GROWTH AND PHYSIOLOGICAL PERFORMANCE OF WEST AFRICAN DWARF GOATS REARED UNDER TWO DIFFERENT MANAGEMENT SYSTEMS.

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ABSTRACT

Twenty young growing West African Dwarf (WAD) goats of both sexes with an average body weight of 5.77kg were used in an experiment which lasted for three months to assess growth and physiological performance of goats reared under two different management systems. Result of the experiment revealed that growth rate was significantly better in animals reared under intensive system of management as indices measured such as average daily weight gain, (kg) and metabolic weight ($W^{0.75}$kg), were better in goats reared intensively. Feed intake was not significantly different ($p>0.05$) among the two management systems. However, physiological parameters such as rectal temperature, pulse rate, respiratory rate and ambient temperature revealed some significant correlation. It was thus concluded that goats reared under both intensive and extensive systems of management could be thermally stressed by the ambient temperature, while rearing goats intensively is better than the extensive method commonly adopted in Nigeria.

INTRODUCTION

The need to intensify livestock production with a view to meet the ever decreasing animal protein intake of an average Nigeria cannot to be over emphasized (Adegbola *et al.*, 1998). To meet this high level of shortfall in animal protein intake, effort should be directed to production of small ruminants such as sheep and goats. In addition, small ruminants are less prone to trypanosomiasis, knowing that about 60% of Nigeria lands are prone to tse-tse fly which limits cattle production mainly to the Northern part of the country (Ugwu and Uwagbo, 1992). Goats have been found to play a very important role in the economy of countries that have been able to increase animal protein intake such as United State of America, United Kingdom and France, since they are used as dairy animals. (Ologun, 2004).

The performance of an animal is dictated by the environment in which it finds itself. Various factors are within the environment which dictates the performance of the animal; these factors include rainfall, temperature, relative humidity, wind and solar radiation amongst

other factors. The effects of these environmental factors can mediate through reduction or increase in feed intake, feed efficiency, weight gain and reproductive performance (Williamson and Payne, 1980)

The livestock management system practiced on the farm will determines the environment of the production system. In Nigeria the system of husbandry is mainly traditional, with individuals keeping two to four breeding goats; this system of husbandry are characterized by trekking and exposure to high temperature (Balogun, 1982), this system is less productive with high incidence of disease outbreak and losses to preferring (Odubote *et al*., 1992). However, Ademosun (1992) stated that goats can show a good performance under intensive system of husbandry, as the health problems are solved and the productivity in terms of weight gain improved. This experiment was conducted with the aim of examining the benefit of raising goat in two different management systems.

Therefore, the objectives of this experiment were: to examine the growth of goats reared under two different management systems; to evaluate feed intake and feed utilization; and to assess the effect of these management systems on physiological indices such as rectal temperature (rt), respiratory rate (rr) and pulse rate (pr).

MATERIALS AND METHODS

Twenty West African Dwarf (WAD) goats of both sexes and age four to five months, weighing an average of 5.77kg were used in the study which lasted 12 weeks after 30 days period of quarantine according to NAPRI (1984). An allowance of one week was given thereafter for animals to get used to changes in environment and management system before the start of the experimental phase. The animals were assigned to two treatments, as shown below.

TREATMENT I (Intensive Management System):

Ten animals were put in a confinement structure of wooden stall with slated floor measuring 2x2xx1.7m^2**.** The floor was bedded with wood shavings; dungs were cleared weekly. These animals were fed in stall with *Panicum maximum*, *Glricidia sapuium*, cassava

peelings; fresh water and salt block were provided *ad libtum*. Goats were allowed to exercise between 0900hrs – 1200hrs every day.

TREATMENT II (Extensive Management System):

Ten animals were allowed to free grazing between the hours of 0800hrs – 1700hrs, water and salt lick were provided in the pen. This group was also housed in stall with slatted floor during the evening hours.

Data Collection:

(a) **Body Weight Change:** All animals were weighed at the beginning of the experiment and subsequently every week, for the assessment of growth rate. Average daily gains were computed from the weekly weight measured for all the goats over the entire period of the experiment.

(b) **Physiological Indices:** The respiratory rate (rr), rectal temperature (rt) and pulse rate (pr) were measured on weekly basis. These were measured thrice at 7030 – 0800hrs, 1230-1300hrs and 1730 – 1800hrs local time on the day of measurement. All physiological indices were measured as described by Kelly (1984).

(c) **Statistical Analysis:** Data were pooled and subjected to analysis of variance and where significant differences were found, the means were seperated using least significant difference (LSD). Correlation coefficient among physiological and environmental variable were analyzed too, according to Steel and Torrie (1980).

RESULTS AND DISCUSSIONS

Growth performance of the experimental animals showed that animals reared under confinement performed better ($P<0.05$) in overall weight gain (Table I). However, feed intake was not significantly different ($P>0.05$) among the two management systems probably due to the availability of plenty of green forages, since the time at which the experiment was conducted coincided with the rainy season (August to November).

The significant correlation values among rectal temperature, respirator rate, pulse rate, and temperature in some cases (Table II) agrees with the findings of Ayo and Minka (2003), when they examined

the effect of confinement on some physiological parameters in Red Sokoto goat during the rainy season. It appear that the West African Dwarf goats although said to be well adapted to tropical humid condition could be stressed when exposed to a relatively high ambient temperature especially for a long time as in the case of extensively reared goats.

CONCLUSION

From the fore going it becomes imperative to say that the management system adopted is important in rearing of WAD goats as there were significant increases in rectal temperature, respiratory rate and pulse rate of those animal reared under extensive system of management compared with those reared intensively, more so, the mean total weight gain was significantly better when goats were reared intensively.

Table 1: Growth Performance of Goats Reared in Two Different Management Systems.

Parameters	**Intensive**	**Extensive**
Mean Initial Live weight (kg)	5.87± 0.31	5.67± 0.28
Mean Final Live weight (kg)	14.37± 035[a]	11.67± 0.27[b]
Mean Total Live weight gain (kg)	8.50± 0.22[a]	6.00± 0.18[b]
Average Daily Live weight gain (kg)	0.06± 0.03	0.05± 0.02
Metabolic Weight ($w^{0.75}$kg)	5.67± 0.43	5.05± 0.31
Total Feed Intake (kg/day)	0.88± 0.10	0.63± 0.13
Feed Conversion Ratio (kg feed/kg gain)	14.66+ 2.93[a]	12.6±5.35[b]

a, b, Means on the same row with different superscripts are significantly different (P<0.05)

Table 2: Correlation Co-efficient Among Physiological and Environment Variable under Different Management System.

Parameters		Intensive					Extensive				
		1	2	3	4	5	1	2	3	4	5
1.	Rectal Temperature	-	.39*	.58*	.05	.11	-	.06	.57	.11	.49*
2.	Respiratory Rate	-	-	.13	.38*	.23	-	-	.61*	.06	.11
3.	Pulse Rate	-	-	-	.36*	.22	-	-	-	.29	.11
4.	Temperature	-	-	-	-	.60*	-	-	-	-	.67*

* Significantly correlated ($p<0.05$)

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