

## Abattoir Based Study of Foreign Body from Ruminants in Jimma Town

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**Abstract:** Abattoir based cross-sectional study was conducted from April, 2018 to June, 2018 at Jimma municipal Abattoir, South West Ethiopia, Oromia National Regional State, with the objectives to assess the prevalence of rumen and reticulum foreign bodies and with their associated risk factors. The study animals were selected by using simple random sampling method from the total slaughtered animals. From the total of 384 male animals examined, 57 (14.84%) were found positive for the occurrence of indigestible foreign bodies in rumen and reticulum. From 343 local breed examined 42 (12.24%) and 41 cross breed examined 15 (36.58%) were found Positive respectively. The types of foreign bodies detected were plastics 28 (49.12%), rope 16 (28.07%), cloth 15 (26.3%), nail 13 (22.8%), wire 4 (7%) and leather 2 (3.5%). The occurrence of foreign body different in different age groups. In young animals it was 4 (5.19%), adult 28 (13.27%) and old 25 (26.04%) While, the prevalence rate recorded within association of body condition were 22(39.28%), in poor 25 (11.68%) in medium and 10 (8.77%) in good body condition. Most of the foreign bodies were harbored from the rumen and from total prevalence 57 (14.84%), 38 (68.42%), 9(15.78%) and 9 (15.78%) in rumen and reticulum respectively. Therefore, appropriate solid waste disposal system need to be implemented in the study area to prevent health risk of ruminants and also to protect the environment.

**Key words:** Abattoir • Cattle • Jimma • Foreign Body

### INTRODUCTION

Cattle play significant contribution in Ethiopian economy as source of meat, milk, drought prowler, income and foreign exchange. However, as other livestock in the country their contribution is below their expected potential due to prevalent livestock diseases, poor management system and poor genetic performance [1]. Gastrointestinal foreign bodies are among the most common surgical emergency in veterinary medicine. Cattle are more susceptible to foreign body syndrome than small ruminants because they do not use their lips for prehension and are more likely to eat chopped feed; lack of oral discrimination in cattle may lead to ingestion of foreign bodies would be rejected by other species [2]. Traumatic reticulo-peritonitis, or TRP, is a relatively common disease in adult cattle caused by the ingestion and migration of a foreign body in the reticulum. The typical foreign body is a metallic object, such as a piece of wire or a nail, often greater than 2.5 cm in length. It has been hypothesized that dairy cattle are more

commonly affected than beef cattle since they are more likely to feed a chopped feed, such as silage or hay [3]. A large number of adult dairy cattle have metallic foreign bodies in their reticulum without signs of clinical disease. It is likely that a predisposing factor in otherwise normal cows, such as tenesmus or a gravid uterus, causes migration of the foreign body into the reticular wall [4]. Ingestion of foreign body in cattle is result a condition of great economic importance and causes severe loss of production and high mortality rate. The ingestion of foreign body is mainly related with nutritional deficiencies and feeding management and cause various problem in different organ of the animal, mainly in rumen and reticulum. The problem that are caused vary with the duration that the foreign body has been present, the location of the foreign body, the degree of obstruction that is caused as well as problems associated with the material of the foreign body [5]. Entrance and migration of foreign bodies through the body tissues lead to many complications that differ according to the nature of the foreign body and the way of its entrance in to the tissues.

TRP relatively common disease in cattle caused by the ingestion of foreign bodies in the reticulum swallowed metallic objects such as nail or pieces of wire fall directly on the reticulum or pass into the rumen and subsequently carried over the rumeno-reticular folds in to the cranioventral part of the reticulum [6] Nonmetallic foreign bodies in the reticulo-rumen cause recurrent rumen tympany in adult dairy cattle, over a period of time, these materials, form large tight balls inside the rumen leading to anorexia decreased production and progressive loss of body condition [7].

