

EFFECT OF BREED ON GROWTH PERFORMANCE OF INTENSIVELY MANAGED GOATS PRE AND POST PARTURITION

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ABSTRACT

The study investigated effect of breed on growth performance of intensively managed goats during pregnancy and within 24hours after kidding. A total of forty five (45) goats which comprised of 15 Kalahari Red (KR), 15 KalaWAD (KW) and 15 West African Dwarf (WAD) were fed known quantities of concentrate diet and Congo grass (*Brachiaria ruziziensis*) in a split form. The study lasted for 162 days after mating. Data obtained were subjected to analysis of variance using General Linear Model as contained in Minitab® 17.1.0. Significance level was taken at 5% probability, while significant means were separated using Duncan Multiple Range Test of same statistical package. Results obtained revealed that KW compared favourably with KR in almost all the parameters taken. KR had highest significant ($p < 0.05$) values for all the intakes such as grass (99.70g/day), concentrate (867.10g/day) and total feed (966.80g/day). Similarly, KR recorded highest significant ($p < 0.05$) values for all the weight gains such as gross (14.78kg), net (9.55kg) and daily less foetal and afterbirth weight (64.15g/day) compared to others. The values for the parameters were followed by KW, while least values were recorded for WAD. Breed had no significant ($p > 0.05$) effect on feed conversion ratio and protein efficiency ratio of the pregnant goats. It could be concluded that growth performance during pregnancy and shortly after kidding was influenced by breeds of goats, where Kalahari Red goats performed better. The results also revealed that KalaWAD was on a par with Kalahari Red goats for growth performance.

Keywords: Kalahari Red, KalaWAD, Growth Performance, Concentrate diet, *Brachiaria ruziziensis*

INTRODUCTION

Small ruminants especially goats make significant contribution to the livestock economy in Nigeria (Ajayi *et al.*, 2008). Goats are significant in the socio-economic life of the people as they contribute about 35% of the animal meat supply (Babayemi, 2009). They provide animal protein, fibre and skin, food security and a stable household income. Ruminant animals are maintained on natural pastures and other feed resources for the supply of needed nutrients (Babayemi *et al.*, 2006). Feeding ruminants especially goats during the dry season has always been a challenge to farmers as good quality pastures rich in protein, energy and other essential nutrients are scarce and without supplementation performance of animals is seriously impaired. Noticeable effects like weight loss, reduced productivity of goats (Collins and Owens, 2003) and reproductive ability among others could be observed during this time of drought especially in pregnant ones.

Reproductive performance of goats is the most valuable trait that determines sustainability and continual use as a valuable resource to improve livelihoods (Devendra, 2001). West African Dwarf is the most common breed of goats which is indigenous to and found in the south-western Nigeria. Their fast reproductive and fast growth rates and shorter gestation length helps in early return on investment (Oppong-Anane, 2008). They are highly prolific, hardy with an average kid's birth weight of 1.15kg (Ayizanga *et al.*, 2018). Kalahari Red goats (KR) on the other hand are indigenous to South Africa. They

are also prolific and hardy with an average kid's birth weight of 3.18kg (Oderinwale *et al.*, 2017a). Average net weight gain reported by Oderinwale *et al.* (2017b) for pregnant KR was 8.78kg. KalaWAD is the offspring resulting from the crossing of pure Kalahari Red buck with West African Dwarf Doe (Oderinwale *et al.*, 2020). Coat colours can be brown; brown with black patches; black with brown patches; and combination of more than two colours. KalaWAD is expected to adapt well with good growth and reproductive performances.

MATERIALS AND METHODS

Experimental Site

The study was conducted at the Kalahari Red Goats Unit of Livestock Production and Research Programme under Institute of Food Security, Environmental Resources and Agricultural Research (IFSERAR), Federal University of Agriculture Abeokuta (FUNAAB).

Animal Management Procedure

Forty five (45) primiparous non pregnant and non-lactating does were sourced from IFSERAR, FUNAAB. The goats comprised of 15 each for Kalahari Red (KR), KalaWAD (KW) and West African Dwarf (WAD) Does. Oestrous synchronization by intramuscular injection of Lutalyse® according to the procedure of Heise (2012) was done, after which Does on heat were mated by introducing six (6) healthy and proven KR bucks (i.e. 2 bucks per goat breed) into the pens where the animals were housed for a minimum of 5 hours/day for a week.

The pregnant Does were fed individually with known quantities of concentrate diet and Congo grass (*Brachiaria ruziziensis*) in the morning (8:00am) and afternoon (4:00pm) respectively for 24 weeks (162 days) until when all the Does kidded. Cool and clean drinkable water was supplied to the Does at all times. Flock treatment of the animals was carried out prior to mating.

Composition of the Concentrate Diet

The concentrate diet is composed of maize (15%); wheat offal (42%); palm kernel cake (30%); soybean meal (4%); groundnut cake (3%); bone meal (3%); limestone (1.5%); common salt (1%); and premix (0.5%).

Nutrient Compositions of Concentrate and Grass Fed to the Animals

Samples taken from concentrate diet and *Brachiaria ruziziensis* were milled, and kept until when needed for proximate analysis according to the AOAC (2005) procedure and fibre fractions according to Van Soest *et al.* (1991).

