

**DETERMINING PREVALENCE OF SUBCLINICAL
MASTITIS AND ANTIBIOTIC SENSITIVITY OF
THE ISOLATES IN DAIRY GOATS IN MOUNT
KENYA REGION**

**INVESTIGATOR: DR. CHRISTINE
MBINDYO(BVM)**

SUPERVISORS:

DR. C. G. GITAO BVM, MSc, PhD

PROF. L.C.BEBORA BVM, MSc, PhD

PROF. P. KITALA BVM, MSc, PhD

Supported by Kapap CGS/CN2010/LC/RC NO.04

INTRODUCTION

- Dairy goat farming is emerging as a high-return option for Kenyans small-scale farmers (Ndegwa *et al.*, 2000).
- They provide a quick source of milk for consumption or sale and are thus of immense value especially to poor households (Kinuthia, 1997).
- Kenya's goat population is estimated at 28 million and about 80,000 are dairy goats. 80 % of which are reared in the Mt. Kenya region (MoLD, 2009).

INTRODUCTION cont.....

- The demand for dairy goat production is increasing due to growing population of people and also increasing awareness of medicinal and nutritional status associated with goat milk (Haenlein,2004).
- Challenges facing this industry include (Ndegwa *et al.*, 2000):
 1. Diseases(subclinical mastitis, pneumonia, diarrhea)
 2. Inbreeding
 3. Inadequate feeding
 4. Lack of market and poor management practices



INTRODUCTION contd.....

- Dairy goat milk is routinely consumed in rural and urban areas of Kenya. The quality and quantity of milk can be affected by mastitis and only a few studies have been done on the prevalence, and no studies done on the antibiotic sensitivity and disease situation in the country as compared to the disease in the cow (Ndegwa *et al.*, 2001).
- Therefore this study is geared towards establishing the mastitis prevalence, antibiotic sensitivity and fill in the gap in information with a goal of improving dairy goat production (Gebrewahid *et al.*, 2012).

2.0 LITERATURE REVIEW

“Mastitis is the inflammation of the mammary gland and is characterized by physical, chemical and bacteriological changes in the milk and pathological changes in the glandular tissue of the udder. (Blood and Radostits, 1989)

“Classification: clinical and sub-clinical (Persson *et al.*, 2011) and subclinical mastitis is the most common form in dairy goats.



Etiology of mastitis

“Bacteria are the most common organism isolated in clinical and subclinical though yeasts and viruses have also been isolated (Shearer *et al.*, 1995, Ndegwa., 2000).

“CNS is the most prevalent pathogen in subclinical (Contreras *et al.*, 2007) while *S. aureus* mostly isolated in clinical mastitis (Bergonier *et al.*, 2003).

“Other causative organisms include: streptococci , coliform, *Corynebacterium*, *Pseudomonas*, *Nocardia*, *Mycoplasma*, yeast and Caprine arthritis encephalitis virus (Tomita *et al.*, 2001).



Pathogenesis of mastitis

“According to Khan *et al* 2006, Pathogenesis involves three phases:

“ Invasion phase

“ Infection phase

“ Inflammation phase

“Risk factors such as unhygienic milking, poor management practice, poor feeding, number of lactation days and geographical locality and lack of therapeutics and control measures influence the type and frequency of causative agent (Ali *et al.*, 2010).



Effects of mastitis

1. Mastitis results in heavy economic losses from:

Reduced milk production

Treatment cost

Increased labor

Premature culling (Miller *et al.*, 1993)

2. Zoonotic importance (brucellosis, leptospirosis)

Diagnosis of mastitis

“Clinical mastitis: Palpation of the udder and visualization of the milk (shearer et al., 2003)

“Subclinical mastitis: indirect methods: CMT, SCC, Bacteriological analyses and electrical conductivity test (Hall *et al.*, 2006).

Treatment of mastitis

“Therapeutic approach which involves use of : Systemic antibiotics and intramammary antibiotics (Shearer *et al.*, 2003).

“Supportive approach (Epi taufik, 2007).



Prevention and control

Control of mastitis can be achieved by:

1. Decreasing the exposure of the teat to pathogens (Tomita *et al* 2001).
2. Increasing resistance of dairy animals to infection (Sharif *et al.*, 2009).

“Treatment is often unrewarding therefore more emphasis should be on control and prevention of mastitis (Shearer *et al.*, 1995).

“Proper control and prevention should be instilled in order to protect the public from diseases and reduce economic losses (Tomita *et al.*, 2001).



