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ASSESSMENT OF FOREIGN BODIES IN SHEEP RUMEN IN KATSINA METROPOLIS ABATTOIR

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ABSTRACT

This study was conducted to assess foreign bodies and its impact on the rumen of sheep slaughtered at the Abbattoir in Katsina Metropolis. Sixty six (66) sheep comprising of thirty-three (33) each of ram and ewe were randomly selected for the study. Live-weights of the animals, weight of rumen contents, weight of empty rumen and prevalence of non-biodegradable materials in the rumen were determined based on sex and age. Rumen obstruction determination was also carried out for sheep aged 6, 12 and 18 months of male and female on weekly basis for eleven weeks. The experiment was conducted in a Completely Randomized Design (CRD). The data collected was analysed with Statistical Package for Social Sciences (SPSS). This study showed that 60.60% and 93.93% of the male and female respectively were positive of foreign bodies in their rumen. 87.88% of the sheep sampled had varieties of non-degradable materials in their rumen and pplastics constituted the highest percentage (77.27%). The result revealed that the problem was more common among the age range of 16 and 18 months of age and that sex also has effect on the rate of rumen obstruction with higher occurence in females. The phenomenon of rumen obstruction was discovered to be due to the shortage of feeds and feeding stuff and the resultant scavenging to meet up with nutrient requirement. The findings of this study could help environmental activists, veterinarians, policy makers and livestock owners to recognise the impact of non-bio degradable materials on sheep health and productivity in the area of study.

Keywords: Productivity, rumen, obstruction, scavenging

INTRODUCTION

Ruminant production is prominent in Northern Nigeria and is abundantly reared most household and farmers. Sheep constitute a significant percentage of these ruminants population. Winrock International (1992) reported an estimated population of sheep in Africa as 127 million while Lombin (2007) estimated the population of Nigerian sheep at 27 million. This population indicates that sheep production has contributed in no way to meat protein supply to the teeming Nigerian population. However, there are challenges militating against the full utilization the capacity of these sheep with feeding being the major one. Adebowale (1982) reported that feeding constitute 65% of the total cost of animal production while the report of Dayo (2009) showed that feeding constitute least 60% of the total variable costs of livestock production in Nigeria. These animals depend on pasture whose supply dwindles during the dry season of the year thereby predisposing them to malnutrition with severe consequences on their productivity. They then result to scavenging to meet up with their feed and nutritional requirement. Muhammad and Muhammad (2007) reported that ruminants scavenge on widely available and improperly disposed polythene bags and other household wastes that litter and then cause rumen impaction. This rumen obstruction has impacted negatively on the wellness of the animals. Muhammad (2002) reported that the lodgment of these non-degradable materials in the rumen of small ruminants results in weight loss, high mortality rates and premature slaughter of sick animals. The present study was carried out to determine the type and quantity of non-degradable materials obtainable in the rumen of

sheep slaughtered at the abattoir in Katsina metropolis and their effect on their welfare.

MATERIALS AND METHODS

Study site

This study was carried out at Katsina main abattoir in Katsina metropolis. The State lies between 12º15N and 7º3E in the Sudan Savannah zone of Nigeria (Nkromah, 2007). It covers an estimated land area of 49,895 square kilometers. Katsina State is bordered by States such as Kaduna State to the South, Zamfara to the West, Kano and Jigawa to the East. It shares boundary with the Republic of Niger to North (N.I.G, 2004). The population of the State is 5.8 million during the 2006 National Head Count (NPC, 2006).

Livestock Slaughtered at the Abattoir

The records of the sheep slaughtered at the abattoir were recorded based on their sex and age. The weights of the animals were taken prior to slaughtering using a bathroom scale while Vatta *et al.* (2005) dentition method of determining age was used. Rumen obstruction determination was carried out for sheep aged 6, 12 and 18 months of male and female on weekly basis for eleven weeks. The experiment was conducted in a Completely Randomized Design (CRD). The factors considered were age (6, 12 and 18 months) and sex (ram = male and ewe = female).

Data collection

Live weight (LW) = Weight of the animal in kg before slaughtering

Rumen content (RC) = Weight of the rumen with its content.

Empty rumen (ER) = Weight of the rumen after emptying the content

Non-biodegradable materials (NBDM) = The non-degradable materials were separated from degradable materials by floating them in water and later were sieved.

The quantity of non-degradable materials (NBDM), such as Polythene bags, metallic objects (nails, spoons and needles) and sand materials were separated into different categories, counted and recorded in percentages.

Statistical Analysis

The statistical analysis was carried out to estimate Pearson's correlation coefficient between live weight, rate of obstruction, weight of empty rumen, weight of rumen contents, sexes and the age.

RESULTS AND DISCUSSION

Results

Relationship of sex, age, live-weight, weight of empty rumen, weight of rumen contents and weight of non-biodegradable materials in sheep.