The presences of foreign bodies in the rumen and reticulum also hamper the absorption of volatile fatty acids (VFA) and consequently reduction in the rate of animal fattening. The perforation of the wall of the reticulum allows leakage of ingesta and bacteria which contaminates the peritoneal cavity, resulting in local or diffuse peritonitis is the swallowed objects can also penetrate pleural cavity causing pleuritis and pneumonitis and into the pericardial sac causing pericarditis [9]. The condition is serious in our country usually in urban and periurban areas where extensive building are carried out and proper plastic material disposal is no conditioned and so thrown on roads and near the fence or anywhere and that is way our dairy cattle are dying mainly associated with foreign bodies [10]. In Ethiopian formation, regarding the magnitude and occurrence of fore stomach foreign bodies is very limited. The fact that rumen impaction by these foreign bodies is mainly a symptomatic in nature and only diagnosed in live animals if the material is accumulated in large amount and thus, it can be adequately studied in abattoirs [11]. Therefore, the present study was attempted with objectives.

To assess the prevalence of rumen and reticulum foreign bodies in cattle slaughtered at Jimma Municipal Abattoir.

To identify the type of foreign bodies and study the risk factors associated with the ingestion of those foreign bodies.

## MATERIALS AND METHODS

**Study Area:** The study was conducted in Jimma town, Oromia regional State from April, 2018 to June, 2018 at Jimma abattoir. Jimma abattoir is found in Jimma town which is located at 352 km south west of Addis Ababa at latitude of 7013' and 8056' N and 35052' and 37037' E longitude & an elevation of 1915 m.a.s.l. The minimum and maximum annual temperature of the area ranges

from 7°C to 30°C while the mean annual rainfall is 1530 mm. The animal population of the area were found to be 4540311 (2016823 Cattles, 942908 Sheep, 288411 Goats, 74574- horses, 49489- donkeys and 28371- mules, 1139735 Poultry) [12].

**Study Animals:** The study was conducted on 384 male apparently healthy slaughtered cattle at Jimma municipal abattoir. The animals were both local and cross breed, which are originated from various localities. It was difficult to precisely indicate the geographical origin of all animals slaughtered at Jimma Municipal Abattoir and relate the findings to a particular locality. Nevertheless, attempts made in this regard revealed that majority of them were bought from nearby markets. Age, body condition and breed were considered a risk factor for occurrence of foreign bodies. During the study time the animals were categorized into three based on age  $\leq 5$  year (young), 5-10 year (adult) and  $\geq 10$  year (old) and also grouped based on body condition as poor, medium and good. Age and body condition was estimated based on dentition pattern (annex2) and body condition score (annex3), respectively.

**Study Design:** A cross sectional study was conducted from March, 2018 to June, 2018 to assess the prevalence of the rumen and reticulum foreign body's and to identify the types of foreign bodies and their associated risk factors.

**Sampling Technique and Sample Size Determination:** Simple random sampling technique was employed to select the study animals and rumen and reticulum of individual animals. The total number of cattle required for the study was calculated based on the following formula In this study 50% prevalence with 5% desired of precision were used to calculate the sample size using the following formula.

$$n = \frac{(1.96)^2 P \cdot \exp(1 - P \cdot \exp)}{d^2}$$

where:

n = required sample size

Pexp = expected prevalence

d = desired absolute precision

Therefore, sample size of the present study was 384.

## Study Methodology

**Ante Mortem Examination:** Ante mortem examination on individual animals was done for assessment of age, breed

and body condition. Age was categorized into young, adult and old based on dentition pattern and body condition also poor, medium and good with breed differentiation (cross and local). Each animal selected for the study was further identified by providing a unique identification number that could be used for both ante-mortem and post-mortem examinations of the animal and each animal's was marked for the identification by writing a code on its gluteal muscle by using ink.