OBJECTIVES

Overall objective

To determine prevalence of subclinical mastitis and antibiotic sensitivity of the isolates in dairy goats in Mt. Kenya region

Specific objectives

1. To collect baseline data on constraints in dairy goat production in Mt. Kenya region
2. To determine the prevalence of subclinical mastitis in lactating goats in Mt. Kenya region
3. To characterize the isolated bacteria and perform antibiotic sensitivity testing on the isolate



JUSTIFICATION

- Dairy goat production is an emerging area, potential for poverty alleviation, improved nutrition, increased income for the poor and can play a role in contribution towards countries development plan
- Main constraint facing this industry is the unawareness on the quality of milk which can be affected by subclinical mastitis whose scope and prevalence have been determined to a very limited extend (Ndegwa.,1999)
- Antibiotics are commonly used in the dairy goats but no study done on their effects and sensitivities
- This study will address the current problems with the goal of improving dairy goat production in Kenya
- HYPOTHESIS There is no subclinical mastitis in dairy goats

MATERIALS AND METHODS

Study area

“The study will be conducted in selected areas in Mt. Kenya region in Nyeri, Meru and Embu counties

“In Nyeri county (Mukurweni and Nyeri municipality) in Meru, Miriga mieru east , Abo East divisions and in Embu in manyatta division.

“ The sites were purposively selected based on the large population of dairy goats in this areas

“The local DLPOs & extension officers will be engaged in the mobilization and location of all the dairy goat farmers in the study divisions.



Study animals

“Lactating dairy goats of different ages, parities and stages of lactation

“Breeds: Toggenbergs, German Alpines and crosses

Sample size

This will be done according to Martin *et al* (1987).

Sample size $n=Z^2\alpha pq/L^2$

where **n**=the required sample size, **Z α =1.96**=the normal deviate at 5% level of significance. **p**=the estimated prevalence (in percentages), **q=1-p** and **L**= the precision of estimate which is considered to be 5%=**0.05**

Previous work done shows that the prevalence of mastitis is 28.7%(Ndegwa *et al.*,1999)

$$1.96^2 \times 0.287 \times 0.713 / 0.05^2 = 314$$

Thus the total number of goats to be sampled will be 314

Study design

“The survey will be a cross sectional study

“Sampling units will be households with at least two lactating dairy goats

“An estimated 157($314/2$) farms will be randomly selected from a list of dairy goats farmers in the DVOs office who are registered members of Dairy Goat Association of Kenya (DGAK) and Meru Goat Breeder Association (M.G.B.A)

“The number of dairy goats to be sampled in each division will be proportional to the population of goats in the division

“The process will continue until the required sample size is reached



Data collection

“A semi-structured questionnaire will be administered to the 157 farmers to collect information on constraint, risk factors in dairy goats production and mastitis in the area. In addition key informant will also be interviewed (M.G.B.A and D.G.A.K)



Milk sample collection

“About 10ml of milk will be collected aseptically from each half of the goat.

“All samples will be transported to the laboratory in cool boxes with ice for bacteriological culture and isolation

“CMT will be performed on the goat side according to procedure described by Quinn *et al.* (2002

LABORATORY PROCEDURES

Isolation and identification of bacteria

“Bacteriological examination -standard methods (Shears *et al.*, 1993).

” Gram stain -Forbes *et al* 2007 , Bebora *et al* (2007) after which further biochemical tests and identification will be carried out.

Direct somatic count

“Will be performed according to the procedure described by (Coles, 1968; Manual for Veterinary Investigation Laboratories, 1986)



Antibiotics susceptibility test

Performed according to the procedure by National Committee of Clinical Laboratory Standards 2006.

Total bacteria counts

The total viable counts of isolated bacteria will be done according to Miles and Misra (1938).



Statistical data analysis

“Data collected will be entered into Ms-Excel and exported to Instat Plus for statistical analysis.

“Descriptive statistics will be used to analyse the variables and chi-square(x) test will be used to assess if there is a significant difference between the variables and the positive results.

“ ANOVA will be used to evaluate statistical significance in bacteria population among counties and within the evaluated potential risk factors.

BUDGET

| ITEM DESCRIPTION | COST |
|---------------------------------------|----------------|
| Stationery | 15,000 |
| Transport | 100,000 |
| Laboratory Chemicals And Equipment | 150,000 |
| Data Analysis | 5,000 |
| Miscellaneous | 50,000 |
| Contingencies (5%) | 10,000 |
| TOTAL | 330,000 |

THANK YOU

