



## Prevalence of Foreign in Rumen and Reticulum of Cattle Slaughtered at Bedele Municipal Abattoir

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### ABSTRACT

*A Cross sectional study was conducted on 384 slaughtered cattle at Bedele municipal abattoir to determine the prevalence of foreign bodies in their rumen and reticulum and to identify the common risk factors associated with their occurrence. Rumen and reticulum were thoroughly examined by visual inspection and palpation and all the*

*contents were inspected. The types of foreign bodies were identified after washing. From a total of 384 animals examined, 52 (13.5) were found positive for the presence of foreign bodies in rumen and no foreign body was found in reticulum. The types of foreign bodies detected were piece of cloth, plastics, rope and shoelace. Piece of cloth were the most common with a prevalence of 10.2%. Prevalence of foreign bodies were significantly associated with age and body condition of the animals ( $p < 0.05$ ). Foreign bodies were more frequent in older cattle (>8years) than in younger (4-8years). The prevalence of ruminal foreign bodies were highest in poor body conditioned animals compared to cattle with better body condition. The prevalence of foreign body ingestion found in cattle by this study show that littering the environment with piece of cloth and other indigestible materials could pose health problem for free grazing cattle.*

**Keywords:** Rumen, Foreign body, Prevalence, Bedele, Cattle, Ethiopia.

### 1. INTRODUCTION

Ethiopia is a leading country in the number of animal population in the African continent. It has livestock population more than 40 million cattle, 48.9 million sheep and Goats, 8.6 million equine over 2.3 million camels and 59 million poultry. Ethiopian livestock sector has the largest resource base in Africa accounting for 17% cattle, 22% sheep, 13% goats, 49% of equine and 9% of came; population of the continent (CSA, 2003).

In varied agroclimatic zones of Ethiopia, ruminant livestock are important source of income for rural and urban communities and are one of the nation's major sources for foreign currency from export. However, the output in terms of contributions to the improvement of the livelihood of animal owners and for the growth of national economy is at a lower stage compared to the vast resource on hand. One of the major causes of economic losses and low productivity of livestock in Ethiopia is high prevalence of animal diseases with its impact that includes the loss of farm productivity through reduced drought power output, reduced productivity of the animals, difficult access to international markets, zoonosis risk and impairment of human welfare (FAO, 1996).

Ruminants are notorious for ingestion of foreign bodies. Ingestion of non-dietary materials is mainly related to nutritional deficiencies and feeding management of the animals and causes various problems in different organs of animals. Gingivitis, glossitis, lamprosis, stomatitis, pharyngitis, tonsillitis, chokes, esophagitis, rumenitis, impaction of the rumen, traumatic peritonitis and traumatic reticulo-pericarditis are the possible health problems which can be caused by the ingestion of foreign bodies by the ruminant (Sastry, 1983). Among these disease of rumen and

reticulum are of great economic importance because of severe losses of productivity of the animals. Ingestion of foreign bodies in cattle was reported to be a condition of great economic importance and causes severe loss of production and high mortality rates (Radostitis *et al.*, 2007).

Batarseh (1991) reported that in Jordan, the most foreign bodies found in grazing ruminants were plastic objects such as bag and pipes. Similarly, reports from different parts of the world have shown that the incidence of ingestion of foreign bodies by domestic ruminants is considerably high causing poor body conditions and losses in productivity (Radostitis *et al.*, 2007). Reports from cattle and sheep reared within urban and sub-urban environment indicated that impaction of the rumen resulted from the accumulation of foreign bodies like plastic bags which cause interference of the flow of ingest a leading to the distension of the rumen and absence of defecation (Abdullah *et al.*, 1984). The presence of these foreign materials in rumen and reticulum also hampers the absorption of volatile fatty acid and consequently reduces the rate of animals fattening (Igbokwe *et al.*, 2003).