**Postmortem Examination:** In the post-mortem examination rumen and reticulum was examined immediately after slaughter in the evisceration stage, the stomach was carefully removed from the abdominal cavity and rumen and reticulum were thoroughly examined by visual inspection and palpation with open and explore for the prevalence of any foreign non dietary material. All the contents were examined thoroughly for the presence of foreign bodies. Foreign bodies that were obtained during inspection washed with tap water to remove adhering feed material and identify type of foreign bodies. When the finding was positive, the location and type of the foreign bodies was recorded otherwise recorded as negative in post-mortem record sheet.

**Data Analysis:** The data obtained was coded in Microsoft excel and subjected to descriptive statistics and chi-square in order to assess the magnitude of the difference of comparable variables using SPSS version 20 software. Pearson chi square ( $\chi^2$ ) test was employed to

assess the existence of association between prevalence of the foreign bodies and different potential risk factors considered. For chi square test, P-value < 0.05 was considered significant.

## RESULTS

From the total of 384 cattle head examined for the presences of any foreign bodies in their rumen and reticulum, 14.84% (57/384) of them were found positive. From the total 57 positive cases of foreign body, 39(68.42%) were occurred in rumen while 9(15.78%) in reticulum and 9(15.78%) in rumen and reticulum. The types of foreign bodies were detected nails, wires, plastics, leathers, clothes and ropes. From these plastics 28 (49.12%), rope 16(28.07%), cloth 15(26.3%), nail 13(22.8%), wire 4(7%) and leather 2(3.5%) were more frequently encountered of the positive cases respectively. Based on the age, the study animals were grouped into three as ( $\leq 5$  years), (5-10 years) and ( $\geq 10$  years). Based on this age group from 77, 211 and 96 examined animals 4 (5.19%), 28 (13.27%) and 25(26.04%) were found positive, respectively. Foreign bodies were more frequently encountered in old animals than other two groups. The statically analysis also showed that there exist highly significant differences among the three age groups ( $P=0.005$ ) which is  $P < 0.05$ . The statically analysis also showed that there exist highly significant differences among the three body condition score groups and different breed groups which is  $P < 0.05$  in the occurrences of foreign.

Table 1: Prevalence of rumen and reticulum foreign bodies in male cattle slaughtered at Jimma municipal abattoir in association with different variables Please use this table format

	Variables				
	Examined no	Positive	Percentage	X2	P-value
Age					
≤5 year	77	4	5.19%	10.6	0.005
5-10 year	211	28	13.27%		
≥10 year	96	25	26.04%		
Total	384	57	14.84%		
BCS					
Poor	56	22	39.28%	31.4	0.00
Medium	211	25	11.68%		
Good	114	10	8.77%		
Total	384	57	14.84%		
Breed					
Local	343	42	12.24%	54	0.00
Cross	41	15	36.5%		
Total	384	57	14.84%		

Table 2: Frequency of the types of foreign bodies in association with age

Variable	Age			Total
	≤5 year	5-10 year	≥10 year	
Nail	1	4	1	6
Wire	–	2	–	2
Plastic	1	7	9	17
Leather	–	1	–	1
Cloth	–	3	5	8
Rope	1	6	–	7
Wire and Cloth	–	–	1	1
Plastic and Cloth	–	–	2	2
Nail and Leather	–	–	1	1
Plastic and Rope	–	1	1	2
Cloth and Rope	–	–	1	1
Wire and Rope	–	–	1	1
Plastic, cloth and rope	–	1	1	2
Nail and plastic	–	1	1	2
Nail, plastic and rope	1	–	1	2
Nail, plastic and cloth	–	1	–	1
Nail and rope	–	1	–	1
foreign body not found	73	183	71	327
Total				

Table 3: Frequency types of foreign bodies in association with body condition

Variable	Body condition score			Total
	Poor	Medium	Good	
Nail	2	4	–	6
Wire	–	1	1	2
Plastic	6	7	4	17
Leather	1	–	–	1
Cloth	3	3	2	8
Rope	1	4	2	7
Wire and Cloth	1	–	–	1
Plastic and Cloth	1	1	–	2
Nail and Leather	–	–	1	1
Plastic and Rope	1	1	–	2
Cloth and Rope	–	–	1	1
Wire and Rope	1	–	–	1
Plastic, cloth and rope	1	1	–	2
Nail and plastic	1	1	–	2
Nail, plastic and rope	1	1	–	2
Nail, plastic and cloth	1	–	–	1
Nail and rope	–	1	–	1
No foreign body	34	189	104	327
Total	56	214	114	384

