

PJN

ISSN 1680-5194

PAKISTAN JOURNAL OF
NUTRITION

ANSI*net*

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The Effect of Type of Birth, Sex and Castration on Body Weight and Body Linear Measurements in Pre-Weaning Kids

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Abstract: This study was conducted to determine the effect of castration, sex and type of birth on the rate of body weight gain and linear measurements non castrates, castrates and female Savanna Brown kids. The mean values of the body weight, body length and chest girth of single non-castrates (5.75kg, 53.37 cm and 42.50cm) were higher but not significantly different ($p > 0.05$) from other groups. Single castrates and twin castrates in height at withers (38.86cm and 38.47cm), significantly ($p < 0.05$) differed from that of the females (36.09cm). Singles (non castrates and castrates) shows a superior performance in body weight and body gain measurement, signifying the effect of type of birth. It was concluded that the influence of castration in this study did not appear significant, However, the sex influence appeared positive as males and castrates performed better in most parameters than females.

Key words: Goats, kids, castration, sex, type of birth and pre-weaning

INTRODUCTION

Rapid growth is an essential criterion for improvement of meat production in goats and both genetic and environmental factors are known to affect this parameter. Among the later are age of the doe, year and season of birth, sex of kids, type of birth and level of nutrition. Sound management and health programs are also important prerequisites for rapid growth rates. Growth can be effectively divided into two periods: growth before weaning or pre-weaning average daily gain (ADG) and growth after weaning or post-weaning average daily gain. A high pre-weaning and ADG not only reflects the genetic potential of the kid but also the mothering ability of the doe.

Pre-weaning performance is recognized as an important factor in determining economic returns from meat goats. The opportunity for improving pre-weaning weight of meat goats by castration demands further investigation to properly evaluate their performance. Some research work indicates that castration and the age it is performed has little effect on the slaughter weight of goats (Barret and Larkin, 1974). Muhikambele *et al.* (1996), in assessing the influence of castration on pre-weaning growth rate in goats, found small and non-significant differences and that from birth to weaning, the growth rate could range from 183 to 234g per day. Similarly, the effect of type of birth on growth rate (weight gain) in goats has not been conclusive. While Akpan (2000) observed that singles were heavier than twins and triplets.

Therefore, it is important to determine the appropriate age of castration and the effect of type of birth in Savanna Brown goats. The knowledge of these factors and their effect on the growth rate could be useful in improvement programmes for increasing meat yield from goats. The

objective of this work was therefore, to determine the effect of castration, sex and type of birth on the rate of body weight gain and linear measurements non castrates, castrates and female Savanna Brown kids.

MATERIALS AND METHODS

Twenty (20) Savanna Brown goats (kids) were allocated to five treatments (T) comprising of four goats each. T1 comprised of Single non-castrates; T2 Single castrates; T3 were Twin non-castrates; T4 were twin castrate; while T5 were female twins. The animals were sourced from Bida and Doko towns in Niger state of Nigeria. The kids were allowed to stay with dams under semi-intensive system of management. The goats were provided with supplementary feed consisting of bran, legume haulms and kitchen waste before and after grazing daily. Each goat was monitored from birth to five months of age. The goats were routinely treated for internal and external parasites during the course of the study. The birth weight of the animals were taken within 72 hours of birth and Subsequently body weight and other body parameters were taking every 2 weeks using weighing scale and flexible measuring tape respectively. Each animal was identified with a number tag. Open castration method was used and factorial experimental design was employed.

Data on the influence of castration, sex and type of birth on 20 savanna brown goats (kids) assigned to 5 treatments of 4 replicates were collected over 20 weeks and analyzed statistically by the analysis of variance (ANOVA) using a computer package (Statgraphics, 1987). Significance was determined at 5% level of probability. Castration by the open method was performed 2 weeks after birth on 8 of the 20 kids.

Table 1: Mean body weight (kg) and length (cm) measurements of single non-castrate, single castrate, Twin castrate, Twin Non - castrate and female goats from birth to 5 months

Parameter	Treatments					SEM
	Single Non-Castrate SNC	Single Castrate SC	Twin Non-Castrate TNC	Twin Castrate TC	Female Twin TFF	
Body weight (kg)	5.75	5.68	5.50	5.54	5.19	0.13
Body length (cm)	53.37	50.43	51.83	51.11	49.08	0.52
Height at withers (cm)	38.86 ^{ab}	40.50 ^b	38.45 ^{ab}	38.47 ^b	36.09 ^a	0.31
Chest girth (cm)	42.50	41.24	41.26	41.02	40.66	0.40
Face length (cm)	12.60	14.63	12.24	12.06	11.75	0.34
Fore leg (cm)	37.18 ^{bc}	39.35 ^c	36.20 ^{ab}	35.79 ^{ab}	33.75 ^a	0.29
Hind leg (cm)	38.93 ^{bc}	41.60 ^c	38.86 ^{bc}	38.45 ^b	35.89 ^a	0.32
Ear length (cm)	9.33	9.00	9.20	9.15	9.20	0.07
Neck length (cm)	14.16 ^c	13.39 ^{ab}	12.89 ^a	12.92 ^a	13.75 ^{ab}	0.14
Tail length (cm)	11.86	11.03	10.78	10.93	10.87	0.12
Poll distance (cm)	5.96 ^b	5.38 ^a	5.38 ^a	6.00 ^b	5.06 ^a	0.05
Neck circumference (cm)	19.55 ^b	18.94 ^{ab}	19.61 ^b	19.26 ^{ab}	18.32 ^a	0.13
Circ. of horn base (cm)	6.55 ^b	4.93 ^a	5.52 ^a	4.79 ^a	4.98 ^a	0.10
Horn length (cm)	3.36 ^c	2.17 ^{ab}	2.80 ^{bc}	2.14 ^a	2.48 ^{ab}	0.07

abc-means in the same row with different letters are significantly different (p<0.05)