The ruminant that ingest foreign body show clinical signs of discomfort, loss of body weight, anemia, dyspnea, distended abdomen, distended jugular vein, complete anorexia, scanty feces, low milk yield to complete loss of milk yield, forced walking, and recumbence in last stages (Geoffre, 1992; Osei-somauh *et al.*, 2004; Boodur *et al.*, 2010).

Ingested foreign bodies can be diagnosed by deep palpation of the abdominal wall just caudal to the xiphoid process of the sternum to detect pain. It is also diagnosed by radiological examination, laparoscopy, and using metal detectors (Blood and Radostitis, 1989).

Despite a widespread environmental contamination especially with plastic bag, frequent occurrence of nutritional deficiencies in cattle and the absence of strong policy to protect the environment, little has been done to know about the occurrence of foreign bodies in cattle in Ethiopia. Therefore, the objective of the present study was:

- i) To estimate the prevalence and occurrence of foreign bodies in the rumen and reticulum of cattle slaughtered at Bedelle Municipal Abattoir
- ii) To identify common foreign bodies in the rumen and reticulum of cattle in the study area and
- iii) To identify the risk factors associated with its occurrence

## 2. MATERIALS AND METHODS

### 2.1. Study Area

Bedelle woreda is located in western part of Oromia regional state, in Illubabor zone, and it is about 483kilometer from Addis Ababa in south western direction on the main road leading to Gembella. Geographically Bedelle town falls between 8° 26' 80" N latitude and 36° 20' 97" E longitude and has an elevation ranging from 00 to 2010meter above sea level. The annual mean temperature ranges from 12.5°C to 27.5°C and the area receives an annual rain fall greater than 1400mm (BWAB, 2006).

### 2.2. Study Animals

The study was conducted on cattle slaughtered in Bedelle Municipal Abattoir. Cattle slaughtered in the abattoir came from the town itself and localities around the town namely Abdella, Chewaka, Chora, Gachi, and Q/Sire. All cattle slaughtered were local breed, male and adult.

### 2.3. Study Design and Data Collection

The study was a cross sectional study conducted from November 2011 to April 2012 at Bedelle Municipal abattoir. Origin of the animals was recorded when animals were submitted to the abattoir by asking the owners/attendants.

### 2.4. Sample Size and Sampling Technique

The study animal were selected using simple random sampling method from cattle slaughtered on the day of sampling after assigning unique number to each and every cattle slaughtered that day. The sample size was determined using the formula given by Thrushfield (1995). To calculate the sample size 50% expected prevalence, 95% confidence level and 5% desired absolute precision ( $d=0.05$ ) was used.

$$n = (1.96)^2 P_{exp} / d^2$$

Where  $n$ =required sample size, 1.96=the value of  $z$  at 95% confidence level

$P_{exp}$  = expected prevalence

d= desired absolute precision level at 95% confidence level  
According to the above formula, sample sizes of 384 animals were sampled.

## 2.5. Study methodology

- i) **Ante-mortem examination:** Ante-mortem examination was conducted on individual animals. Age, sex, and body condition of each animal presented for slaughtered were recorded. Age of the animals was determined based on teeth eruptions and body conditions were determined based on spine process.
- ii) **Post-mortem examination:** During post mortem, rumen and reticulum were thoroughly examined by visual inspection and palpation. After slaughter, the rumen and reticulum were removed from the abdominal cavity and all the contents were inspected. After washing, the types of foreign bodies were identified.

## 2.6. Data management and analysis

The data collected were recorded on special formats prepared for this purpose and raw data were entered into Microsoft excel spread sheet. The data was analyzed using stata release 11 statistical software (Stata Corporation, college station. TX). The potential risk factors considered in the study were origin, body condition and age of the animal. Association between variables was analyzed using Pearson's Chi-squared or Fisher's exact tests. During the study different risk factors like age and body condition were recorded.