Table 4: Frequency of types of foreign bodies in association with breed

Variable	Breed		Total
	Cross	Local	
Nail	3	3	6
Wire	1	1	2
Plastic	1	16	17
Leather	–	1	1
Cloth	1	7	8
Rope	4	3	7
Wire and Cloth	–	1	1
Plastic and Cloth	–	2	2
Nail and Leather	1	–	1
Plastic and Rope	1	1	2
Cloth and Rope	–	1	1
Wire and Rope	–	1	1
Plastic, cloth and rope	–	2	2
Nail and plastic	1	1	2
Nail, plastic and rope	1	1	2
Nail, plastic and cloth	–	1	1
Nail and rope	1	–	1
No foreign body	26	301	327
Total	41	343	384

Table 5: Frequency of occurrence of rumen and reticulum foreign body in association with the location

Variable	Location site			Total
	Rumen	Reticulum	Rumen and Reticulum	
Nail	–	6	–	6
Wire	–	2	–	2
Plastic	16	1	–	17
Leather	1	–	–	1
Cloth	8	–	–	8
Rope	7	–	–	7
Wire and Cloth	–	–	1	1
Plastic and Cloth	2	–	–	2
Nail and Leather	–	–	1	1
Plastic and Rope	2	–	–	2
Cloth and Rope	1	–	–	1
Wire and Rope	–	–	1	1
Plastic, cloth and rope	2	–	–	2
Nail and plastic	–	–	2	2
Nail, plastic and rope	–	–	2	2
Nail, plastic and cloth	–	–	1	1
Nail and rope	–	–	1	1
No foreign body	327	–	–	327
Total	327	39	9	384

From total 57 positive cases of foreign body, 39(68.42%) were occurred in rumen while 9(15.78%) in reticulum and 9(15.78%) in rumen and reticulum and rumen harbored mostly plastic materials while reticulum was the major site for the retention of metallic objects.

## **DISCUSSIONS**

Ingestion of indigestible foreign materials by ruminants is a common worldwide problem previously reported from Nigeria [13, 14], Jordan [15] and Sudan [16, 17]. This study revealed an overall prevalence of 14.84% (n= 57) of rumen and reticulum foreign body in male cattle slaughtered at Jimma Municipal abattoir. The percentage recorded in this report is lower than two reports whom reported 17.07% of prevalence of fore stomach foreign bodies in Hawasa municipal Abattoir, Ethiopia [18] and 92 (23.9%) from the total of 384 examined cattle [19]. In the other hand, higher prevalence of 77.41% was reported in adult dairy cattle cases having indigestible foreign bodies suffering from recurrent rumen tympany [20]. The variation in the prevalence of studies could be due to the differences in the waste management systems between the study areas. Moreover, the time of the study also could play a role for the differences where in recent times the rate of intensification of animal management is increasing and as a result the probability of animals to be exposed to foreign materials might be declined as the animals are staying in a limited confinement for longer time. The highest frequency of occurrence of rumen and reticulum foreign bodies was detected in animal's  $\geq 10$  year (26.04%) followed by 5-10 years (13.27%) and  $\leq 5$  years (5.19%). High prevalence (26.04%) of foreign bodies was detected in cattle greater than 10-years than other age group. This finding is in agreement with Desiye and Mersha [2] who recover 81.25% of foreign bodies in cattle greater than 10-year age and also significant prevalence rate of 59.14% was reported in old cattle [15]. Other studies reported 17.85% of the animals had higher frequency of foreign bodies in rumen and reticulum in the old age [18]. The highest frequent occurrence of rumen and reticulum foreign bodies were detected in this study animals of poor, medium and good body condition were 39.28%, 11.68% and 8.77%, respectively. The highest frequency of occurrence of rumen and reticulum foreign bodies was detected in poor body condition animals. These findings are in agreement with Desiye and Mersha [11] who found