Table 1 shows the relationship of sex, age, live-weight, weight of empty rumen, weight of rumen contents and weight of non-biodegradable materials in sheep. There was no correlation between sex and age. Results obtained revealed that the highest negative relationship occurred between NBDM and age ($-r^2$ = 0.082), followed by sex and LW (r^2 = -0.081) and the lowest negative relationship was between NBDM and LW (r^2 = -0.036). However, lowest positive correlation value was recorded between NBDM and RC (r^2 = 0.098) while highest correlation value was recorded between LW and age (r^2 = 0.557).

Table 1: Pearson's Correlation coefficients between sex, age, live weight, weight of empty rumen, weight of rumen contents and non-biodegradable materials in sheep

Parameters	Sex	Age	LW	ER	RC	NBDM
Sex	-					
Age	0.00	-				
LW	-0.081	0.557**	-			
ER	0.152	0.335**	0.408**	-		
RC	0.133	0.373**	0.520**	0.233*	-	
NBDM	0.369**	-0.082	-0.036	0.098	0.312	-

LW = Live weight, ER = Weight of empty rumen, RC = Weight of rumen content, NBDM = Non-biodegradable materials

**Correlation is highly significant at the P<0.01 level (1-tailed); *Correlation is significant at the 0.05 level (1-tailed) NBDM: Signifies Non-Biodegradable Materials.

Cases of rumen obstruction

Table 2 shows the summary of rumen obstruction occurrence in sheep investigated from Katsina Abattoir. The results obtained showed that out of 66 animals examined, 60.60% and 93.93%, male and female respectively had presence of non-degradable materials with a mean weight of 0.16 kg and 0.49 kg respectively in their rumen. It was also revealed that the animals had an average live weight of 25.32kg and 27.30kg for male and female respectively. The table also showed that mean weight of rumen contents in males was 2.91kg while that of females was 3.45kg; and the weight of empty rumen was found to be 0.70kg in males and 0.80kg in females.

Table 2: Frequency distribution of sheep investigated for rumen obstruction

Parameters	**Male**		**Female**	
	Freq.	**%**	**Freq**	**%**
No. of positive cases	20	60.61	31	93.94
No. of negative cases	13	39.39	02	6.06
Total	33	100.00	33	100.00

Table 3: Summary of rumen obstruction parameters in sheep investigated from Katsina Abattoir.

Parameters	**Sex**	
	Male	**Female**
Mean weight of NBDM (kg)	0.16	0.49
Mean Live weight (Kg)	25.32	27.30
Mean weight of rumen content (kg)	2.91	3.45
Mean weight of empty rumen (kg)	0.70	0.80

Proportions (%) of different degradable and non-degradable materials found in sheep slaughtered in the study area.

Table 4 indicated different proportions of degradable and non-degradable materials in the rumen of the affected animals. Plastics constituted the highest percentage (87.93%) of the non-degradable material eaten by sheep during scavenging and 1.73% for sand while fibre was 10.34%.

Table 4: Proportions (%) of different degradable and non-degradable materials found in sheep slaughtered in the study area.

Materials	Frequency	Percentage (%)
Plastics	51	77.27
Fibre	6	9.09
Sand	1	1.52
Total	58	87.88

Mean live-weight, weights of rumen contents, empty rumen and non-degradable materials in sheep slaughtered at the study area.

Table 5 showed the mean live-weight, weight of rumen contents, empty rumen and non-degradable materials in sheep slaughtered at Katsina. The live-weight in table 5 indicated the highest ($P<0.05$) in 18 month ram (41.70kg) which differs significantly ($P<0.05$) from live-weight of 6 month ram (26.10kg) and 12 month (30.60kg) whose values did not differ significantly ($P>0.05$) between each other. Weight of rumen contents in 6 month ram (3.13kg) and 12 month ram (3.86kg) indicated that there was a highly statistical significant difference ($P<0.05$) between them, but between 12 month (3.86kg) and 18 month ram (4.96kg) there was no significant difference at ($P>0.05$).

The weights of empty rumen in 6 month ram (0.65kg) and 12 month ram (0.70kg) were not significantly different ($P>0.05$) while that of 18 month indicated significant difference statistically ($P<0.05$) with (0.97kg). The result on weight of non-degradable materials in 6 month ram (0.17kg) and 12 month ram (0.26kg) were not significantly different ($P>0.05$) but significant statistical difference existed between the

weights of non-degradable materials in 18 significantly different (P<0.05) from that of 18 month ram. There was also no significant difference (P>0.05) in the rumen content of ewes in the three age categories.

The table reveals that there was no significant difference between the weights of empty rumen in 6 month sheep (0.80kg) and that of 12 month (0.85kg) at (P>0.05) but both are significantly different (P>0.05) from 18 month ewe (1.08kg). As shown in table 4, the weight of non-degradable materials for 6 month ewe (0.79kg) and 12 month ewe (0.89kg) were not significantly different (P>0.05) from each other but were significantly higher (P<0.05) than that of 18 month (0.33kg).

