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THE EFFECT OF BREED, SEX AND AGE ON DRESSING PERCENTAGE OF INDIGENOUS SHEEP IN BAMA LOCAL GOVERNMENT AREA OF BORNO STATE

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ABSTRACT

A study was carried out to determine the effects of breed, sex, and age on the dressing percentage of sheep in Bama Local Government Area of Borno State. Live weight and slaughter weight of 86 sheep comprising of 40 Balami, 20 Uda, 20 Yankasa, and 6 West African Dwarf breeds were collected from slaughter house and examined. Live weight and carcass weight were determined as a percentage of the live weight. The data collected were subjected to analysis of variance and significant means were separated using the Duncan Multiple range test. There are significant difference ($P<0.05$) among the breeds and age of the animals with Balami, Uda and Yankasa breeds having the higher dressing percentage, while WAD had the lowest. Sex of the animals had no effects on dressing percentage however, females tend to be higher. Breeds and physiological age of the animals rather than sex were factors affecting dressing percentage of sheep in the study area.

Keywords: breeds, sex, age and dressing percentage

Introduction

Sheep is one of the first animals known to have been domesticated as a source of food. As ruminants, they serve a multiple functions from food to fertilizer, which are essential to human life as both rich and poor countries (Gatenby, 2002).

Africa has a population of over 205 million sheep and 174 million goats representing more than 17 and 31% of the world's total food (FAO, 1990). Sheep are kept everywhere in Nigeria, with a broad distinction between their importance and ubiquity in the north, and more populated in the humid zone. Sheep and goats are seen to have secondary importance in relation to crops. They are generally considered to be four native breed in Nigeria, Balami, Uda, Yankasa and West African Dwarf (Adu and Ngere, 1979).

Livestock, especially the small ruminants, play an important role in the economy of most developing nations like Nigeria. Milk and meat products obtained from these animals, constitutes

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the major sources of animal protein for greater part of the populations, and provisions of subsistence income to small ruminant livestock farmers (Fajeminsin, 1991). Also bye products such as hides and skins and bones, serve as raw materials for some agro based industries, thereby serving as a source of foreign exchange. Furthermore, they have vast potential in mixed farming, in addition, to their faecal droppings which can be used to nourish or improve the soil fertility as manure for proper and vigorous crop growth (Obudu and Adeleye, 1995).

Dressing percentage is one of many factors affecting the values of slaughtered animals. A basic knowledge of dressing percentages is important in understanding slaughter sheep pricing system and pricing variability. Dressing percentage in perspective is calculated by dividing the warm carcass weight by the shrunk live weight of the animal and expressing the result as a percentage, which was generally between 40% and 50%.In general, dressing percentages increase with age and discovered to be low (young sheep) which have little muscle and fat and high in older sheep (Gatenby, 2002).

There is a great deal of information on livestock population and production in the country, but there is limited information on the dressing percentage and carcass composition. Therefore, the present research is aimed at determining the dressing percentage in high livestock producing areas, particularly in this area where small ruminant animals are slaughtered in thousands of pounds on daily bases. The specific objectives of the study therefore are;

- To determine the dressing percentage of most indigenous breeds in the study area and

- To know the clear difference between the animals live weight and dressing percentage.

Meat (Carcass) Quality

In rural markets, there is rarely any grading of meat, and all parts of the carcass are sold at a uniform price. Unlike in many western countries, fat is described in most tropical markets. No consideration is given to tenderness (softness) probably because of traditional methods of cooking, in which meat is stewed for several hours, and is ideal for tough meat (Gatenby, 2002).

As in the case of the other meat species, organo-loptic quality in goat meat is affected by a range of pre-harvest factors such as breed, age, sex and nutrition and also by a number of post-harvest factors such as slaughter and refrigeration practices (Pike, 1973).

Since goat carcass generally have far less subcutaneous fat than cattle, sheep and pigs, great care has to be taken in refrigeration practices in order to avoid excessive drying out of the carcass. Weight loses up to 13.7% of the carcass while under refrigeration for two hours were experienced in Botswana (Owen, 1977).

