# Prevalence of haemonchus contortus biology essay

Some house holds in cities depend on livestock keeping as a source of livelihood. Most urban farmers have resorted to keeping animals which require less space for example small ruminants since land in urban areas is a scarce resource. Uganda has a total of 5. 2 million goats according to a report by the Uganda bureau of statistics.

In mukono district, 2. 9% of the agricultural households rear sheep and the total number of sheep reared is 4, 530. Out of 100 households, 44. 22 of them rear 1 sheep, 47. 99 rear 2-4 sheep, 5. 78 rear 5-9 sheep, 1. 55 rear 10-19 sheep, 0. 42 rear 20-49 sheep and 0. 04 rear 50-99 sheep.(UBOS report).

19. 5% of the agricultural households rear goats and the total number of goats reared are 59, 598. out of every 100 households, 30. 58 rear 1 goat, 57. 85 rear 2-4 goats, 9. 83 rear 5-9 goats, 1. 38 rear10-19 goats, 0. 28 rear 20-49 goats and 0. 08 rear 50-99 goats .(UBOS report).

Goats and sheep have numerous helminthes parasites, many of which are shared by both species. The most important include nematodes (roundworms), cestodes (tapeworms), and trematodes (flukes).

# 1. 1 PROBLEM STATEMENT

**In Mukono abattoir the prevalence of Haemonchus contortus (barber pole worm) in the goats and sheep slaughtered is not known yet these parasites affect the quality of meat. These parasites cause diseases and lead to emaciation of the animals thus affecting the quality of the meat.**

The parasites also cause economic loss to the farmers since an animal in poor health condition will fetch a small amount of money.

# 1. 2 JUSTIFICATION

Because Haemonchus contortus (barber pole worms) cause diseases in goats and sheep, in order to effectively control these diseases it is of utmost importance to have a record on the prevalence of the parasite.

Surveys in abattoirs are an excellent means of knowing the causes of prevalent ruminant diseases in an area. (Adoun., 2012)

# 1. 3 OBJECTIVES

## 1. 3. 1 OVERALL OBJECTIVE

To establish the prevalence Haemonchus contortus (barber pole worms) in goats and sheep slaughtered in the abattoir and how it can be controlled.

## 1. 3. 2 SPECIFIC OBJECTIVES

To know the prevalence of barber pole worms in goats

To know the prevalence of barber pole worms in sheep

## 1. 4 HYPOTHESIS

The prevalence of Haemonchus contortus (barber pole worms) in goats and sheep in mukono abattoir is not high.

# CHAPTER TWO

## 2. 0 LITERATURE REVIEW

### 2. 1 Haemonchus contortus (barber pole worms) in goats and sheep

Gastrointestinal nematodes, commonly known as worms, present the greatest danger to the goat and industry . Haemonchus contortus, commonly referred to as the barber pole worm, is a clinical problem for goats sheep. (Maria Lenira Leite., 2006) It gets its name due to the barber pole appearance consisting of the white ovaries that twist around the red blood filled gut.( Jim Miller ., 2000)

Haemonchus contortus is cylindrically shaped, tapered at both ends, and has a complete digestive system.

This voracious bloodsucking parasite causes anaemia and bottle jaw and has a tremendous capacity to reproduce through egg-laying. (Lynn Pezzanite et al.,)

The larvae and the adults cause small haemorrhages at sites of the abomasal mucosa where they feed. The ingesta may be reddish brown and fluid. Worms may either be attached to the mucosa or free in the lumen. (Love and Hutchinson., 2003)

Anemia, low packed cell volume (PCV), diarrhea, dehydration, peripheral, and internal fluid accumulation are common signs of barber pole worm infestation. Infested goats and sheep have lower growth rates, reduced reproductive performance, and are susceptible to diseases that eventually lead to death. Haemonchus contortus may consequently account for a great reduction of profits in small ruminant operation. (Maria Lenira Leite., 2006)

## 2. 2 Distribution

the occurrence and prevalence of barber pole worms is determined by the climatic conditions of the area. The development of eggs and larvae is limited to areas and seasons where pastures are moist during the warm months of the year. However, the larvae can survive on pasture for some time, particularly during cool conditions, and can affect sheep outside the favorable periods for development. (Dr Brown Besier., 2011)

## 2. 3 Factors that contribute to barber pole worm infestation in goats

Environment with high temperatures, humidity, and rainfall

Genetic make-up of goats makes them highly susceptible

Resistance to anthelmintics as a result of excessive usage

## 2. 4 Life cycle

The worms occur in the abomasum or fourth stomach of sheep and goats. They are up to 3 cm long. The life cycle is typical of roundworms of sheep. Adult worms lay about 5000 eggs which pass out in the faeces of the host. Barbers pole worms are the highest egg producers of all sheep worms. The

eggs hatch within a few days, and microscopic larvae emerge. They migrate on to the pasture, where they may be ingested with the herbage grazed by sheep. In the sheep’s gut, larvae develop to adult worms in about three weeks. (Dr Brown Besier., 2011)

If the worm enters the survival stage of arrested development, it could survive for months. Arrested development involves the larvae remaining in the abomasums of the animal without maturing until months afterwards. This allows the worm to survive the winter months when the egg and larvae do not thrive well on the ground. The survivability of the free-living stage of H. contortus is short; in fact, most infective larvae vanish from the pasture within 4-6 weeks in a wet tropical environment (Waller, 2004).

