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Feed Intake and Nutrient Digestibility of Castrate and Non-Castrate Savannah Brown-Goats

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ABSTRACT

Ten savannah brown goats were investigated for feed intake and nutrient digestibility when fed concentrates and forage diets. The goats were randomly assigned to two treatment groups, each with five replicates consisting of five castrates and five non-castrates. One thousand grams of mixed diets were offered per goat/day. Total daily faecal output of each animal was collected. The total faeces collected was oven-dried at 65°C for 48 h and analyzed for Dry Matter (DM), Crude Protein (CP), Crude Fibre (CF) Ether Extract (EE), ash and Nitrogen Free Extract (NFE). There was a significant ($p = 0.05$) difference between the feed intake of castrates and non-castrates. Castrates had a highly significant ($p < 0.05$) feed intake (1107.1) than non-castrates (1071.2 g). Apparent digestibility coefficient values indicated that castrates had higher values for DM, CP, EE, ASH, NFE and CF though, there was no significant difference ($p > 0.05$) between the two group of the experimental animals for C.F. It was concluded that castration of male goats favours feed intake, better feed utilization thus increase in live weight gain. Therefore, castration of surplus male goats not required for breeding programmes will improve their meat potentials.

Key words: Apparent digestibility, castration, feed intake, savannah brown goats

INTRODUCTION

In 2008 the world population of goat was estimated to be about 862 million of, which 291 million (34%) were in Africa (FAO, 2010). In Nigeria goat population was estimated to be 54 million (FAO, 2010). Goats play an important role in food production systems in developing countries. Their great popularity can be explained by their good adaptation to many different climates (ecological adaptation) and the many uses for, which they can be kept (Jansen and Burg, 2004). Nutritionally, goats are reared for milk and meat production which are high-grade foodstuffs for people (Jansen and Burg, 2004).

They are also a good source of fibre and skin. Goats feature prominently in the economic and social lives of Nigerian. They serve as a quick source of income and play a role in the payment of dowry, ceremonies and are used as sacrificial animal (Oni, 2002; Jansen and Burg, 2004). Inadequate nutrition both in quantity and quality is one of the major constraints limiting livestock production in the developing countries (Makkar, 2002). Therefore, the economic benefit of commercial goat meat production may be enhanced by increasing the efficiency of growth to heavier market weights (Ruvuna *et al.*, 1992) through appropriate and adequate feeding.

Castration is one of the husbandry techniques practiced in a livestock production enterprise. Castration of male kids not required for breeding purposes improve meat qualities (Devendra, 1990; Kaberia *et al.*, 2003; Jansen and Burg, 2004) and increases the carcass weight; hence it has proved advantageous in the production of goat meat (chevon) (Akinyosoye, 1976; Kyomo, 1978). The potential for feed intake and feed utilization in castrate and non-castrate goats based on forage and concentrate diets have not be fully documented. This present study was therefore, designed to investigate the feed intake and nutrient digestibility of castrate and non-castrate goats fed on forage and concentrate diets.

MATERIAL AND METHODS

Experimental site: This study was conducted at the Teaching and Research Farm of the School of Agriculture and Agricultural Technology, Minna (9°41 'N, 6°31 'E, 400 m above sea level). Ten Savannah Brown Male goats were used for the study. The goats were procured locally. The mean age for the goats was 12 months. The ages of the goats were assessed as reported by Ensminger (1962) and their live weight was approximately 9.2 kg. Five of the goats were castrated; closed method of castration was employed using a pair of Burdizzo castrator. The animals were neck tagged for ease of identification. They were housed in pens.

The wall and roof of the pens were made of corrugated iron sheets and wire mesh. Wood shavings were provided as bedding to absorb urine and as well as to protect the animals from dampness and/or cold and were changed on weekly basis. A month after castration, the animals were randomized into two treatment groups, each with five replicates. One group was castrated while the other was not castrated, they consist of five castrates and five non-castrates and they were housed in individual pens.

The goats were dewormed, administered with antibiotics and treated against ecto-parasites. The animals were fed for a preliminary period of fourteen days to enable them adjust to confinement and normalize feed intake. Two kg of the feed (forage-Gamba grass and concentrate-cereal bran) was offered to each animal daily along with fresh water (Table 1). Feed refusals were collected and weighed on the following day to determine intakes. Total daily faecal output of each animal was collected. The total faeces collected were oven-dried at 65°C for 48 h.

