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GROWTH RESPONSE OF RED SOKOTO CASTRATE SUPPLEMENTED AND DEWORMED IN BAUCHI STATE, NIGERIA

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ABSTRACT

The experiment was conducted at the Small Ruminant Teaching and Research Farm, Abubakar Tafawa Balewa University, Bauchi. The objective of the study was to evaluate the effect of concentrate supplementation and deworming on the intake and growth performance of Red Sokoto castrate goats. Twenty four young growing castrates were purchased from open markets in Bauchi metropolis and allotted to four treatments with six castrates each in completely randomized design. The factors considered were supplemented animals (S), not supplemented (N/S), dewormed (D) and not dewormed (N/D).. Data collected were feed intake, daily weight gain, and worm egg counts. The experiment lasted for three months. The results showed that the chemical composition of the experimental diets meets the requirement of small ruminants. The initial weights of the castrate goats were 7.17, 7.33 and 7.67 kg with no significant (P0>.0.5) differences. Final weight gain values were 10.67, 11.17, 11.00 and 13.17g/day with no significant (P0>0.5) differences. The daily weight gain ranged between 27.78 and 42.59g/day which were not significant (P0>0.5) as well. The daily concentrates intake were however significant (P<0.01) among supplemented/not dewormed and supplemented/dewormed castrates. Daily weight gain values were 29.63, 31.48, 27.78 and 42.59g with no significant (P>0.05) differences. Worm egg counts at the beginning, at the middle and end of the experiments were significant (P<0.05) among the treatment groups with values ranging between11.50 and 47.17%, 5.78 and 10.07% and 6.33% respectively. It can be concluded that supplementation and deworming will improve the growth performance of castrate goats.

Keywords: Castrate, deworming, goats, supplementation, worm egg count

INTRODUCTION

It has been reflected time and again that livestock in Nigeria is an important and integral component of agriculture, which is the backbone of the economy. The subsector does not provide the much-needed animal protein for the ever-growing human population but it offers employment opportunities for millions of rural and urban dwellers involved in some form of livestock production and marketing (Belanger and Bredesen, 2010).Livestock is an important elements of the pathway out of poverty for millions of the rural dwellers in Nigeria and other African countries. They have a special role to play in the conversion of feed that is unsuitable for humans into food and other useful products (Adegbola, 1998). They also play a key role in the lives of poor rural people, providing a major proportion of their cash income, capital assets, draught power, fuel and fertilizer (Bogoro *et al*., 1999). The sale of livestock accounts for more than 30% of the family cash income for small farmers. In developing countries, livestock contributes

more than 50% of the agricultural gross domestic product (GDP) and more than 20% of the total gross domestic product (FAO,1995). Approximately294 million goats are found in Africa and about 53.8 million of them are in Nigeria which represents 18.3% of its population in Africa (Gagiotti *et al.,* 2008).

Despite the large size of the country's goat population, the productivity *per* unit of animal and the contribution of this sector to the national economy is relatively low. These may be due to different factors such as poor nutrition, prevalence of diseases, lack of appropriate breed, breeding strategies and poor understanding of the production system as a whole. The indigenous goat breeds, however, have relative advantage in their natural habitat (Adegbola, 1998). Kiwuwa (1992) also observed that the broad genetic variability of African small ruminant breeds enabling them to survive under stressful environmental conditions, including high disease incidence, poor nutrition, and high temperature. Environmental pressure also maintains a wide range of genotypes, each adapted to a specific set of circumstances.

Considering goats, in particular, they have a great role in the economy of farming community of Nigeria. Sale of goats and goat products (meat, skin, and milk) by farming communities is a source of cash for the purchase of clothes and other essential household commodities. In addition, goats are raised mostly to safeguard against crop failure and unfavorable crop prices in intensive cropping areas. Goats represent a more liquid form of capital than cattle and are readily tradable (Steele, 1996).The overriding constraint of livestock production in the country is believed to be shortage of feed and improper medication. Poor grazing and low quality feed, especially in terms of energy or protein lead to undernourishment and low productivity (Akingbade, 2004). Under such circumstances, the concept of utilizing locally available agro-industrial product as a supplementary feed may be a feasible feeding system for farmer's and commercial production and at the same time converting non edible agro- industrial byproducts into highly nutritious animal feeds (Ademosun,1992). The system would create possibilities of getting alternative feeds to ensure that the animals take complementary rather than a competitive part with man (Alemu*et al.,* 1989).Therefore, assessing the potential of available genetic resources, and identifying and prioritizing the major constraints limiting the traditional goat production system are immediate tasks in order to carry out research and development strategies in the areas of feed quality and worm load reduction.

MATERIALS AND METHODS

The Study Area

The study was carried out at the Teaching and Research Farm of Department of Animal Production, Abubakar Tafawa Balewa University Bauchi in Bauchi State, North-eastern part of Nigeria. The study site is located between longitude 10^0 31^1 N and latitude 9^0 84^1E.It shares border to the north with Kano and Jigawa, to the south with Taraba and Plateau, to the east with Gombe and Yobe and to the west is Kaduna (FRNOG, 2007). The mean annual rainfall varies from 800mm to 1094mm as one moves from North to South, with the mean daily maximum temperature as 33.5^{o}C (FRNOG, 2007).