72.72 % in poor body condition followed by medium 35.95% and good 7.33% body condition of animals. High frequency of foreign body occurrence in animals having poor body condition than in good body conditioned animals [18, 21]. Poor body condition by itself might be due to the contribution of the foreign body that is the animal loss weight after it has been exposed or it might be due to the interference of foreign body with the absorption of volatile fatty acid (VFA) and thus causes reduced weight gain [13, 18, 20]. Hairball sometimes occur in ruminant in fore stomachs and abomasum [22] and long period of time, these materials form large tight balls over inside the rumen leading to anorexia, decreased production and loss of body condition [23] as such foreign bodies hinders the process of fermentation and mixing of contents leadings to poor body condition. In this study the finding of foreign body was higher in the cross-breed cattle (36.58%) than local breeds (12.24%). This finding agree with recording 70% in cross breed and 10.77% in local breed [11] and the presence of 58.82% foreign bodies in the fore stomach in crossbreeds [18]. This study indicated that most foreign bodies occurred in the rumen 39 (68.42%) than reticulum 9(15.78%). This result agreed with reporting 64 positive cases of foreign bodies, 49 (79.68%) from rumen [11]. Similarly, 58.45% foreign bodies were found in rumen and 19.32 % in reticulum of Achai Cattle [13]. This difference may be due to the fact that many ingested feeds go to the rumen. This study also indicated that Metallic foreign bodies were most frequently recovered from reticulum, while nonmetallic foreign bodies were detected from rumen. The reason might be due to retention of these foreign bodies by the honey comb structure of the reticular mucosa and their heavy weight give chance to be attracted to the lumen of the reticulum due to gravitational attraction force of these heavy foreign bodies to the ventral part of the fore-stomach. The types of foreign bodies detected in this study were plastic, rope, leather, cloth, nail and wire. The result of this study indicated that plastics 28 were (49.12%). In the same context, the plastics 22 (34.37 %) were found in 64 positive cases [11]. This may be due to improper disposal of plastics and other ingestible foreign materials with in plastics. Several reports referred the rumen impaction to the presence of plastics in 13% of the cases in rumen [14, 15, 24, 34]. The relatively large size, plastic materials are preferentially retained in rumen and at certain time may cause impaction of the rumen leading to death of animals [25]. The presence of large amounts of these plastic

materials in the reticulo-rumen caused the impaction where these plastic bags interfered with flow of ingesta leading to the distention of rumen and consequently impaired the digestion process [20].

### CONCLUSION AND RECOMMENDATIONS

Ingestion of metallic and non-metallic foreign bodies is the most common problem encountered in cattle not only because of its mortality and morbidity but also it causes decrease in productivity. It is common in developing countries where the standard of animal management is unsatisfactory. Both poor body condition and cross breed cattle are the most affected groups compared to that of good body condition and local breed cattle respectively and also animals have  $\geq 10$  years were more affected. Hence, breed, age and body condition score of animals are considered risk factors for the occurrence of foreign bodies. The types of foreign bodies detected in this study were plastic, rope, leather, cloth, nail and wire, plastics were the most common observed foreign body followed by rope and cloth. Most of the nonmetallic foreign bodies lodged in rumen while metallic foreign bodies lodged in reticulum. The problem of foreign body in stomach is very common in country, Ethiopia and presents great economic impact. Thus based on the above conclusion the following recommendations are forwarded:

- Keeping cattle away from new construction site and keeping away from old and unclear grazing site.
- Awareness creation for animal owners should be done to avoid the risk of foreign body ingestion by their animals.
- Since previous studies about foreign bodies in these areas are very few, further research should be made to emphasize the important of the problem and address the prevention and control measure.

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