From the table, it is shown that the live-weight comparison of ram and ewe in each of the age groups 6 months, 12 months and 18 months categories of age shows that live-weight for the ewe and ram were not significantly different (P >0.05) from each other. The rumen content weight of the ewe (3.13kg) and ram (3.83kg) of 6 months of age were significantly different (P<0.05) from each other while those 12 months and 18 months of age were not significantly different from each other (P>0.05). Empty rumen weight was shown to be significant higher (P>0.05) in ewe (0.80kg) than ram (0.65kg) of 6 month, the same trend was observed in the 12 months age category with ewe (0.85kg) being significantly higher than that of ram (0.70kg). However, for the 18 months category, there was no significant difference (P>0.05) between the value for ram (0.97kg) and ewe (1.08kg). The non-bio degradable materials value recorded in the study showed that ewes ages 6 months and 12 months with 0.79kg and 0.89kg respectively are significantly higher (P<0.05) that those of ram of 0.65kg and 0.70kg for 6 months and 12 months respectively. However, ewe of 18 month age group had significantly lower (P>0.5) non-bio degradable materials than ram with 0.49kg.

Table 5: Mean live-weight, weights of rumen contents, empty rumen and non-degradable materials in Sheep slaughtered at Katsina

Parameters	**6 months**		**12 months**		**18 months**		**SE**
	Male	**Female**	**Male**	**Female**	**Male**	**Female**	
LW	26.10b	26.67b	30.60b	30.63b	41.70a	40.25a	1.242
RC	3.13b	3.83a	3.86a	4.88a	4.96a	5.02a	0.214
ER	0.65b	0.80b	0.70b	0.85a	0.97a	1.08a	0.046
NBDM	0.17b	0.79a	0.26b	0.89a	0.49a	0.33b	0.082

a,b,c = Means followed by the same letter superscript within the same rows are statistically not significantly different (P>0.05).

LW = Live weight in kg, RC = Weight of rumen contents in kg, ER = Weight of empty rumen in kg, NBDM = Non-biodegradable materials in kg.

DISCUSSION

Percentages of Cases of Obstruction in Male and Female Sheep

The result of the study revealed rumen obstruction is prevalence among the sheep sampled as shown with 60.60% and 93.93% in male and female respectively. It is worthy of note that ewe have higher prevalence of rumen obstruction that the male along with higher mean weight of rumen content. This was in agreement with the report of Igbokwe *et al.* (2003), who reported that female animals are predisposed to rumen impaction than male animals. The higher demand for nutrients needed to meet up with the physiological condition especially during pregnancy and lactation could be contributing factors. Other factors that could have been responsible for higher rate of obstruction in female sheep is that female animals are kept longer than the males for breeding

Among the non-digestible materials eaten by sheep, plastics had the highest occurrence being one of the most common house hold waste in the area of study and then followed by fibre and sand. The outcome of this study is similar to that of Abebe and Nuru (2011) where plastic had 28, hairball 7, leather 7, polythene bags 7 and wire 1 non-degradable material were found in the rumen of small ruminants. In present study plastics have higher frequency of occurrence, followed by plastics and ropes, wire, clothes and ropes. This may be attributed to improper disposal of plastics and other ingestible foreign materials in urban and peri urban areas. Fasil (2016) and Roman (2010) reported that plastic bags were the most common cause of rumen

impaction that were found in all of the animals examined at Addis Ababa municipal abattoir.

Mean Live weight, Weights of Rumen Contents, Weight of Empty Rumen and Weight of Non-Degradable Materials in Sheep

6 months and 12 months ram did not show any significant difference but that of 18 month was higher than them probably to the gradual increase in general body structure. But in the case of weight of non-degradable materials, there was significant difference in the three age categories of females may be it is because female animals are kept longer than males. This is in conformity with Igbokwe (2003) who reported that female animals are kept for breeding purpose, and hence kept longer time than males.

Likewise, in female sheep, the live weight of 6 and 12 month there was no significant difference, the difference occurred only in 18 month. This is because as the animal ages, the structure develops giving it more weight. While in the case of weight of non-degradable materials, this difference may be due to location where the animals live and economic situation of the keepers. This study is in agreement with the findings of Roman *et al*. (2010) who reported that more foreign bodies are found in older animals than the young ones may be due to gradual ingestion of indigestible materials over the prolonged period of time.

The result of the correlation analysis showed that there is relationship between live weight and age, weight of empty rumen and age, weight of rumen contents and age and; weight of rumen content and live weight. However, non-bio degradable materials have a strong relationship with sex as it is shown in the study that female sheep ingest more non-bio degradable materials than male.

CONCLUSION

The phenomenon of rumen obstruction due to the presence of non-bio degradable materials was prevalent in the study area. This was discovered to be due to the shortage of feeds and feeding stuff and the resultant scavenging to meet up with nutrient requirement. The findings of this study could help environmental activists, veterinarians, policy makers and livestock owners to recognise the impact of non-bio degradable materials on sheep health and productivity in the area of study.

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