

GROWTH PERFORMANCE OF SAHELIAN AND RED SOKOTO KIDS FED *DIGITARIA SIMUTSII* HAY SUPPLEMENTED WITH CONCENTRATE.

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SUMMARY

A study was conducted to evaluate the comparative growth of 2-colour coat types of the Sahelian breeds of goats along side the Red Sokoto. Animals were group-fed based on gender and fed concentrate supplemented with *Digitaria simutsii* hay. The growth trial lasted for 150 days with 14-day digestibility trial. Prior to the growth trial kids were monitored from birth to weaning age. The treatment groups were Red Sokoto kids (RD), black and white coated Sahelian kids (BW) and red and white Sahelian kids (RW). There was significant difference between the breeds; the birth weights were, 1.00 kg, 2.42 kg, and 1.97 kg, and weaning weights were 7.50 kg, 7.63 kg and 7.83kg for RD, BW and RW, respectively. The weight changes were 6.1 kg, 5.6 kg, and 5.6kg for RD, BW and RW, respectively over the period of 150 days. The differences noticed were based on gender, where males recorded higher weight changes than the females. The birth, weaning weight and weight changes were 1.53, 6.98; 5.3 for females and 2.06, 8.36, 6.4kg for males. Although all reported values do not show any significant differences, except for differences by sex, the graphical picture demonstrates linear increase in weight gains of RW over BW with RD showing high values.

Key Words: goats, growth, sahelian, Red Sokoto.

INTRODUCTION

Livestock production and research have been geared towards increasing livestock numbers, rather than on raising and intensifying the productivity of individual animals, breeds and species. Even when research is carried out in ruminants it has always been to address production of cattle and sheep, little is done to address other species like goats and camels (Bogoro *et al.*, 1999, Haenlein, 2001, Dhanda *et al.*, 2003, Kosgey *et al.*, 2005). Small ruminants, including goats which are estimated to be about 34.45 million in Nigeria, (Rims 1992) contribute about 30 % of all meat consumed by the populace in Nigeria, thereby having the potential to bridge the gap between demand for animal protein and actual amount supplied in Nigeria and Africa. There are two main types of goats in the Sudan savanna, the Red Sokoto and the Sahelian respectively.

The Red Sokoto goat is predominantly reddish brown in colour, while the colours of the Sahelian range from white, mixture of white and brown or white and black, the kids of Red Sokoto weigh about 1.5-2.0 kg at birth while adults weigh between 20-35 kg. (Osuhor *et al.*, 2002). The kids of Sahelian goats weigh between 2.0-2.8kg at birth and matured adults weigh between 31-50kg (Akinwale *et al.*, 1999). The birth weight of the kid and its subsequent weight before weaning is usually a function of the dams mothering ability (Pfeffer and Rodehuntsard, 1998). Therefore if goats are properly managed, they can achieve high productive gains because they possess peculiar qualities that are not common to other ruminants (Silanikove, 2000). One of the ways in which the growth rate of kids can be improved is by increasing the dietary protein level of their diet. Negesse *et al* (2001) were able to double the weight of kids by increasing their dietary protein level, but the recommended optimal levels of 16% has been demonstrated to supply the required nutrients for growth and finishing of lambs and kids. (Haddad *et al.*, 2001; Abi Saab *et al.*, 1997). These include selective grazing and browsing, better digestibility of roughage, higher milk production per unit weight, high fecundity, to mention a few (Alcaide *et al.*, 1997;

Goorewordene *et. al.*, 1999). In Nigeria, research is beginning to evaluate the authenticity of indigenous knowledge (IK) that has been accumulated from experience over centuries of experimentation and practice. This IK will complement science-based knowledge in support of raising livestock productivity. Therefore this study was undertaken to evaluate the comparative growth performance of Sahelian and Red Sokoto kids fed *Digitaria simutsii* hay supplemented with concentrate.

MATERIALS AND METHOD

Location

The experiment was conducted at the National Animal Production Research Institute, (NAPRI), Shika, Ahmadu Bello University, Zaria, Nigeria. Shika is situated in the Northern Guinea Savanna between latitudes 11° and 12° N, and between longitudes 7° and 8° E; at an elevation of 650m; with a mean annual rainfall of 1150mm.

Experimental Animals

A total of forty primiparous does, comprising of twenty each of Sahelian and Red Sokoto goats were purchased from Niger Republic along with their respective bucks. Blood and faecal samples were taken to laboratory for protozoan and helminth evaluation. Animals were thereafter treated against coccidiosis, helminthosis and ticks using sulphadimadin, thiabendazole^R and ivomec^R respectively. Does were then synchronized using progesterone sponges and hand mated after 2 weeks of treatment. Following kidding, weight changes of dams and kids were recorded weekly. At weaning, a total of 27 kids, comprising 18 and 9 kids of Sahelian and Red Sokoto breeds, respectively were involved in a growth trial that lasted 150days. Each group was made up of 5 males and 4 females and fed according to sex.

