeria.

MATERIALS AND METHODS

The study was conducted at the Experimental Unit of the Small Ruminant Research Programme of the National Animal Production Research Institute, Shika – Zaria. Ten intact yearling rams each of Balami, Uda and Yankasa sheep averagely weighing 34.20, 35.35 and 31.80 kg, respectively procured from local markets were used for the experiment.

Digitaria smutsii hay harvested from sown pasture in the Institute was fed as the basal diet. Concentrate mixture (fed at two levels) were used as supplement in 2x3 factorial design. The concentrate was a mixture of cottonseed cake (39.19 %), maize (37.87 %), maize offal (18.94 %), bone meal (2.50 %) and table salt (1.50 %) obtained from the Institute were compounded and stored properly at the experimental site. Animals were fed the concentrate at 1 or 2 % of their body weight and the hay fed *ad libitum*. All animals had free access to fresh clean water every day, the intake of which was measured. The study lasted for ninety days.

RESULTS AND DISCUSSION

Water intake was affected by breed effect, level of concentrate as well as their interaction (Table 1). The Balami breed had lower water intake than Uda and Yankasa. Although Balami is a bigger animal than Yankasa, the difference due to breed effect could be attributed to the fact that these animals (Balami) are adapted to drier environments. It also agrees with the finding of Schoeman and Visser (1995) which reported both inter and intra species differences when he worked with sheep. The effect of concentrate level where animals fed concentrate at 2 % body weight consumed more water than those fed at 1 % body weight agrees with previous report on sheep by Vosooghi-Postindoz *et al.*, (2018) that under southern Australian conditions, Border Leicester sheep consume 70 % more water than Merinos, of a comparable body weight.

Table 1: Interaction effect of breed and concentrate level on feed intake and body weight change of Balami, Uda and Yankasa rams fed *D. smutsii* hay supplemented with concentrate at 1 or 2% body weight

Parameter	Concentrate level						SEM	LOS		
	1 %			2 %				B	H	BxH
	Breed			Balami	Uda	Yankasa				
	Balami	Uda	Yankasa							
Initial weight (Kg)	35.8	36.50	31.80	32.60	34.20	31.80	1.32	*	*	*
Metabolic weight (W Kg ^{0.75})	14.64	14.85	13.39	13.64	14.14	13.39	1.04	NS	NS	NS
Final weight (Kg)	43.50	43.80	39.0	53.70	52.00	45.06	1.79	*	*	*
Weight Gain (Kg)	7.70	7.30	7.20	21.10	16.80	13.26	0.73	*	*	*
Average Daily Weight Gain (Kg)	0.09	0.08	0.08	0.23	0.18	0.15	0.01	*	*	*
Daily Con. Intake (DM Kg)	0.41	0.41	0.37	0.91	0.89	0.82	0.04	*	*	*
Daily Hay Intake (DM Kg)	0.65	0.65	0.54	0.67	0.74	0.66	0.04	*	*	*
Average daily feed intake (Kg)	1.17	1.23	1.11	1.68	1.66	1.45	0.08	*	*	*
Intake/Metabolic weight (W Kg ^{0.75})	0.08	0.08	0.08	0.12	0.12	0.11	0.04	NS	NS	NS
Av. Daily water Intake (l)	2.44	2.72	2.73	2.84	3.33	3.81	0.14	*	*	*
Feed / Gain	13.00	15.38	13.87	7.30	9.22	9.67	0.94	*	*	*

Standard error of means (SEM), Kilogramme (Kg), Dry matter (DM), litre (l), Level of significance (LOS), Not Significant (NS), Significant at 5 % (*), Breed (B), Hay (H), Breed x Hay (BxH), Significant at 5% (*), Not significant (NS)

It was revealed that Balami rams fed concentrate at 2 % had higher water intake than their counterparts raised on concentrate at 1 %. This situation was similar for Uda and Yankasa rams when they were fed concentrate at 2 % and they had higher water intake above their corresponding counterparts which were fed concentrate at 1 %. The difference in water intake between the three breeds in this study is a function of breed effect agreeing with the reports in previous works with sheep (Macfarlane *et al.*, 1961), cattle (Forbes, 1985) and goats (Frith, 1981) showing both inter and intra species differences. Irrespective of whether it is concentrate at 1 % or concentrate at 2 % that was fed, interaction existed between breed and concentrate level and there was outstanding difference for both total and average daily water intake. This could also be attributed to the fact that feeding concentrate stimulates water intake due to its nature (smoothness) and the level of oil in it resulting from some ingredients like the cotton seedcake hence the higher the quantity of concentrate in the diet, the more the water consumption.

CONCLUSION

It was concluded that feeding higher level of concentrate and breed affect water intake in sheep as those fed concentrate at 2% body weight had higher water intake above their contemporaries fed 1% and Balami recorded lower water intake compared to Uda and Yankasa rams.

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