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# Goat carcass jaundice assessment report

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## 1. Introduction

The number of livestock in Ethiopia is approximately 53.99 million cattle, 25.5 million sheep, 24.1 million goats, 9.01 million equines, 0.92 million camels and 50.4 million poultry (CSA, 2013). The livestock sector contributes for about 19% of the GDP and 20% of the export (Behnke and Metaferia, 2011). About 85-90% of mixed crop-livestock farmers, and 21.6 million agro pastoralists and pastoralists, depend on livestock as a major economic activity for their livelihoods (NABC, 2010).

Small ruminants are important domestic animals in the tropical animal production system (Devendra and Meclorey, 1990). Within African society, small ruminant comprise a greater proportion of the total wealth of the poor families, because of the low input requirements such as small initial capital, fewer resources and maintenance cost. Furthermore, their production cycle make them need only short periods to reconstitute flocks after disaster and respond quickly to the demand (Getenby, 1991). Small ruminants are found mainly in the lowland Agro-ecology which constitutes 65% of the area, where 25% Sheep and close to 100% goat's population exist (PACE Ethiopia, 2003) and they cover over 30% of all domestic meat production of the country (FAO, 2010).

Abattoir data is an excellent option for detecting diseases of both economic and public health importance (Arbabi and Hooshyr, 2006; Abbuna *et al.*, 2010) especially in ascertaining the extent to which human is exposed to certain zoonotic diseases and estimating the financial implications of carcass condemnations (Jobre *et al.*, 1996). Surveillance at the abattoir allows for all animals passing in to human food chain to be examined for unusual signs, lesions or specific disease (Alton *et al.*, 2010).

The purpose of meat inspection is to protect public health and to provide risk free products to the society. Also, it provides information that can be utilized for animal diseases control (Gracey *et al.*, 1999). Meat inspection, comprising of ante mortem and postmortem examination, to remove gross abnormalities from meat and its products, prevention of distribution of contaminated meat that could result to disease risk in man and animals and assisting in detecting and eradication of certain diseases of livestock (Van Longtestijin, 1993).

Each year a significant economic loss results from mortality, poor weight gain, condemnation of edible organs and carcasses at slaughter. This production loss in the livestock industry is estimated at more than 900 million USD annually (Jacob, 1979; Abebe, 1995; Jobre *et al.*, 1996). The major causes of organs condemnation during postmortem inspection are disease caused by parasites, bacterial and other pathological abnormalities. Out of the total of 14,062 cattle, 4,443 sheep and 6,789 goats slaughtered at main Juba slaughter house, livers demonstrated to be the most condemned organs with the condemnation rate of 3.49% in cattle, 3.87% in sheep and 3.12% in goats due to Fasciolosis, Hydatidosis, T.B, *Cysticercus bovis*, Jaundice, fatty liver and liver cirrhosis. This is supported by similar reports from Ethiopia (Shegaw *et al.*, 2009 Nurit *et al.*, 2012).

Jaundice has been quoted in different research outputs as if it could be the cause of organ and carcass condemnation. In addition, Lots of professionals engaged in meat inspection and certification as well as those abattoirs owners and managers have stated that the prevalence of jaundice have not been done in detail and remains still a problem in major export abattoirs.

In Ethiopia there were complaints about excessive occurrence of goat carcass jaundice in export abattoirs especially on goats coming from Babile area. These complaints were discussed in stakeholder meetings and decided to investigate the real cause of the problem and come up with the possible solution. Therefore, Ministry of Livestock and Fisheries, and Ministry of Industry have established a joint team, to prepare a research proposal for the assessment. The team has prepared the proposal which was approved by both ministries. The team was updated by new members and undertakes the assessment in February 2017.

The assessment was conducted in export abattoirs, and market production areas using questionnaire survey, discussions, goat inspection, and blood and fecal sample examination. The limitation of the assessment was inaccessibility of the producers and unavailability of drug residue testing laboratory.

Therefore, the objectives of the assessment were;

- To identify the origin/area of the problem
- To know the causes of the problem, and
- To find out mitigation measures.