Feeds

The basal diet was *Digitaria simutsii* hay, which constituted 50% of the ration while the supplement was also fed at 50% of the diet. The

be visual. Even though the Sahelian kids consumed more feed, the Red Sokoto grew faster than them, to the extent that their weaning weights were comparable possibly due to the inherent breed differences or environmental adaptation as have earlier been reported (Tauh *et. al.*, 2005). The difference in weight changes between the Red Sokoto and Sahelian breeds may be due to environmental differences between the arid regions where the Sahelians are found to be predominant, and the savanna, which is the habitat of the Red Sokoto. In the arid regions the Sahelian feeds on browses and shrubs, which usually contain more protein and are available all year round to support them during the dry spells (Aganga and Monyatsiwa, 1999; Papachritou *et. al.*, 1999). The Red Sokoto are already adapted to this guinea savanna so that even when they consume less feed they are able to utilize it for maximum gains, while the Sahelian were yet to adjust for that benefit from the available

feeds. The works of various scientists demonstrate that browses and shrubs are able to sustain and improve goat productivity in the arid regions (Papachritou *et. al.*, 1999; Aganga and Monyatsiwa, 1999; Ahmed and Nour, 1997; and Hatenda *et. al.*, 1992).

The implication of this work for us is that the red and white Sahelian goats had better growth performance than the black and white Sahelian goats in the savanna ecological zone. More work needs to be done to document all productive and reproductive performance of the red and white for future breeding and cross breeding with the red sokoto breed. It can be thus be concluded that the Sahelian breeds of goats can adapt and thrive in the Sudan Savanna zone of Nigeria, however, the Red Sokoto goats performed better than the Sahelian goat in this zone. The Faster growth rate of the red and white strain of the Sahelian can be harnessed in breeding programmes with regards to crossing with other breeds.

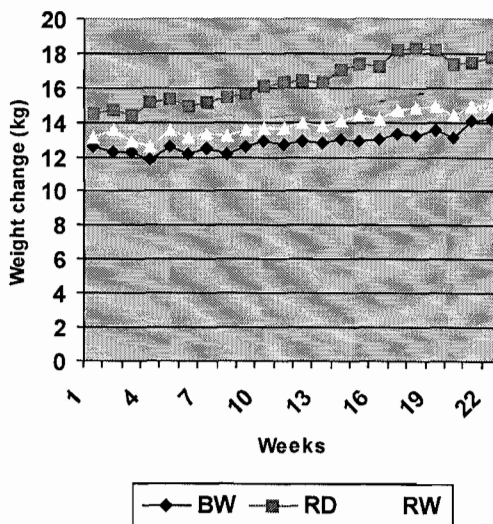
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Table 1: Feed ingredients and their chemical composition

| Feed Ingredients | Percent diet (%) | Dry Matter | Organic Matter | Crude Protein |
|------------------|------------------|------------|----------------|---------------|
| Maize | 26.1 | | | |
| Cottonseed cake | 43.1 | | | |
| Wheat bran | 27.8 | | | |
| Bone meal | 2 | | | |
| Salt | 1 | | | |
| Supplement | | 95.59 | 90.16 | 20.63 |
| Hay | | 93.6 | 85.86 | 7.74 |
| Maize Stover | | | | |

Fig 1 Growth performance of the Red Sokoto and Sahelian breeds of goats



supplement consisted of the following ingredients: maize (26.1%); wheat offal (27.8%); cottonseed cake (43.1%); bone meal (2%); and salt (1%) (Table 1). *Digitaria simutisii* was cultivated on station, baled in late October for storage and fed as roughage. Water and Mineral licks (manufactured by Whitebarn Limited, Winsford, U. K.), were provided *ad libitum*. Samples of concentrate and hay were analysed for dry matter, organic matter and crude protein

Fresh feed was provided to animals daily. Feed was supplied at 4% of their body weight with concentrate at 2 % and hay 2%. Animals were weighed weekly and their feed adjusted according to the weight change with a 10% increment to allow for refusal.

Digestibility trials

The same animals used in the growth trial were used for the digestibility trials. Animals were allowed 7 days to adjust to the metabolic crates and samples recorded for 7days. Samples collected included feed offered, feed refused and 10% of the faeces produced throughout the whole day and night. Feed offered, feed refused and faecal samples were analyzed for dry matter, organic matter and nitrogen.

Data collection and statistical analysis

The feed intake, average daily gain, and digestibility coefficient data were analysed using the general linear model (GLM) procedures in the Statistical Analysis System (SAS, 2000). Proc Mixed procedures of SAS 2000 were used for the repeated measures analysis of the milk yield data. The difference between treatments means were tested using pair-wise difference, PDIFF All differences were considered significant at $P < 0.05$.

RESULTS

The birth weight and weaning weights of the female kids were significantly lower than the male kids ($P < 0.05$). The Sahelian kids had higher birth weights (2.2kg) than the Red Sokoto kids (1.0kg kids $P < 0.05$; Table II).