## 3. RESULTS

### 3.1 Prevalence of foreign bodies in rumen and reticulum of cattle

From a total of 384 cattle examined 52 (13.5%) had foreign bodies in their rumen. No foreign body, however, was found in reticulum. Among 163 animals originated from towns and 221 animals from rural areas, 23(14.1%) and 29 (13.1%) were found to contain foreign bodies in their rumen respectively. There was no significant association between origin and rumen foreign body prevalence ( $p>0.05$ ) as shown in the table 3.1.

Table 3.1 Prevalence of foreign bodies in rumen of cattle originated from towns and rural areas

| Factors | Level | No. of observations | No. of positive | Prevalence (95% CI) | p-value |
|---------|-------|---------------------|-----------------|---------------------|---------|
| Origin  | Town  | 163                 | 23              | 14.1%(11.4 - 19.5)  | 0.780   |
|         | Rural | 221                 | 29              | 13.1%(8.6 – 18.4)   |         |
| Overall |       | 384                 | 52              | 13.5%               |         |

The types of foreign bodies found were piece of cloth, plastics, rope and shoelace. Piece of cloth were the most common foreign bodies encountered which accounted for 10.2% of overall prevalence and it refers to Table 3.2.

Table 3.2 Types and frequency of foreign bodies in rumen of cattle slaughtered at Beadle Municipal abattoir (n=384).

| Foreign body | No. of animals with the foreign body | Prevalence (%) |
|--------------|--------------------------------------|----------------|
| Cloth        | 39                                   | 10.2           |
| Plastic      | 9                                    | 2.3            |
| Rope         | 3                                    | 0.8            |
| Shoelace     | 1                                    | 0.3            |

### 3.2 Prevalence of foreign bodies in relation to age groups

From 384 animals, 339 animals were 4-8years old and 45 animals were >8years old. Among these animals higher foreign body prevalence (28.9%) was observed in older animals (>8years) and lower prevalence (11.5%) was encountered in younger animals (4-8years). The Chi-square test showed that there was significant ( $p<0.05$ ) difference in the prevalence of foreign bodies among the ages groups. Older animals (>8years) had higher prevalence (28.9%) of foreign bodies compared to younger animals (4 – 8years) (11.5%).

Table 3.3 Prevalence of foreign bodies in relation to age groups

| Factors | Level       | No. of observations | No. of positive | Prevalence (95% CI)     | p-value |
|---------|-------------|---------------------|-----------------|-------------------------|---------|
| Age     | 4-8years    | 339                 | 39              | 11.5% (8.1-14.9)        | 0.001   |
|         | >8years     | 45<br>13<br>28.9%   | 45              | 13<br>28.9% (15.1-42.3) |         |
|         | (15.1-42.3) |                     |                 |                         |         |
| Overall |             | 384                 | 52              | 13.5%                   |         |

### 3.3 Prevalence of foreign bodies in rumen in relation to body condition

The overall foreign body prevalence in thin, medium and good body conditioned animals was 38.6%, 8.9% and 5.1% respectively. The chi-square test showed that there is significant ( $p < 0.05$ ) difference between presence of foreign bodies and body conditions of animals. Cattle with poor body condition had the highest prevalence of rumen foreign bodies compared to cattle with medium and good body conditions as discussed in table 3.4.

Table 3.4 Prevalence of rumen bodies in rumen of cattle by body condition

| Factors        | Level  | No. of observations | No. of positive | Prevalence (95% CI) | p-value |
|----------------|--------|---------------------|-----------------|---------------------|---------|
| Body condition | poor   | 70                  | 27              | 38.6% (27.5-50.3)   | 0.000   |
|                | medium | 135                 | 21              | 8.9% (5.3-12.5)     |         |
|                | good   | 79                  | 4               | 5.1% (1.6-8.6)      |         |
| Overall        |        | 384                 | 52              | 13.5%               |         |

