

## **Sex, Age Distribution and Carcass Yield of Sheep and Goats Slaughtered at Sokoto Abattoir**

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### **Abstract**

Carcass yield, sex, age and body weight distribution of sheep and goats slaughtered within a period of three months at the Sokoto Central abattoir were studied. Four hundred and seventy seven Yankasa sheep and three hundred and sixty four Maradi goats were used. The animals were at about two years each, and averagely weighed 33 and 22 Kg for sheep and goats respectively. Over 90 and 80% of the animals were female sheep and goats, respectively. Carcass yield in sheep increased with age or body weight ( $r=0.68$ ); but a negative correlation ( $r=-0.27$ ) between the traits from goats was observed. Influence of sex on carcass yield was not discernible. Generally the Maradi goat tended to dress out better than the Yankasa sheep.

**Keywords:** Yankasa sheep; Maradi goats; Carcass yield; Sokoto abattoir.

### **Introduction**

The predominant breeds of sheep and goats found in Sokoto State are the Yankasa and the Sokoto (Maradi) goats respectively. Mature weights of Yankasa range from 25-40 Kg for ewe and 35-50Kg for rams. Similarly, the average weight of Maradi goat is 20Kg for doe and 25Kg for buck. Detailed description of the small ruminant breeds have been documented (Adu and Ngere, 1979 and Payne, 1990).

During the dry season large proportion of sheep and entire goats population are allowed to roam grazing on natural forage. In the cropping

season, however, the animals are tethered either on fallow fields or in the compound to prevent damage to crops. The predominant grass or shrub species found in Sokoto State have been identified by Oteng - Yeboa and Aliero (1987). Sheep is usually offered supplementary crop residues such as groundnut and cowpea haulms, husk, grain offals, etc. Specific housing is not always provided and health care is poor.

Sheep and goats still remain important sources of animal protein in Nigeria as a result of gradual depletion of the beef supply (FAO, 1979). The small ruminants seem to thrive much



better in difficult terrains and under other environmental hazards than cattle. Attempts have, therefore, been made to exploit some of the good traits identified in sheep and goats to increase their productivity. Emphasis has been in the area of genetic improvement (Osinowo, *et. al.* 1989), nutritional requirement (Alhassan *et. al.* 1986) and health status (Ayoade *et. al.* 1998) of the small animals. On the other hand, there is inadequate information on carcass yield from Maradi goats and Yankasa sheep reared in the traditional husbandry system in the semi-arid zone of North Western Nigeria where the animals are kept as source of income, for meat and for other social rites. Also documentary evidence on the sex, age, and body weight distribution among slaughtered animals and their effects on carcass yield is scarce. The objective of the study was to investigate these factors.

#### Materials and Methods

The study was conducted at Sokoto Central Abattoir for a period of three months (July – September) during the rainy season. Sokoto is in the semi-arid zone of Nigeria with annual rainfall of about 700mm and relative humidity of 30-57% (Meteorological unit, Nigeria Airport Authority, Sokoto).

Four hundred and seventy seven Yankasa sheep and three hundred and sixty four Maradi goats were used for the study. The animals were brought to the abattoir for slaughter from several locations in the State and from neighbouring Niger Republic. Ante-mortem and post-mortem examinations were conducted by the researchers to avoid the use of diseased animals. Before slaughtering, the animals were aged, weighed and their sexes identified. Ageing was done by using the incisor

teeth according to the method employed by Devendra and Mcleroy (1988). A universal weighing (hanging) scale was used to determine weights of the animals. Animals were slaughtered by severing the carotid arteries and jugular veins. Decapitation was done at the occipito – atlas articulation. The slaughtered animals were skinned, eviscerated, and their feet cut off between the cannon and pastern bones. The dressed carcass was weighed hot and later expressed as percentages of live body weights (carcass yield).

Analysis of variance was carried out to determine the effect of age and live weight on carcass yield. Comparison between the means was done by Duncan's new Multiple Range Test (Steel and Torrie, 1980). Effect of age on carcass yield was, however, examined using Student's t-test. Correlation between age and live weight, and dressing percentage and live weight of animals was determined by the use of Pearson's coefficient (Treloar, 1951).