Experimental Animals and their Management

Twenty four goats were purchased from the nearby markets in Bauchi, and the goats weighed between 7 and 9kg on arrival. They were quarantined for two weeks (14days). The animals were drenched and injected with broad spectrum antibiotic and were ear-tagged for easy identification. The animals were vaccinated against Peste des petit ruminant (PPR) at the dose rate of 1m *per* animal at the thigh muscle. The animals were castrated using

a burdizor castrator (close castration) and thereby followed with oxytetracycline LA to control secondary bacterial infection and treatment of other disease conditions. The animals were housed in their individual pens after grazing

The concentrate was a mixture of maize bran (MB) and cottonseed cake (CSC) mixed in ratio 2:1 respectively fed at the rate of two percent each of its total body weight. The animals belonging to the treatment groups to be dewormed (D/NS, S/D) were given albendazole 1bolus *per* 10kg forth nightly throughout the three months of the research work. Water was always available at their pens and at water points during grazing and animals had access to potash (kanwa) a source of minerals alongside the concentrate.

Experimental Design

Twenty four castrated Red Sokoto bucks were used for this experiment with an average initial weight ranged from 7-8kg. The bucks were allotted to four (4) treatments and six (6) replicates in a completely randomized design. The animals were managed under semi-intensive system divided into four (4) treatment groups:

- Control not supplemented and not dewormed (ND/ND)
- Dewormed but not supplemented (D/NS)
- Supplemented but not dewormed (S/ND)
- Supplemented and dewormed (S/D)

The animals were supplemented in the morning before grazing with maize bran and cottonseed cake in the ratio of 2:1.The quantities of feed offered to the goats were given based on 2 % of their body weight.

Data collection

Supplements were offered to the animals in the morning before taking them for grazing. The leftover were weighed and deducted from the initial quantity supplied. The experimental animals were weighed at the end of every week using a weighing balance. The average weight of each treatment was recorded as the weekly gain and worm egg count was determined by collecting faecal samples from the experimental animals using polythene bags. The faeces were collected via rectum of the animals. In the laboratory, the samples were analyzed and worm egg count determined using the Mc master techniques of Soulsby (1982). The study was conducted towards the end of the rainy season (between September and November). Two grams of faecal sample was weighed and placed into a test tube, 15mls of distilled water was added, and the faecal sample was then loosened using a glass rod and was shaken vigorously. Ten ml of saturated sodium chloride (common salt) was added to each bottle and the content shook vigorously again. The contents were sieved to remove the supernatant after settling for 5minutes.Using a Pasteur pipette, the two chambers of the McMaster slide were filled up. Air bubbles were avoided and all liquid drops wiped off, the slide is often left on the table for 5minutes before it is examined under the microscope using x10 magnification objective piece for worm eggs. There after all the eggs lying within the ruled areas were counted, egg count *per* gram was then calculated as a sum of counts of eggs from the two chambers was x200 and if it is only one chamber it is x100.

Chemical analysis

Feed samples (supplements) were analyzed for dry matter (DM), organic matter (OM), and crude protein (CP) using the procedure of Association of Official Analytical Chemist (AOAC, 2009). Neutral detergent fibre (NDF), acid detergent fibre (ADF) and hemicelluloses were determined by the procedure of Van Soast (1992).

Statistical Analysis

Data obtained were analyzed using statistical packaged for social sciences SPSS 16.0 (2009). Significant differences among means were

separated using least significant differences (LSD).

RESULTS AND DISCUSSIONS

Chemical Composition of Experimental diet

Table 1 shows the chemical composition of experimental diet. The Dry matter of maize bran and cotton seed cake were 89.29% and 89.11%. The organic matter of the two ingredients was 99.9% for maize bran and 99.77% for cotton seed cake. Crude protein of both maize bran and cotton-seed cake were 11.89% and 30.58% respectively. The acid detergent fibre was also19.56% for maize bran and 16.23% for cotton seed cake. Neural detergent fibre was recorded as26.54% for maize bran and 20.68% for cotton seed cake. Hemi-cellulose had 6.98% in maize bran and 4.45% for cotton seed cake.

Table1: Chemical Composition of Experimental diet

Ingredient	Parameters					
	DM	OM	CP	NDF	ADF	HC
Maize bran	89.29	99.05	11.89	26.54	19.59	6.98
Cotton seed cake	89.11	98.77	30.58	20.68	16.23	4.45

DM = Dry matter, OM = Organic matter, CP = Crude protein, NDF =Neutral detergent fibre, ADF =Acid detergent fibre and HC = Hemicellulose (HC)