RESULTS AND DISCUSSION

Effect of castration on body weight gain of kids: Single castrates obtained higher values for fore and hind legs (39.35 cm and 41.60 cm) than the single males (37.18 and 38.93cm) and females (33.75 and 35.89cm) Table 1. Kolo (2001) reported longer body, fore and hind legs of castrate than males and females. Castrates (twins and singles) had higher values in poll distance (6.0 cm) and height at withers (40.50 cm) respectively compared to non-castrates and females. A similar result was reported by Kolo (2001). Similarly the result showed that castrates (Singles) were slightly but non significantly longer in facial length (P > 0.05) than the others. This is contrary to Kolo, (2001) who observed that females had longer facial length than males and castrates. Castrates (singles) were observed in this study to have shown slower growth rate (weight gain) from week 2-15 figure 1. However, the effects of castration manifested positively as from 16th week. Adama (2003) in his work, observed that castrates and males had similar body length and body weight at early stage of life but differences manifested in the two parameters as from the third week with castrates performing better than the male goats.

Effect of type of birth on pre-waning kids: Table 1 shows the superiority of single non-castrates with respect to mean body weight, body length and chest girth length. Singles (non castrates and castrates) together were also observed to have obtained higher values in 12 of the 14 parameters measured including body weight table 1. This further suggests the superiority of single non castrates (kids) with respect to rate of live-weight gain and efficiency of food conversion. This is in agreement with Akpan (2000) who reported that kids born single were heavier than twins and triplets but

their growth rate was slower. Similarly (Ruvuna *et al.*, 1988) found that singles were significantly (p < 0.01) heavier than twins and had average higher daily gain to weaning (62 v. 58g) than twins. Single non-castrates obtained the highest mean value for horn base circumference and significantly differs from other groups. Similarly Single non-castrates obtained the highest mean value for horn length and also significantly differs from other groups except twin non-castrate.

Effects of sex on pre-weaning kids: The results of this study show that males obtained higher values (14.16cm) in Neck length, which support the previous findings of Kolo (2001) that males had higher values for neck length (14.16cm) compared to females. The females in this study had significantly (p > 0.05) lower values in most of the parameters measured. (Table 1). This agreed with Ruvuna *et al.* (1988) who reported that male kids were significantly (p<0.01) heavier and had higher daily gain to weaning than females and that the average daily gain to weaning difference was 7g/day in favour of males. The males (Single non-castrates) had higher values for neck and horn length, neck circumference and horn base circumference than the females Table 1. This could be influenced by male secondary sexual characteristics, which are not reflected in females. Colomer-Rocher *et al.* (1992) reported that this increase in neck of the male is commonly observed as secondary sexual characteristics in ruminants. Ledger (1987) also reported that entire matured male goats develop heavy neck and shoulder and has more protein than females. Males (single non-castrates) were slightly but non-significantly heavier in body weight (5.75 kg) and chest girth (42.50 cm) and longer in body length (5.68 cm) than the females.

Conclusion and recommendation: The results of this study show better performance of single castrates over non-castrates and between males (castrate non-castrate) and females. It can be concluded that pre-weaning goats of single birth (male and castrates) are superior to those of twin birth and female in terms of growth rate and that castration does not seem to have any positive effect on the performance of kids before weaning (5 months of age). However, sex seemed to have some effect as males and castrates kids performed better in terms of both live weight gains and body length than females. It could therefore be recommended that more research work be carried out in this area for more information, which will be of economic benefits for farmers.

REFERENCES

- Adama, T.Z., 2003. Effect of castration on growth performance and feed utilization in Savanna Brown goats. *J. Sustainable Agriculture*.
- Akpan, G.N., 2000. Factors affecting growth and body measurement of traditionally Managed Red Sokoto goats, BK of proc. 25th Ann. NSAP. Conf., 19-23 March, 2000 Umudike., pp: 262-263.
- Barret, M.A. and P.F. Larkin, 1974. *Meat and Beef Production in the tropics* Oxford University Press London, p: 180-184.
- Colomer-Rocher, F., A.H. Kirton, G.J.K. Mercer and D.M. Duganzich, 1992. Carcass composition of New Zealand Saanea goats slaughtered at different weigths. *Small Ruminant Res.*, 7: 161-163.
- Kolo, T.G., 2001. *Bady Conformation and Carcass Characteristics of male, Female and Castrate male Savanna brown goat*. M. Tech. Project Submitted to Deptment of Animal Production, F.U.T. Minna.
- Ledger, H.P., 1987. The composition of improved Boran (Bos indicus) steer carcass. *J. Agric. Sci., Cambridge*, 65: 261-284.
- Muhikambele, V.R.M. L.A. Mtenga, E. Owen, G.C. Kifaro, D.S.C. Sendalo, N.F. Massewa, S.M. and D.R. Kiango, 1996. Effect of castration and diet on Performance and feed utilization in sa'anen goats. Proceeding s of the 3rd Biennial conference of the Agricultural Ruminant research network. U.I.C.C., Kampala Uganda, 5-9th December 1995. Lebbies S.H.B. and Kagwini E.I.L. R.I. (Eds.), Nairobi, Kenya., pp: 221-224.
- Ruvuna, F., T.C. Cartwright and H. blackBurn, 1988. Gestation length, birth weight and growth rates of purebred indigenous goats and their crosses in Kenya. *J. Agric. Sci. Camb.*, 111: 363-368.
- Statgraphics, 1987. *Statistical Graphics System*, STSC, Inc. and Statistical Graphics Corporation.