#### Results

The sex distribution and dressing percentages of sheep and goats are presented in Table 1. Most of the animals slaughtered were females (92% ewes; and 82% does) and only a few of them were males (8% rams, and 18% bucks). The average age at which sheep and goats were slaughtered was about 2 years, each, and at live body weight of 23 and 22 Kg respectively. Fewer number of goats (364) than sheep (477) were slaughtered at the abattoir for the same period with the daily mean of about 23 and 30 respectively. Female sheep and goats were slightly ( $P>0.05$ ) heavier than their respective males at slaughter. The female sheep dressed better ( $P<0.05$ ) than male sheep, but



differences of carcass yield due to sex were not significant ( $P>0.05$ ) in the goats.

Table II shows live body weight distribution of the animals. About 68% of the sheep weighed 30-40Kg whereas 59% of the goats were within the weight range of 20-30Kg. Carcass yield significantly ( $P<0.01$ ) increased with increasing body weight (Table II) or age (Table III) in sheep; however, in goats the reverse was observed ( $P<0.05$ ). The dressing percentage was positively ( $r=0.68$ ;  $P<0.05$ ) related to slaughter weight in sheep but a negative correlation ( $r=-0.27$ ;  $P>0.05$ ) was noticed in goats. Similarly, there was positive and stronger correlation between age and body weight in sheep ( $r=0.82$ ;  $P<0.01$ ) than in goats ( $r=0.59$ ;  $P<0.05$ ). Generally the Maradi goat tended to dress out better than the Yankasa sheep.

### Discussion

The major Hausa and Fulani ethnic groups of Northern Nigeria prefer mutton to goat meat and this partly explained the higher number of sheep than goats slaughtered at Sokoto Central Abattoir. Both sheep and goats are usually slaughtered at early age of about 2 years to avoid starvation of animals due to inadequate feed and natural forage.

Mature bucks are priced higher than does of similar size in Southern Nigeria; therefore, a large proportion of bucks are transported to the south. Similarly, rams are usually preserved for fattening and slaughter mostly during muslim festivals when their prices may increase two to three times more than those ewes of the same liveweight. Consequently there has been progressive depletion of females faster than that of male sheep population.

The dressing percentages obtained from Yankasa sheep in this study were higher than value (42.5%) previously published for this breed (Dettmers and Loosli, 1974) and 44.1-46.5% reported for Nigerian dwarf sheep or its crosses with Permer, Uda, or Yankasa breeds (Taiwo *et al.* 1983). The figures were similar to 47% reported for Sudan desert sheep (Osman *et al.* 1970) but lower than values for Butana (48-52%), Bantu (57%) and Toposa (57-60%) breeds of sheep (Devendra and McIeroy, 1988). The discrepancies in carcass yield may have been influenced by the different breeds used (Payne, 1990).

The positive relationship between slaughter weight or age and carcass yield in sheep agrees with some earlier studies (Dickerson *et al.* 1972; and Taiwo *et al.* 1983). Dickerson *et al.* (1972) reported 1.9% increase in carcass yield when carcass weight increases by 4.9 kg. Similarly, Hohenboken (1977) observed 0.46-0.79% improvement in carcass yield for each Kg in body weight. The older or heavier sheep possesses relatively smaller fill, head and feet and higher fat, and therefore dressed better than lighter younger sheep. Those traits are known to affect carcass yield (Aduku and Olukosi, 1990).

The average dressing percentage of Maradi goat compared favourably with that of Anglo - Nubian goat (51.2% at 22 Kg live weight (Gatan, 1941), Angora whethers in Texas (48-52.6%; Miller *et al.* 1943), and Somalia local breed of goats (50-52.3%; Congiu, 1954). The Maradi goat, however, dress better than Congo indigenous goats (45.6%; Tiepont and Vandervelden, 1961) and the small East African breed (43.5%; Wilson, 1958).

The inverse relationship between slaughter weight or age carcass weight



of Maradi goats in this study was in agreement with earlier work of Wilson in which Ugandan goats of 13.6 Kg live weight yielded 43.5% while those of 25.6 Kg produced 40.0%. He further reported that the proportion of meat in the animal increased from 24.5 to 37.5% between birth and one year and then decreased irregularly to 34.9% at 2 years. These observations were at variance with those in sheep and are difficult to explain. The Yankasa sheep dressed poorer than Maradi goats in accordance with the work of Payne (1963) in which goats dressed better than sheep. Generally sheep is known to possess relatively heavier skin and offals (Forest *et. al.* 1975) and these reduced its dressing percentage than that of goat.