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Dressing Percentage in Sheep

Sheep of some tropical breeds appear to dress out rather poorly at 37-40%, and Epstein (1977), has reported that in Israel, Awassi rams dress out from 48.6 -59.1% at 3-10 months of age respectively. Average dressing out percentage of tropical types of sheep are therefore probably within the range of 40-50. Dressing out percentage is a measure of productivity rather than quality. The later factor is hard to define but many mutton eaters agree that the meat of at least some tropical sheep breeds is sweet and with high quality.

In order to yield a high percentage of carcasses, sheep must be light, in pelt, well finished and heavily muscled and free from paunchiness. Because of the higher value for the offal of sheep, especially the high value of the pelt, a high dressing percentage in sheep is not so important as in cattle (Ensmmger, 1990). Dressing percentage of sheep are generally between 40 and 50% but this depends very much on what part of the carcass are sold as meat. Young animals will have a higher proportion of offal's in relation to carcass weight than will the older stock. An example is shown below:

Dressing; Sucking lambs 12-l6weeks 48-50% and Fat ewes 3-4 years 56.58% (Goodwin, 1979).

Materials and Methods

This study was conducted within Bama Local Government Area. Bama is bordering a number of local governments (Dikwa, Kala Balge, Konduga and Gwoza). It is estimated on latitude of 11°32N, longitude 13º42E and at altitude 1100 meters above sea level. The short spell of annual rainfall of 792.1mm (range from 50- 600mm) and the temperature range from 26UC-35UC or 35°C-44°C

Slaughter house meant for the slaughter of food animals was used, and all the animals (Sheep) for the study were tag prior to and starved or fasted for 12-24 hours before slaughter. A total of 86 sheep comprises of all age, sex, breeds, over a specific period of time and at the time that, the animals has a good premium for market and had the weight from a season of low feeds availability were targeted.

The ages of the animals are estimated using the detention methods as adopted by (Gatenby, 2002).The permanent incisor teeth's were counted to estimate the ages of the animals before slaughter as follows;-

1. None-less than 1 year 3 months

2. 1 pair- 1 year 3 months to 1 year 10 months

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3. 2 pair- 1 year 3 months to 2 year 4 months

4. 3 pair — 2 year 4 months to 3 years

5. 4 pair — more than 3 years

The breeds are identified and followed by weighing of the animals using spring balance scale of 0.5kg to 50kg capacity and all the animals are tagged for identification. Immediately after dressing, the carcasses were weighed using similar weighing machine used for live weight. The spring balance scale was hanged to an overhead beam to weigh the animal. The sheep was restrained by tying of legs with a rope and then put on to the spring balance scale for reading of the live weight. After skinning and removal of visceral organs, head and legs, the carcass weight is obtained by hanging the hind legs on the balance scale. The dressing percentage computation was obtained by the use of the following formula.

$$DP = \frac{\text{Live weight} - \text{Carcass weight}}{\text{Live weight}} \times 100$$

The data obtained were subjected to analysis of variance using the Statistix 8.0, 2005 version. The breeds, sex and age were used as the dependent variables and, dressing percentage as the independent variable. Means where significant, were separated using the Duncan multiple range tests, (Steel and Torries 1980).

Results

The result on effects of breeds, sex and age of sheep on dressing percentage is presented on tables below:

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Table1: **Least Square means of live and carcass weight of breeds and sex of Sheep.**

Breeds	Live weight	Carcass Weight
Uda	26.873[a]	12.289[a]
Balami	28.072[a]	14.426[a]
Yankasa	28.200[a]	13.816[a]
WAD	18.475[b]	10.675[b]
Sex		
Male	26.090[a]	25.219[a]
Female	12.976[a]	12.627[a]

*abcMeans with different superscript in the same row differ significantly, * P>0.05

Table 1 above, depicts the means of live weight and carcass weight of breeds and sex of sheep brought to Bama slaughter house indicating the dressing percentage. The result shows the dressing percentage as it is being affected by breeds and sex. The mean of live weight of all the breeds did not differ significantly except for WAD breed. Similarly the dressing percentage could not differ in among all the breeds. The sex could not differ significantly on both the live weight and carcass weight

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Table 2: Least Square Means of live and Carcass weight for Age and Sex of Sheep.