Male kids recorded higher weight changes than the females. Although all reported values do not show any significant differences, except for differences by sex, the graphical picture demonstrates linear increase in weight gains of Red Sokoto over the Sahelian (Fig 1). The black and white Sahelian kids had higher birth weights (2.4kg) than the Red and white Sahelian (1.9kg) or the Red Sokoto (1.0kg) kids ($P < 0.05$).

The average daily gain was significantly higher in the Red Sokoto (66.9gm) and males (61.9gm) as compared to the Sahelian (46.6gm) or female kids (44.9gm), ($P < 0.05$). The results of the intake and digestibility are shown in Table 3. There was no difference for intakes and digestibility between breed and sex, ($P > 0.05$; Table 3). However, the Sahelian consumed more feed and had higher digestibility than the Red Sokoto. The values for intake ranged from 657.4 to 828.1g/kg, 613.3 to 771.9g/kg and 99.5 to 124.9g/kg for dry matter, organic matter and crude protein respectively.

DISCUSSION

There is a deficiency of goat breeding in Nigeria, which has been associated with lack of adequate data on all the breeds of goats. Most works have addressed problems in sheep and cattle, and rarely in goats. Available research has looked at performance of Red Sokoto or West African Dwarf goats found in Nigeria (Tuah *et al.*, 2005). The results of this study have shown that the males of both Sahelian and Red Sokoto kids were born heavier than the females and this corroborates the reports of Pfeffer and Rodehutsord (1998). The males of both breeds also grew faster than the females, similar to the earlier of Al-Nakib *et al* (1996); Santra and Karim (1999). The males tend to have heavier bone structures, which serve as the frame for the heavier weights. The weight changes of Sahelian kids were not different between the two colour coats, but when plotted graphically the Red and white kids seemed to grow faster than the black and white kids. Since the farmer may not be weighing the kids, it is apparent that his perception of their growth rates would

Table 2: The Least square means of birth weight, weaning weight and weight change of Red Sokoto and Sahelian breeds of goats

| Growing kids | | | | | | | | | |
|--------------------|--------------------|--------------------|------|--------------------|--------------------|------|--------------------|----------------------|------|
| | Red Sokoto | Sahelian | SE | Female | Male | SE | BW | RW | SE |
| Birth weight | 1.00 ^b | 2.20 ^a | 0.23 | 1.50 ^b | 2.10 ^a | 0.23 | 2.40 | 1.90 | 0.17 |
| Weaning weight | 7.50 | 7.80 | 0.64 | 7.00 ^b | 8.40 ^a | 0.64 | 7.70 | 7.80 | 0.42 |
| Initial weight | 14.80 ^a | 12.90 ^b | 1.15 | 12.80 ^b | 14.60 ^a | 0.81 | 12.55 | 13.08 | 1.04 |
| Final weight | 18.90 ^a | 14.40 ^b | 1.79 | 14.70 ^b | 17.90 ^a | 1.02 | 14.22 | 14.98 | 1.66 |
| Weight change | 6.3 ^a | 5.6 ^b | 0.64 | 5.3 ^b | 6.4 ^{0a} | 0.64 | 5.60 | 5.60 | 0.43 |
| Average daily gain | 66.9 ^a | 46.6 ^b | 1.59 | 44.9 ^b | 61.90 ^a | 1.58 | 45.10 ^b | 48.10 ^{a,b} | 1.58 |

^{ab} Means in the same row bearing different letter superscript differ significantly (P<0.05)

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Table 3: The least square means of Intakes, digestibility (%) of dry matter, organic matter and Nitrogen of Red Sokoto and Sahelian goats

| Post-weaning kids | | | | | | | | | |
|------------------------------|------------|----------|-------|--------|--------|-------|--------|--------|-------|
| | Red Sokoto | Sahelian | SE | Female | Male | SE | BW | RW | SE |
| Dry matter intake | 657.4 | 818.8 | 38.95 | 704.20 | 798.90 | 38.95 | 828.10 | 806.10 | 64.72 |
| Organic matter intake | 613.30 | 763.20 | 36.26 | 655.60 | 745.90 | 36.26 | 771.90 | 751.60 | 60.26 |
| Nitrogen intake | 99.60 | 120.40 | 5.74 | 98.60 | 124.90 | 5.74 | 121.90 | 118.40 | 9.55 |
| Dry matter Digestibility | 78.10 | 75.60 | 2.84 | 76.90 | 77.90 | 2.84 | 73.90 | 80.30 | 2.23 |
| Organic matter digestibility | 78.60 | 76.40 | 2.14 | 77.50 | 78.60 | 2.14 | 74.70 | 81.10 | 2.15 |
| Nitrogen Digestibility | 63.20 | 55.20 | 6.09 | 57.20 | 60.10 | 6.09 | 54.10 | 58.20 | 5.23 |

BW = Black and White strain of Sahelian goats

RW = Red and White strain of Sahelian goats

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