The faster growth rate or higher carcass yield of the female than male Yankasa sheep contradicted the report of Hill (1960). The differences may be small except for the large number of animals used which probably made the differences significant.

In conclusion, the study has shown that Yankasa sheep and Maradi goats in Sokoto State compared favourably with many tropical breeds of small ruminants in carcass yield. Also, live body weight or age of Yankasa sheep can be used to estimate the carcass yield; and the heavier or older the animal, the higher will be its dressing percentage. Although higher dressing percentage is obtained from goats at early age, slaughtering before one year of age is not desirable because the sellable percentage of live weight does not increase in the same proportion as the carcass yield.

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**TABLE I: Sex, Age distribution and carcass yield of slaughtered sheep and goats (mean + S.D.)**

Traits					
Species	Sex	No. of animals	Age (Yrs)	Liveweight (Kg)	Carcass Yield (%)
Sheep	Both	477	32.9 ± 0.9	32.9 ± 6.1	46.6 ± 2.5+
	Male	39(8.2%)	2.3 ± 0.7	31.6 ± 5.6 <sup>a</sup>	45.9 ± 2.0 <sup>a</sup>
	Female	438(91.8%)	2.3 ± 0.9	33.0 ± 7.3 <sup>a</sup>	46.6 ± 2.5 <sup>b</sup>
Goats	Both	364	1.9 ± 0.7	22.1 ± 6.1+	50.9 ± 5.8++
	Male	66(18.1%)	1.6 ± 0.9	20.5 ± 2.3 <sup>b</sup>	51.7 ± 5.4 <sup>c</sup>
	Female	298(81.9%)	1.9 ± 0.7	22.5 ± 6.1 <sup>b</sup>	50.7 ± 5.9 <sup>c</sup>

a,b = Means with different superscripts in a column among the same species differ (P<0.05).

+,++ = Means with different signs in a column among different species, differ (P<0.01).

**TABLE II: Effect of livebody weight on carcass yield of sheep and goats (mean ± S.D)**

Body Weight Range (Kg)						
Species	Traits	0.5 - 1.9	20 - 29	30 - 39	40 ≥	Level of Significance
Sheep	No. of animals	14 (2.9%)	137 (28.7%)	231 (48.5%)	95 (19.9%)	0.01
	Liveweight (Kg)	18.1 ± 1.2	26.7 ± 2.4	34.9 ± 3.1	41.7 ± 1.9	
	Carcass Yield Kg)	42.8 ± 1.1 <sup>a</sup>	44.8 ± 1.8 <sup>b</sup>	46.9 ± 2.1 <sup>c</sup>	49.5 ± 1.7 <sup>d</sup>	
Goats	No. of animals	97 (26.7%)	213 (58.5%)	54 (14.8%)	-	0.05
	Liveweight (Kg)	14.6 ± 3.6	23.2 ± 2.8	31.8 ± 2.0	-	
	Carcass Yield Kg)	53.4 ± 7.7 <sup>b</sup>	49.9 ± 4.9 <sup>a</sup>	50.1 ± 3.7 <sup>a</sup>	-	

a, b,c,d, = Means with different superscripts in a row among the same species differ significantly. -

Negligible number of animals.

**TABLE III: Carcass yield of sheep or goats in relation to age (means ( S.D)**

Age Range (Yrs)						
Species	Traits	0.5 - 1	1.1 - 2	2.2 - 3	3.1 ≥	Level of Significance
Sheep	No. of animals	57 (12.0%)	168 (35.2%)	199 (41.7%)	53 (11.1%)	0.01
	Liveweight (Kg)	22.8 ± 2.1	30.1 ± 2.8	36.1 ± 3.0	40.8 ± 2.3	
	Carcass Yield Kg)	43.4 ± 1.5 <sup>a</sup>	45.7 ± 1.8 <sup>b</sup>	47.4 ± 2.0 <sup>c</sup>	49.5 ± 1.6 <sup>a</sup>	
Goats	No. of animals	72 (19.8%)	165 (45.3%)	127 (34.9%)	-	0.05
	Liveweight (Kg)	16.2 ± 6.3	22.4 ± 4.4	26.5 ± 4.6	-	
	Carcass Yield Kg)	52.6 ± 7.5 <sup>b</sup>	50.4 ± 5.9 <sup>a</sup>	50.7 ± 4.3 <sup>a</sup>	-	

a, b,c,d, = Means with different superscripts in a row among the same species differ significantly. -

Negligible number of animals.