## 2. Methodology

### 2.1. Materials and methods

General methodology for the study involves physical observation/inspection, laboratory testing, and data collection through questionnaire, interview and secondary data.

#### 2.1.1. Meat jaundice *magnitude evaluation in export abattoirs*

##### Sample types and sampling method

The sampling methods were purposive sampling and samples have been taken from those goats suspected of having carcass jaundices. Samples were being collected from live and slaughtered goats, which were selected during antemortem examination. Types of samples were thin blood smear from ear vein, fecal sample and tissue sample from liver, kidney and lymph nodes. The sample size was determined based on the probability of detecting a diseased animal in potential risk population using the formula below. A total of 165 goats were selected from 4 export abattoirs through ante mortem and post mortem inspection for consecutive five days.

$$n = \frac{(1 - (1 - \alpha)^{\frac{1}{d}}) / (N - 1/2(SeD - 1))}{Se}$$

FORMULA FROM CANNON

(2001)

Sense and sensitivity –designing surveys based on an imperfect test. Prev. Vet. Med. 49: 141-163

$n$  = sample size;  $\alpha$  = confidence level;  $D$  = number of diseased;  $N$  = population size;  $Se$  = test sensitivity

### **Inspection, Sample taking and Recording**

Export abattoirs which experience yellow coloration of goat carcass have been screened and included for further investigation. Goats to be slaughtered were grouped as per the locality down to the origin as much as possible and record has been taken. During ante mortem inspection examination of eye sclera and conjunctiva mucus membrane has been given due attention. The carcasses have been thoroughly inspected for the presence of jaundice and different samples were collected for further laboratory analysis. Those carcass seemed to have yellow coloration during postmortem inspection were rechecked after 24 hrs whether the coloration remain permanent or disappear during chilling.

### **Laboratory Examination**

Laboratory samples were examined for haemoparasites from thin blood smear stained with giemsa. Fecal samples were tested for the presence of gastrointestinal parasites and histopathological examinations were made for tissue samples taken from liver, muscle, lung, and spleen.

### **Retrospective Data Collection**

All available records relevant with yellow coloration of goat carcass recorded in the selected export abattoirs have been explored. The source of goats for the export abattoirs for the previous years has been recorded. Structured questionnaire has been administered to 8 respondents including meat inspectors and abattoir workers which are relevant to meat handling, quality control, and storage and transportation activities.

#### **2.1.2. Investigation of potential risks for jaundices in the source (origin) area**

##### **Study area identification**

The experience so far available from export abattoirs and experts working in meat inspection showed that the potential risk of carcass yellow coloration are related with those goats coming from Babilie areas located in East Hararge Oromiya Zone and adjacent areas of Somali Region.

### **Study population and sampling method**

Goat population found in the selected study areas were constitute the study population. All age groups and male were included in the sampling. The sampling method to detect the potential risk of jaundices has been based on indicative information for the likelihood of the event occurrence. It was assumed that the study population will be drawn from Babile market area, which is supplied mainly by districts of Somali region and to some extent Oromia region-East Harargae zone. Thus, the sample size for the study has been determined based on Cannon (2001). Assuming that the expected prevalence of the jaundices syndrome in the source area will be 2%, and the sensitivity of detecting the clinical disease occurrence in the population was assumed 90%, then the sample size from market center were 165 goats.

### **Clinical Examination and Sample taking in live Goats in the study area**

Study animals were selected randomly from market/suppliers. Selected individual goat has been examined for the sign of jaundices in the eye sclera and in the external mucous membranes. Blood and fecal samples were collected. The samples were processed for the potential cause of the syndrome in NAHDIC (National Animal Health Diagnostic & Investigation Center).