Age (Months)	Live weight	Carcass weight
15	21.800[c]	10.560[c]
22	24.892[bc]	12.194[b]
27	27.485[b]	12.838[b]
36	33.540[a]	17.670[a]
Sex		
Male	26.564[a]	13.0439[a]
Female	27.450[a]	13.5889[a]

*abc Means with different superscript in the same row differ significantly, * P>0.05

Table 2, above shows least square means of live and carcass weight of four (4) breeds of sheep as it is being affected by age and sex. The live weight of the animals increases with increased in age. The animals that attain 36 months of age put on high (33.850) weight compared to the rest, while 15 months old sheep weighed the lowest (21.800). Similarly, the dressing percentage followed the same trend. Both live and carcass weight did not differ significantly for both sexes (male and female).

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Table 3: **The interaction of means for breeds, age and sex on live and carcass weight**

Breeds	Sex	live weight	carcass weight
Uda	Male	26.267^{ab}	12.450^{ab}
	Female	27.479^{ab}	12.129^{ab}
Balami	Male	27.111^{ab}	13.456^{ab}
	Female	31.032^{a}	15.397^{a}
Yankasa	Male	28.500^{ab}	14.100^{ab}
	Female	27.900^{ab}	13.531^{ab}
WAD	Male	19.000	11.900^{ab}
	Female	19.950^{c}	9.459^{Db}
Age (months)			
15	Male	24.000	11.400^{b}
	Female	19.600^{c}	9.720^{b}
22	Male	24.889	12.589^{b}
	Female	24.894	11.800^{b}
27	Male	26.700^{b}	13.350
	Female	28.270^{b}	12.326^{b}
36	Male	30.669^{b}	14.833^{b}
	Female	37.033^{a}	20.507^{a}

*abcMeans with different superscript in the same row differ significantly, * P>0.05

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Table 3 above, shows the breeds and sex as they affect the live and carcass weight of the animals slaughtered at the slaughter house. The females of Balami breeds had the highest (31.032) mean live weight than all other breeds, but did not differ significantly from the other breeds except for female of WAD sheep. The dressing percentage (carcass weight) followed the same trend. The age of the animals differs significantly ($p<0.05$) from each other at 36 months of age in females for both live and carcass weight. The animals of 15 months weighed the lowest.

Table 4: **Means and standard deviations of live weight for breeds, sex and age of Sheep.**

Breeds	**Mean ±SD**
Uda	27.115±5.9.104
Balami	30.150± 6.4039
Yankasa	28.020± 8.3358
WAD	18.300± 2.6253
Sex	
Male	26.362± 4.9757
Female	28.691± 7.7060
Age (months)	
15	20.333± 5.2910
22	24.893± 4.4873
27	27.911± 5.4425
36	35.972± 7.4941

*abcMeans with different superscript in the same row differ significantly, * P>0.05

Table 4 above, takes into account the means and the standard error of the mean of live weight as affected by breeds, sex and age of sheep. The result reveals that, the balami breeds of sheep were significantly ($P<0.05$) higher in terms of live weights among all the breeds brought into the slaughter house for slaughter. The mean weight of the females was also higher (28.691) when

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compared to the male (26.333) counterpart. On the other hand when the animals are weighed base on age, the old (36 months) had the higher mean weights, while the young (15 months animals) weighed least (20.333).However it is indicative from the result that balami breed of sheep are more heavier than the rest of the breeds(uda, yankasa and WAD) in the study area. Also females were allowed to mature before they were slaughtered, which at the end gives heaviest live weight.

Table 5: **Mean and standard deviation of carcass weight for breeds, Sex and Age of sheep.**

Breeds	**Mean ± SD**
Uda	12.225± 2.5784
Balami	14.960± 5.7578
Yankasa	13.645± 5.8798
WAD	10.267± 1.5095
Sex	
Male	13.143± 3.2383
Female	13.868± 5.6558
Age (months)	
15	10.000 ± 1.8144
22	12.063 ± 2.7377
27	12.560 ± 2.7492
36	19.560 ± 7.5874

*abcMeans with different superscript in the same row differ significantly, * P>0.05

Table 5 above shows the mean and standard deviation for dressing percentage as affected by breeds, Sex and Age.

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Table 6: Mean ± standard error for dressing percentage for Breeds and Sex.