Effect of concentrates and deworming on the performance of castrate goats

There were no significant (P>0.05) differences in the initial body weight of all the castrates in the treatment groups and values ranged between 7.17and7.67 kg as shown in Table 2. The final weight values ranged between 10.67 and 13.17kg. This is in agreement with the work of Sigimoto *et al*, (2003) that supplementation did not differ in the wet season due to crude protein (CP) source obtained when grazing steer calves were fed with supplements. The present work is in agreement with the work of Luka *et al*, (2009) who reported that animals supplemented and those not supplemented in the rainy season had similar weight gains. This study also conforms with the research conducted by Kabir *et al*. (2002) using grazing goats and supplemented with high protein and low protein diet which showed no significant difference between the diets in DM intake and live weight gain, although there was a tendency of increased live weight gain in goats given high protein diet. The values shown in the table indicated that those supplemented and dewormed had higher values of 42.59g/day. This agreed with the report of Mukassa-Mugerwa *et al*. (1989) who reported that growth rate of goats in Ethiopia under a semi-intensive system of management reaches 44 g/day at 3 month. The little difference might be due to location, weather and time of research. There were significant (P<0.01) differences recorded with daily concentrate intake in which values for those supplemented and dewormed (S/D) was 124.33g while supplemented but not dewormed (S/ND) had 102.28g. There were however no significant (P>0.05) differences between the daily weight gain among the treatment groups with a range of 27.78-42.59 g/day. The supplemented and dewormed castrates had the highest value (42.59g) of daily weight gain followed by those dewormed and not supplemented (D/NS) with 31.48g, control (29.63) followed by those supplemented and not dewormed having the lowest value of

10.67g. The significant differences agrees with the findings of Adamu *et al.,* (2004) who reported that the increase in weights resulted from the inclusion of concentrate which has higher density than the feeds with higher percentage of roughages. Adeleye (1998) reported equally that inclusion of concentrates in ruminant diet enhances feed intake. Giger and Sauvant (1991) demonstrated that animals normally eat enough amounts of forages and feed which satisfy their protein, and energy requirements from grazing. So, strategic supplementation of energy, protein and minerals offer an important means to ensure that animal performance is not reduced, especially during the critical periods of feed shortage (Ranjhan, 1980).

Table 2: Effect of concentrates and deworming on sthe performance of castrate goats

Parameters	**Treatments**				**SEM**	**LS**
	Control	**D/NS**	**S/ND**	**S/D**		
Initial weight (kg)	7.17	7.33	7.67	7.33	0.24	N
Final weight gain (kg)	10.67	11.17	11.00	13.17	0.49	NS
Daily concentrate intake(g)			102.28^{b}	124.33^{a}	5.22	**
Daily weight gain(g)	29.63	31.48	27.78	42.59	2.99	NS

$^{a, b, c, d}$ means with different superscripts along the same row are significantly (P<0.05) different, SEM-standard error of the means, LS = Level of Significance, NS-Not D/NS-dewormed but not supplemented, S/ND-supplemented but not dewormed, S/D – Supplemented and dewormed..

Effect of concentrates and deworming on worm egg count of castrate goats

Table 3 shows the effect of concentrates and deworming on worm egg count of castrate goats, where significant (P<0.05) difference were observed in all the treatment groups. Animals on treatment 4 (S/D) had the lowest egg count at the beginning of the experiment with (11.50%) while animals on treatment 3 (S/ND) with (47.17%) having the highest egg count. Treatment 4 (S/D) also had the lowest egg count at the middle of the experiment with (5.78%) while treatment 1 (control) had the highest value of 10.0%. At the end of the experiment, treatment 2 (D/NS) had the lowest count of (0.17%) and the control group having the highest (6.33%).The significant (P<0.05) difference observed in all the treatment groups in this study agrees with the report of Akinnusi and Adeleye, (2001) who reported that worm egg count reduction is not influence by the effect of supplementation except if the animals are given adequate routine deworming programme. The worm egg count obtained at the end of .this experiment was lower (0.17%) than those reported by Muensterman and Tome, (1989) who worked on strongyle eggs and observed count of over fifteen percent both untreated and control or dipped and drenched sheep and goats. Grunner and Caberet (1985) reported a negative egg count of below fifty percent which shows that there was a poor efficacy of the dewormers used against the nematodes in sheep and goats.

Table 3: Effect of concentrates and deworming on worm egg count of castrate goats

Parameters	Treatments				SEM	LS
	Control	D/NS	S/ND	S/D		
Worm egg count % (AB)	27.00^{c}	15.17^{b}	47.17^{d}	11.50^{a}	2.89	*
Worm egg count % (M)	10.07^{d}	7.64^{b}	7.68^{c}	5.78^{a}	0.32	*
Worm egg count % (END)	6.33^{d}	0.17^{a}	6.17^{c}	0.50^{b}	0.62	*

$^{a, b, c, d}$means with different superscript along the same row are significantly ($P<0.05$), SEM-standard error of the mean, LS = Level of Significance, D/NS- dewormed but no supplements, S/ND – supplemented but no deworming, D/S- dewormed and supplemented, AB-at beginning.

CONCLUSION AND RECOMMENDATIONS

It can be concluded from the findings of this work that deworming and supplementation can result in significant decrease in worm egg count and an increase in concentrate intake. Good housing and other medications should be given attention for goat productivity. Red Sokoto goats should be subjected to routine deworming programme to reduce worm burden and improve feed utilization and growth.

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