Statistical Analysis

Data obtained were subjected to analysis of variance using General Linear Model as contained in Minitab® 17.1.0 (2013 edition). Significance level was taken at 5% probability, while significant means were separated using Duncan Multiple Range Test of same statistical package.

RESULTS AND DISCUSSION

Table 1 shows the proximate composition and fibre fractions of concentrate diet and *Brachiaria ruziziensis* fed to the pregnant Does. For concentrate diet, 16.49% was obtained for crude protein (CP), while 12.27MJ/kg DM was obtained for metabolisable energy. The values for these major feed constituents are sufficient to meet the need of the Does based on the reports of NRC (2007) which recommends CP range of 13-14% and Agricultural and Food Research Council (1998) which recommends metabolisable energy of 11.30MJ/kg DM for pregnant goats.

KR Does had the highest significant ($p < 0.05$) value of 42.13kg for weight within 24hrs before kidding, followed by KalaWAD with 39.46kg, while lowest value of 37.24kg was recorded by WAD. Similarly, KR Does recorded 36.90kg for weight within 24hrs post-kidding, followed by KalaWAD with 33.96kg, while WAD recorded 30.64kg for same parameter. Differences observed could be as a result of rates of nutrients utilisation and mobilisation for various foetal materials, especially the afterbirth. Metabolic weight gain and final metabolic weight of 14.21 and 16.41g/day/ $W^{0.75}$ respectively were recorded for KR Does. KalaWAD Does recorded 13.78g/day/ $W^{0.75}$ for metabolic weight gain and 15.64 g/day/ $W^{0.75}$ for final metabolic weight. WAD Does recorded 13.27 and 14.79g/day/ $W^{0.75}$ for metabolic weight gain and final metabolic weight respectively. Gross weight gain of 14.78kg was recorded for KR Does, followed by KalaWAD with 12.12kg, while 9.88kg was recorded for WAD for same parameter. Net weight gain of 9.55kg was recorded by KR Does, followed by KalaWAD with 6.62kg, while WAD had 3.28kg. KR

Does recorded 64.15g/day for daily weight gain less foetal and afterbirth weight, followed by KalaWAD with 43.41g/day, while WAD recorded 22.85g/day for same parameter. Breeds of goats had no significant effects ($p>0.05$) on metabolic initial weight, daily weight gain, feed conversion ratio and protein efficiency ratio. Significant values recorded for the intakes and weight changes (gross, net and daily weight gains) by KR Does could be attributed to heavy breed of the goat, which make them to have capacity to consume more feed than KW and WAD goats with relatively small size in terms of body weight.

Table 1: Nutrient compositions of concentrate diet and *Brachiaria ruziziensis*

Parameters (%)	Concentrate diet	<i>Brachiaria ruziziensis</i>
Dry Matter	88.19	89.12
Crude Protein	16.49	8.01
Ether Extract	2.48	2.41
Crude Fibre	27.50	24.54
Ash	10.98	7.78
Nitrogen Free Extract	41.74	54.17
Organic Matter	89.02	92.22
Neutral Detergent Fibre	62.67	65.33
Acid Detergent Fibre	38.00	45.33
Acid Detergent Lignin	10.67	13.33
Hemicellulose	24.67	20.00
Cellulose	27.33	32.00
*ME (MJ/kg DM)	12.27	12.21

*Calculated using De Boever *et al.* (1997) equation **ME** is Metabolisable Energy

Table 2: Growth performance of three breeds of goat during pregnancy and shortly after kidding

Parameters	Kalahari Red	KalaWAD	WAD	SEM
Grass Intake (g/day on DMB)	99.70 ^a	97.67 ^a	77.87 ^b	2.51
Conc. Intake (g/day on DMB)	867.10 ^a	595.85 ^b	551.60 ^c	11.15
Total Feed Intake (g/day on DMB)	966.80 ^a	693.53 ^b	629.50 ^c	11.14
Weight within 24hrs BK (kg)	42.13 ^a	39.46 ^a	37.24 ^b	0.97
Weight within 24hrs PK (kg)	36.90 ^a	33.96 ^a	30.64 ^b	1.34
Weight Gain (g/day/W ^{0.75})	14.21 ^a	13.78 ^a	13.27 ^b	0.18
Initial Weight (g/day/W ^{0.75})	11.88	11.83	11.69	0.57
Final Weight (g/day/W ^{0.75})	16.41 ^a	15.64 ^a	14.79 ^b	0.31
Gross Weight Gain (kg)	14.78 ^a	12.12 ^a	9.88 ^b	1.08
Net Weight Gain (kg)	9.55 ^a	6.62 ^a	3.28 ^b	1.34
Daily Weight Gain (g/day)	99.09	79.84	68.55	7.41
Daily Weight Gain less foetal and afterbirth weight (g/day)	64.15 ^a	43.41 ^{ab}	22.85 ^b	8.68
Feed Conversion Ratio	10.44	8.83	9.96	0.76
Protein Efficiency Ratio	0.68	0.79	0.72	0.06

^{abc} Means on the same row having different superscripts are significantly different ($p<0.05$)

DMB is Dry Matter Basis **Gross weight**= Weight within 24hrs before kidding (**BK**) -Initial weight at mating

Net weight gain= Weight within 24hrs post-kidding (**PK**)-Initial weight at mating

CONCLUSION: It could be concluded that growth performance during pregnancy and shortly after kidding was influenced by breeds of goats. Kalahari Red goats performed better compared to other breeds.

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