Breeds	Number	Mean of dressing percentage (%)
Uda	20	48.908 ± 1.950
Balami	40	52.040 ± 1.902
Yankasa	20	48.085 ± 2.002
WAD	6	41.082 ± 3.224
Sex		
Male	22	44.612 ± 2.444
Female	64	46.799 ± 1.885

*abcMeans with different superscript in the same row differ significantly, * P>0.05

Table 6 above, depicts the number, mean and standard error of the mean for breed, and sex of sheep slaughtered at Bama slaughter House. The result showed that Balami breed had the highest dressing percentage (52.040), while the WAD has the lowest (41.082). Similarly the sex differences for dressing exist between males and females. The female appears to have the higher dressing percentage than their male counterpart. There was a significant difference (P<0.05) among the four native breeds of sheep in the study area, while uda breed had the highest value and the West African Dwarf (WAD)sheep had the lowest.

Where the results, indicates that female sheep has high dressing percentage of 46.799± 1.885 and the male had 45.612± 2.444. There was no significant difference (P>O.05) between the sex of the sheep.

Discussion

Almost all the breeds of sheep produced in the study area are being slaughtered for food as it is being practiced in other parts of the world (Rim, 1992; Wilson, 1991; Aganga, 1988; and Devendra and Mcleroy, 1979). It was also identified from the study area, that sheep is not only kept for meat alone, but for the products such as milk, skins and manure are been utilized from

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them. This finding agrees with other workers (Gatenby, 2002) in other parts of the world, who reported that sheep production are important for meat, milk, skin, wool and manure.

Predominately, sheep rearing is for meat as it is being identified in the study area. The same has been reported in other parts of the world (Kloff and Wilson, 1984), who reported the same in their research. It is also pertinent to note from the present study that, sheep especially the rams are being slaughtered from the ages of 15- 16 months, which is consistence to the work of Kloff and Wilson, (1984), who reported that most male are being slaughtered or sold before the age of 15 months, when the animals are still growing rapidly. However, other products of sheep such as milk, skin and wool were not considered in the present study as being reported in other parts of the world (McCane et al, 2009, Gatenby, 2002, Turner, 1974, Devendra and Owen, 1983, and Chris, 2009).

The values of 41-52 dressing percentage agreed with the partly finding of Williamson and Payne (1978) and Gatenby, (2002) that most tropical sheep breeds have dressing percentage of 40-50%. The relatively higher dressing percentage in this study may be due to the fact that carcass was weighed and sold hot. It has been reported (Alaku and Moruppa, 1983), that dressing percentage reduces by 2.4% from hot to cold carcass.

The superiority of the Uda and Balami breed may not be unconnected with the body size. Uda and Balami had an average live weight of 27.12kg and 30.30kg, respectively. It has also been reported by Devendra and Owen (1983), that the higher the live weight of the animals, the greater would be its dressing percentage.

Records from this study showed that animals were brought to the slaughter house regardless of breeds, sex, age and nutrition status and it is most probable that they did not undergo pre-slaughter fasting.

The variation between the sexes may be due to the fact that no attention was given to the nutritional status of the animal at the time of slaughter. However, the female tend to have a higher dressing % than male, by about 2.5%. Male animals had an average weight of 25.38kg while the female had 29.03kg before slaughter. These variations in the live weight which was greater in the females may be as a result of anatomical, growth stage and maturity of the animal. It has been observed that most of the females brought for slaughter were already matured and old. Owing to the fact that most of them were normally kept at home for breeding purpose, they are sold and slaughtered when they are very old or when absolutely necessary.

This seems to be generally true as in the case of New Zealand feral goats (Kirton, 1970) and Crillos x Nubian goats (Acosta, 1979) when males and females of similar weight have been

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compared. In study by Pant, (1974) on dressing percentage in Jamnapari goat was highest in the female of 10-15kg live weight and males of 25-30kg live weight.

Conclusion

In conclusion therefore, owing to the study which entails the effect of breeds, age and sex on the dressing percentage of sheep was conducted at Bama slaughter House. The study involves eighty six (86) sheep of various breeds, age and sex. The data obtained was subjected to analysis of variance and descriptive statistics, to determine the significant difference and dressing percentage of animals slaughtered. It was observed that, breeds and age showed variation, while sex could not.

Recommendation

Based on the findings it is therefore recommended, that animals should be evaluate for dressing percentage on breeds difference and physiological age difference. It could be further be evaluated based on cold or hot carcass pre-slaughter fasting and anti-mortem examination to avoid slaughtering of pregnant female animals

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