## 4. DISCUSSIONS

The current study revealed an overall foreign body prevalence of 13.5% in cattle slaughtered at Bedele municipal abattoir. A study conducted in Nigeria reported a comparable level of 19.3% prevalence (Igbokwe *et al.*, 2003). However, the result obtained from this study is substantially low compared to previous studies by Gonenci and Yildirim (2008) who in Turkey reported prevalence of 73.4% in cattle slaughtered at Iskenderun slaughter house. This is most likely due to differences in the level of urbanization and hence the level of contamination of the environment, or due to differences in cattle management practices. In the present study small settlement were considered as towns. It has been reported prevalence of ruminal foreign bodies may be associated with shortage of feed especially vitamins and minerals (Rossow and Harvoth, 1985; Hailat *et al.*, 1996). Feed shortage usually occurs at specific time in Ethiopia: moreover, most owners don't provide supplementary feed to ruminant animals. The feed shortage interim, may predispose the animal to negative energy balance and force them to feed on unusual materials including cloth, plastic, rope and even metallic substances (Hailat *et al.*, 1996).

The present study revealed that there was no significant association between origin and ruminal foreign body prevalence. Contrary to our findings a study in Nigeria revealed an overall ruminal foreign bodies prevalence of 97% in animals brought from urban areas for slaughter. In Nigeria, prevalence of foreign body was observed to be higher in animals originating from urban setting than from rural areas (Remi-Adewunmi *et al.*, 2004).

In this study, older animals and animals having poor body condition were found to be more frequently affected with indigestible foreign body. This is in agreement with the findings of Hailat *et al.* (1997, 1998). Animals aged greater than 8years were found more frequently to have foreign bodies in their rumen than animals with 4-8years of age. This could be due to the gradual accumulation of these foreign bodies in the rumen. The more frequent occurrence of ruminal foreign bodies in emaciated and thin animals may be attributed to the interference of the foreign body with the flow of ingesta and with interference in the absorption of volatile fatty acids causing reduced weight gain. Emaciation, abdominal distension, lack of feces in rectum, foamy salivation, recumbence, and in appetite was reported in sheep with indigestible foreign bodies (Igbokwe *et al.*, 2003).

The result of this study indicated that the piece of clothes were the most common foreign bodies in the rumen as they were found 75% of the cases. Egbe and Chaundhry (1995) also have reported a more or less consistent result.

Polythene cloth and rope were the most common causes of rumen impaction in cattle, sheep and goats in Nigeria. In another study conducted in Addis Ababa municipal abattoir. Hiwot (2008) reported that plastics were the most common foreign bodies found in rumen of all animals slaughtered at Addis Ababa municipal abattoir. This difference may be due to the difference in the origin of the animals. Urbanization increases the use of plastic material and thereby increases the ingestion of this material especially, by cattle roaming and grazing freely in towns. Whereas, in less urbanized or rural areas old cloth were left outside without proper disposal and the animal would have exposure to such type of foreign materials.

This study indicated that all numbers of foreign bodies were found in the rumen and no foreign bodies were found in the reticulum. Hiwot (2008) also have reported higher foreign body in rumen than in the reticulum. This may be due to the fact that heavy metallic foreign bodies were not detected in this study and may be due to larger size of the rumen as compared to that of the reticulum. Only heavy materials could sink down to the reticulum.

## 5. CONCLUSION

This study revealed that littering the environment with piece of cloth and other indigestible materials could pose health problems for free grazing cattle unless appropriate is taken.

Based on the findings of this study the following are recommended:

- i) Livestock owner should be aware of the risk of allowing ruminant animals to graze on polluted environment with indigestible foreign materials,
- ii) Strict legislation regarding proper disposal of indigestible materials from households and factories should be formulated by policy makers
- iii) Veterinarians and animal health workers should consider foreign body as differential diagnosis for gastrointestinal disorders.
- iv) Further study should be conducted to determine the occurrence of foreign bodies with its economic impact.

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