## 2. 5 Signs of the barber pole worm infestation in goats and sheep

Diarrhea

Dehydration

Unthrift appearance, rough hair coat, depression, low energy, and lethargy.

Significantly reduced growth and reproductive performance

Fluid accumulation in sub-mandibular tissues (bottle jaw), abdomen, thoracic cavity, and gut wall

Blood loss, white mucous membranes, and anemia. (Maria Lenira Leite., 2006)

## 2. 6 Effects of barber pole infestation in goats and sheep

Haemonchus suck blood from the lining of the stomach, causing anaemia.

Animals with heavy infections of Haemonchus lack stamina, have pale gums and conjunctiva, and may also have bottle-jaw or constipation. Sheep and goats with lighter burdens have a gradual onset of weight loss and loss of colour in the gums and conjunctiva

If present in large numbers, Haemochus can kill goats and sheep. In these animals large, red masses of worms are clearly visible in the stomach. The stomach contents are often brown because of bleeding from the stomach lining and the lining has pin-point blood spots on it. The blood of the goats and sheep is watery due to anaemia.

In animals with lighter infections worms are present in the stomach, but the lining of the stomach looks normal.

## 2. 7 Risk factors for Haemonchosis in goats and sheep

The likelihood of haemonchosis outbreaks is extremely difficult to predict, and varies from one year to the next. (Dr Brown Besier., 2011) The risk factors include;

## 2. 7. 1 History of occurrence

The best guide to the likelihood of an outbreak is the previous history of haemonchosis on the individual farm or in the district, and how this varies with seasonal conditions.

## 2. 7. 2 Weather and season

Barbers pole worm larvae need warm conditions and moisture on the ground to develop. The risk of haemonchosis outbreaks is increased in tropical weathers.

## 2. 7. 3 Pastures

Barbers pole worm can survive where pasture remains green over summer. Typical situations include perennial pastures and areas of moisture along creeks and around troughs and seepage points. Irrigated pastures pose an especially high risk.

## 2. 7. 4 Type of animal

Sheep and goats with a low or impaired immunity to worms have a greater risk of haemonchosis. This includes lambs and kids for two to three months after lambing. (Dr Brown Besier., 2011)

## 2. 8 Management practices that can be used to control barber pole populations in goats and sheep

Avoid grazing goats and sheep on less than 3 inches of pasture canopy. Larvae are unable to climb higher than this on the grass and thus will not be ingested.

Increase use of browse in grazing systems. Parasite larvae cannot climb up onto browse so goats don’t ingest them.

Rotate species on pastures. For example graze cattle or horses behind goats and sheep. Because parasites are species specific, when a cow or horse ingests a goat parasite it simply dies without causing damage.

Do not feed on the ground. Elevated feeders help to eliminate fecal contamination and thus parasite transmission.

Make sure that water and mineral sources are not contaminated with feces.

Allow pastures to “ rest” for at least one year before allowing animals back on them. Larvae will have a hard time surviving that long without a host and therefore the pasture will be relatively worm-free.

Utilize annual forages in your pasture systems and till the ground between crops. The act of plowing tends to kill or disrupt the larvae and eggs, reducing transmission. Additionally, annual forages tend to do best when grazed at higher levels (4 to 6 inches of canopy). (Jackie Nix., 2006)

## Control programmes for Haemonchus contortus in goats and sheep

Prevention, rather than cure, is the philosophy used in developing control programs against gastrointestinal nematodes. It must be assumed that worms cannot be eradicated but may be limited to the extent that they will not cause serious economic loss to the producer. A combination of treatment and management are necessary to achieve control. Several approaches to the use of anthelmintics are considered. (Thomas M. Craig., 1999)

## Strategic

The strategic approach is the use of an anthelmintic at a time when most of the total worm population is within the host and not on the pasture. This approach can be used when the animals are moved from a contaminated pasture to a nearly parasite free pasture.

## Tactical

When weather conditions have been favorable for the transmission of, eliminating worms from the gastrointestinal tract before they have the opportunity to reproduce and further contaminate the environment is a tactical approach. The timing of tactical deworming may be based on recent rain or it may be based on increasing fecal egg counts.

## Individual

Treatment of wormy individuals may prove to be a worthwhile endeavor especially where resistance to anthelmintics is widespread. Individuals in a flock will have a higher egg excretion count than the average. This over-distribution of the parasite population can be lessened by the selective treatment of wormy individuals or by the removal of these individuals from the flock.