### **Triangulation of the data sources with respective veterinary clinics/regional vet labs**

Expert opinion from personnel working in the veterinary clinics and regional Veterinary Laboratories has been assessed through formal and informal interviews. Recorded clinical data from case books and log books was explored to get relevant information related with the event. In addition, structured questionnaire were administered to the livestock suppliers in the study area which covers the livestock husbandry, feed and water source management, knowledge of jaundices syndrome, treatment practices, drug source, drug type, drug usage, major disease problems, history of toxic plants/chemicals, tick burden and tick-borne diseases, tick infestation

seasonality etc--. The number of respondents includes, 8 small ruminant traders/suppliers and 10 expert opinions. Therefore, the total respondents were 18.

### **3. Results**

#### **3.1 Questionnaire**

From the discussion with export abattoirs' meat inspectors, abattoir management personnel, animal suppliers, local veterinary clinics' personnel, Regional Laboratory personnel and the questionnaire survey conducted the following points were identified: The excessive carcass jaundice problem was seen on goats coming from Babile area (Ethiopian Somali, East Harargae); the occurrence is seasonal and it is in the dry season of the localities and the cause of the problem as of their observation is the drug given to improve the goat body condition and resistance, which was weakened by the draught and long journey. This bad practice of injecting animals by the traders and producers spreading to other bordering areas like Bale and Borena and the problem is starting to be seen in these localities too.

In addition to that, the local veterinary clinic and laboratory personnel identified parasitic diseases, Drug residue and Poisonous plants to be the causes of the goat carcass jaundice problem.

#### **3.2 Laboratory Results**

##### **3.2.1. Histopathology Reading**

The histopathology reading/examination shows that all the tissues( muscle, liver , spleen and lung) taken from Modjo modern export slaughter house and Jigjiga export slaughter house had extensive yellowish discoloration/ pigmentation and necrosis were also observed on the superficial muscles, liver and spleen.

##### **3.2.2. Result of Blood Smear Examination**

From a total of 302 blood samples examined 23.5% (71/302) were found positive for hemoparasites. Out of that: 19.53% (59/302) were positive for *Theileria* species, 1.32% (4/302) were positive for *Babesia* species and 2.64% (8/302) were positive for *Anaplasma marginale*.

### 3.2.3 Result of Fecal sample Examination

From a total of 302 fecal samples examined 78.4% were found positive for GIT parasite. Out of that: 42.38% (128/302) were positive for strongyle , 1.32% (4/302) for Moneezia, 1.32% (4/302) for Trichuris, 0.33% (1/302) for Toxocara, 20.20% (61/302) for Eimeria oocyst, 12.25% (37/302) for both strongyle and Eimeria, 0.66% (2/302) for both Moneezia and Eimeria infections.

## 4. Conclusion

From the questionnaire survey conducted to export abattoirs', animal suppliers, local veterinary clinics' personel, Regional Laboratory personnel and laboratory results the following conclusions are made. The excessive carcass jaundice problem was seen mainly on goats coming from Babile market feeder areas (Ethiopian Somali, East Harargae) and this days the problem extends to some extent to Bale and Borena ; the occurrence is seasonal (dry season); the causes of the problem are considered to be drug both modern and local given to the animal, Blood parasites (*Theileria* species, *Babesia* species *Anaplasma marginale*.) In addition to that the post mortem findings and histopathology reading were suggestive for excessive intake of carotenoide pigments caused by plants which results in yellowish discoloration of muscles and visceral organs. Besides, the relative high prevalence of gastrointestinal parasites found in these animals may also contribute for jaundice conditions by causing anemia and reducing disease resistant of the animal.

## 5. Recommendations

The team proposes the following activities to solve the study problem/goat carcass jaundice:

1. Animal health extension service should be strengthened and avoid animal treatment malpractice (treatment should be done only by veterinary personnel; during treatment of animals to be slaughtered proper withdrawal time should be kept).
2. Vector control and use of effective antiprotozoal drugs should be done regularly against haemoparasites.
3. Appropriate deworming activities should be designed and implemented against gastrointestinal parasites.

4. Further in depth and broaden area coverage investigation is important to solve both qualitative and quantitative animal supply problem.
5. In order to implement the above activities and solve the goat carcass jaundice problem, there should be a close collaboration between MoLF and Somali and Oromia regions and Federal concerned parties.

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