The dried faeces were weighed, milled to pass through a 2 mm sieve and stored for analysis. The samples of experimental feeds and faeces were oven-dried at 6 S°C for two days and their dry matter determined. The faeces samples were bulked into two groups i.e., castrate and non-castrate and all the samples were analyzed for Crude Protein (CP), Crude Fibre (CF), Ether Extract (EE), Nitrogen Free Extract (NFE), Ash and moisture content. The proximate analysis was conducted according to methods of AOAC (1990). The data obtained from this study were subjected to analysis of variance and multiple range analysis using Statistical Graphics (1987).

Table 1: Composition of concentrate and forage diets fed to the experimental goats

Item	Concentrate (DM)	Forage (DM)
Crude protein	8.78	13.56
Crude fibre	6.20	25.93
Ether extract	5.14	7.41
Ash	6.60	12.50
Nitrogen free extract	73.28	40.60
Total	100.00	100.00

Table 2: Feed intake of castrates and non-castrates

Item	Castrates	Non-castrates
Concentrate (g)	420.5	396.5
Forage (g)	686.6	674.7
Total (g)	1107.1	1071.2

Table 3: Apparent digestibility coefficient of castrate and non-castrates

Digestibility coefficient (%)	Castrate	Non-castrate
Dry matter (DM)	71.07 ^b	67.86 ^a
Crude protein (CP)	68.35 ^b	60.87 ^a
Crude fibre (CF)	79.87	74.80
Ether extract (EE)	62.62 ^b	53.76 ^a
Ash	51.64 ^b	40.31 ^a
Nitrogen free extract (NFE)	81.26 ^b	76.62 ^a

Means with different letters are significantly different (p<0.05)

RESULTS AND DISCUSSION

Table 2 shows the result of voluntary feed intake. The mean feed intake obtained from this study indicates that castrates consumed significantly more (p<0.05) Dry Matter (DM) than the non-castrates (1107.1 vs. 1071.2 g).

In corroboration with the finding in this study, Muhikambebe *et al.* (1994) in their work with saanen goats reported that between 24.5 to 36.0 kg body weight, feed intake was higher in castrates (1290 vs. 1094 g/day) than the intact males.

In contrast with this view, Louca *et al.* (1977) working with Damascus goats concluded that feed intake of castrate was similar to intake of females but lower than the intake of males (1.23 vs. 1.30 vs. kg/head) Adama (1976) working with red Sokoto (Maradi) goats also reported that total feed intake was higher in entire males (57.6 vs. 55.5 g/w kg 75) than the castrates.

The findings of this study in respect of feed intake also agrees with the work of Al-Jalil and Al-Wahab (1985). who found that castrated sheep had higher values for feed intake than for intact male, a conclusion also reached by Field (1971) with cattle.

Apparent digestibility coefficient in this present study indicates that castrates were superior to non-castrates for DM, CP, EE, ASH, NFE and CF (Table 3) though there was no significant difference (p>0.05) between the two groups of the experimental animals for CF. This findings disagrees with the work of Muhikambebe *et al.* (1994) who reported that digestibility coefficient was not significantly affected by castration, although they observed there was a tendency for castrates to exhibit lower digestibility coefficient.

The dry matter digestibility of non-castrate on the experimental diets were lower (p>0.05) 67.36 vs. 71.07. The same trend was observed with crude protein 60.87 vs. 68.35 crude fibre 74.80 vs. 79.87, Ether extract 53.76 vs. 62.62, Ash 40.31 vs. 51.64 and nitrogen free extract 76.62 vs. 81.26. This probably explains the superiority of castrates over non-castrate in this present study in respect to their feed intake and apparent digestibility coefficient.

CONCLUSION AND RECOMMENDATION

From the results obtained from this study. It can be concluded that castrates are superior to non-castrate in feed intake and in apparent digestibility coefficient therefore, castration of goat favours feed intake, better feed utilization hence increase in live weight gain. The result of this

study indicated that castration of goats is of economic importance to goat rearers since castration enhances feed intake, feed utilization and hence increase in live weight gain.

From the foregoing therefore, it is recommended that surplus male goats not required for breeding programmes should be castrated to improve their meat potentials.

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