## Salvage

Salvage (treatment to save lives, not control parasites) is why anthelmintics are frequently used in small ruminants. This is treatment in the face of disease; the animals are frequently anemic, have bottle jaw or diarrhea due to the effects of worms. Whatever the case, animals may be in desperate straits and even if they have the genetic ability to resist worms, they will be overwhelmed. Although anthelmintics may remove thousands of worms from each of the treated animals, the pastures from which they came have billions of larvae awaiting ingestion. Under these circumstances, treatments at 2 to 3 week intervals may have to be practiced until weather conditions are no longer favorable for transmission.

## Pasture Rotation

Pasture rotation may decrease parasite numbers in deferred grazing systems where a pasture is rested for at least 6 months during the cool or 3 months during the warm part of the year. (Thomas M. Craig., 1999)

## Small ruminant production in Uganda

There are about 400 million goats in the world, with Africa accounting for 67%. In East Africa, Kenya has a goat population of 6. 4 million, Tanzania 4. 3 million and Uganda 3. 9 million. One method of increasing the number of goats and sheep is to select for twinning traits within a population. The twinning rate of East African goats is 30% and triplets occur at the frequency of 2%. Goats have a unique feeding characteristic of browsing which accounts for 60% while the grazing preference is only 40%.

Goats and sheep make an important contribution to the subsistence subsector of the economy of Uganda and, indeed, of many countries in Africa. Over one million goats and sheep are slaughtered and consumed annually for meat. The skins contribute substantially to foreign exchange earnings as well as permitting import substitution for use in the local tannery and leather craft industry of Uganda. Locally the skins are used extensively in traditional techno culture.

They are used notably in the making of mats, covering handles of tools (knives, dancing costumes, ropes, drums and shields) and covering ornamental articles. Footwear, strings and specific musical instruments are also made from skins.

Exotic goats of the Toggenburg and Anglo-Nubian breeds were imported to Uganda for cross-breeding with local goats with a view to enhancing milk yield and meat production in the offspring. In the early 1960s exotic wool sheep were introduced into Uganda and were bred on Government farms with the objective of assessing their ability to survive, reproduce and produce wool and meat in Uganda’s climatic, technical and management environment.

Exotic sheep, goats and their crosses with indigenous stock are more susceptible to helminth infection than the local breeds. Therefore every care should be taken to institute an effective regime of preventive measures comprising adequate rotational systems of grazing coupled with strategic prophylactic cover and all reinforced by regular chemotherapeutic preventive treatments. (Nsubuga)

## Breeds of goats

In Uganda there are three distinct breeds of goat reared for meat production.

The commonest type is the smallest of the three and can be described as the Small East African (SEA). Its mature live weight is 20-25 kg. It occurs extensively in northern and eastern short savannah ecological areas and the drier areas of Buganda in the northern parts of Luwero and Mukono districts (Buruli, Bulemezi and Bugerere).

The second type is described as the Mubende goat. This is a large animal of 30-35 kg live weight. It is renowned for its popular skin on the international market. The skin is called “ Kampala skin” in trade circles. This breed is concentrated in the Mubende District.

The third type falls in between the first two in live weight, 25-30 kg. Its typical ecological niche is in Kabale, Kisoro and Rukungiri in Kigezi District. It is referred to as the Kigezi goat. (Nsubuga)

# CHAPTER THREE

# 3. 0 MATERIALS AND METHODS

## 3. 1 Study area

Mukono abattoir is located in Kyetume Mukono district.

## 3. 2 Study Population and Sampling Technique:

The study populations will be sheep and goats of different ages and body conditions brought from different parts of the country to the abattoir for the purpose of meat production. Simple random sampling method will be used to select the study units. (Sintayehu and Mekonnen., 2012

## 3. 3 Study Type and Sample Size Determination:

A cross sectional study will be used to determine the prevalence of Haemonchus contortus infestation in sheep and goats slaughtered at Mukono abattoir in 2012. To calculate the total sample size, the following parameters will be used: 95% level of confidence (CL), 5% desired level of precision and with the assumption of 50% expected prevalence of barber pole worms, the sample size will be determined using the formula given in Thrusfield.

n = 1. 96 Pexp (1-Pexp)

d2

n = required sample size

Pexp = expected prevalence,

d = desired absolute precision

Therefore, based on the above formula the total number of sheep and goats will be calculated. (Sintayehu and Mekonnen., 2012)

## 3. 4 Study Methodology

### 3. 4. 1 Study animals

The study will be carried out on 400 sheep and adult goats of four breeds from various regions of mukono district. (Gorski et al., 2004)

### 3. 4. 2 Post Mortem Examination:

The abomasum of slaughtered animals which will be selected to be sampled will be inspected for the presence of barber pole worms. (Sintayehu and Mekonnen., 2012)

## 3. 5 Data Analysis:

Percentages to measure prevalence and Chi-Square (x2) test will be employed to measure association between the parasitism and species of the animals, age, origin and body condition. The worms will be estimated as mean number of worms with respective standard deviation of mean and range (Maximum- Minimum worm) in each species. The data will be analyzed using statistical packages MINTAB software Version 16 and SPSS for windows. In all analyses, Confidence level will be held at 95 % and P <0. 05 for significance.